

574

92d Congress }
2d Session }

JOINT COMMITTEE PRINT

PEOPLE'S REPUBLIC OF CHINA:
AN ECONOMIC ASSESSMENT

A COMPENDIUM OF PAPERS

SUBMITTED TO THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES



MAY 18, 1972

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LETTERS OF TRANSMITTAL

MAY 17, 1972.

To the Members of the Joint Economic Committee:

Transmitted herewith for use by the Joint Economic Committee, the Congress, and the interested public is a factual and analytical study of the economy of Communist China entitled *People's Republic of China: An Economic Assessment*. This is a compilation of invited papers designed to meet the interests of the committee and the Congress in an up-to-date body of actual data and interpretative comment on the state of the domestic economy of China, including the record of its recent experience in economic development, and its relations with the outside world.

Early in the Great Proletarian Cultural Revolution the Joint Economic Committee released a pioneering, two volume assessment, entitled *An Economic Profile of Mainland China*. As the People's Republic of China begins to relate more with the world community through its membership in the United Nations it seems appropriate to supplement the earlier study by a presentation of information and analysis that has become available to the various Departments of the Federal Government in the past 5 years.

At the present time, China, the largest nation in the world, remains both an enigma and a potential threat to world stability. Certainly, the Chinese economy is a subject of primary concern, and we have an obvious and compelling need of knowledge on the subject. This extensive compilation was organized by the staff in the hope that it will help to serve this need. It covers all of the major aspects of the Chinese economy and should provide a valuable source book for further committee studies of the subject. It is our intention to follow this study with hearings at which nongovernmental experts may testify thereby helping the Congress to obtain a clear view of what is taking place in China.

Our earlier volumes provided a factual basis for better understanding of the economy of Communist China. We hope this volume will not only update this earlier effort but provide a current reassessment. The sources of information on China are even more limited now than during the earlier study.

It is hoped, that this volume drawing on research in the Federal Government will serve as an aid and a stimulus to private scholars working on this subject. The committee is deeply indebted to the scholars from the Government who gave so generously of their time and expertise to the committee. They are listed in the executive director's memorandum to me, and I would like to take this opportunity on behalf of the committee of expressing our gratitude for their invaluable efforts without which this study would not have been possible.

Finally, we wish to take this opportunity to express our gratitude

to the Congressional Research Service for making available the services of John P. Hardt, who helped to plan the scope of the research and coordinated the contributions for the present study.

It is understood that the views contained in this study are not necessarily those of the Joint Economic Committee nor of individual members.

WILLIAM PROXMIRE,
Chairman, Joint Economic Committee.

MAY 16, 1972.

HON. WILLIAM PROXMIRE,
Chairman, Joint Economic Committee,
U.S. Congress, Washington, D.C.

DEAR MR. CHAIRMAN: Transmitted herewith is a volume of materials on the economy of Communist China entitled *People's Republic of China: An Economic Assessment*. The study has been prepared in the form of a symposium containing a series of selected papers contributed by invited specialists who are recognized authorities on China. The specialists in question have been drawn from the ranks of the several departments of the Federal Government and the Library of Congress. The papers they have submitted, in response to our request, cover the broad range of topics dealing with the recent performance of Chinese economy. Included among these topics are economic policy, the defense burden, agriculture, transportation, industry, population, education, research, science, international trade, and foreign aid.

The Joint Economic Committee undertook an earlier study, the two volume *Economic Profile of Mainland China* to provide a basic body of information on the economy of Communist China. This study is intended to supplement the earlier study by a presentation of information and analysis that has become available to the various Government agencies during the last 5 years.

It is hoped, furthermore, that the facts and ideas presented in this survey of available information will help to shed light on the alternatives facing the United States in ordering our relations with the People's Republic of China within the foreseeable future. The shape of these relations is certain to be significant both for the internal development of China and critical to the issue of war and peace in the world.

The contributors to the study have been most considerate of our needs and generous in giving of their time and expertise to provide not only basic information but indispensable analytical perspective on this important subject. The individual scholars who have participated in the preparation of the present study are:

John S. Aird
Arthur G. Ashbrook, Jr.
R. E. Batsavage
Alva Lewis Erisman
Robert Michael Field
Edwin F. Jones

Leo A. Orleans
Philip D. Reichers
Leo Tansky
A. H. Usack
Philip W. Vetterling
James J. Waggy

In addition, the committee received the wholehearted cooperation from the following agencies of the Government:

Department of Commerce
Department of State
Library of Congress

Central Intelligence
Agency

It should be clearly understood that the views expressed in these papers are those of the individual contributors and do not necessarily represent the positions of the respective executive departments, the Joint Economic Committee, individual members thereof, or the committee staff.

The Library of Congress made available the services of John P. Hardt, senior specialist in the Congressional Research Service, who helped to plan the scope of the research and to coordinate the contributions for the present study.

JOHN R. STARK,
Executive Director, Joint Economic Committee.

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SUMMARY

By JOHN P. HARDT

Five years ago, as the Great Proletarian Cultural Revolution was building up to a peak, the Joint Economic Committee released a pioneering, two-volume assessment, entitled *An Economic Profile of Mainland China*.¹ Today, as the People's Republic of China begins to participate in the United Nations and as relations between China and the United States begin to thaw, it is appropriate to reassess and update the conclusions reached in the earlier study. The present volume, in which 12 U.S. Government specialists analyze China's economic performance, is the result.

Although the authors are faced with formidable data problems—discussed in each of the studies—they are able to support their conclusion that China's economy has shown great resiliency and that recent policies and programs are moving the country into a strong economic position. At the same time, the authors demonstrate that China has many remaining economic problems, the most conspicuous of which are the pressure of population on agricultural resources and the difficulty in keeping up in the worldwide technological race.

The volume starts with two articles on the general economic setting—an overall survey of China's economic performance in the past two decades (Ashbrook), an analysis of economic motivation in China (Jones). The next group of papers are on specific sectors of the economy—industrial development (Field), the electronics industry (Reichers), agriculture (Erisman), and transportation (Vetterling and Wagy). Next, problems of human resources are covered in papers on science and education (Orleans) and on population policy (Aird). Finally, China's external economic relations are addressed in papers on foreign trade (Usack and Batsavage) and foreign aid (Tansky).

The authors have provided their own summaries, and the readers will want to make up his own mind when there are clashes in individual viewpoints. Some of the major questions suggested by the analysis of these papers are as follows:

1. *How badly was economic development in the PRC set back by the Great Leap Forward (1958-60) and the Great Proletarian Cultural Revolution (1966-69)?*

In general, the assessment of the present volume is less pessimistic than the assessment of the 1967 JEC study, partly because of the advantage of hindsight. It is now clear that fairly impressive industrial growth occurred in the midst of the Leap Forward confusion (Field, p. 64) and that the remedial measures in the post-Leap adjustment period were timely and effective (Ashbrook, pp. 4-5). Furthermore, the Cultural Revolution—which was just beginning to have adverse

¹ Joint Economic Committee. *An Economic Profile of Mainland China*, Government Printing Office, vol. 1 and 2, February 1967, p. 684; commentary on this study is contained in Joint Economic Committee, *Mainland China in the World Economy*, Government Printing Office, Hearings in April 1967, p. 248.

effects on the economy when the first JEC study was being published—proved to have no palpable effect on agriculture and only short-lived effects on industry (Ashbrook, pp. 25–20).

The closing of universities for some 4 years will have some lasting effects on the training of high-level professional manpower, “but the present halting adjustments will, eventually, result in an acceptable compromise between ideology and experience” (Orleans, p. 205).

As for the scientists, professors and the intellectuals in general, who had to absorb the brunt of the Cultural Revolution :

. . . the seemingly unrestrained attacks against his Chinese colleagues are likely to be much more painful to the Western scientists . . . than to the object of the abuser who probably has become quite immune through exposure and who is pursuing his daily responsibilities, if not with enthusiasm, then at least with discerning acquiescence (Orleans, p. 197).

2. *How serious were the short and longer term impacts of the Sino-Soviet rupture in relations on Chinese economic development?*

Soviet aid was critically important to Chinese industrial development during the 1950's:

The major impetus to the drive for industrial development was furnished by large-scale imports of machinery and equipment, much of it in the form of complete industrial installations. The Soviet Union was the chief supplier of complete plants. During the decade agreements were signed with the U.S.S.R. for the construction of 291 major industrial installations in China. By the end of 1959, equipment valued at \$1.35 billion had been delivered and about 130 projects were completed. Agreements were also signed with Eastern European countries for the construction of at least 100 major projects and about two-thirds of these were completed by 1959. In addition to supplying equipment for these installations the Soviet Union provided China with valuable technical aid including: (a) blueprints and technical information, (b) some 10,000 Soviet technicians and advisors, and (c) training for 15,000 Chinese technicians and academic students in the U.S.S.R. (Usack and Batsavage, p. 344).

The impact of Soviet aid termination in mid-1960 on Chinese industrial output was soon in coming:

In 1961, industrial production fell sharply to a level slightly above that of 1957 but only two-thirds of the peak reached in 1959. After the withdrawal of the Soviet technicians in mid-1960, the Chinese found that they could not operate many of the heavy industrial plants built as Soviet aid projects, and they were forced to cut production drastically (Field, p. 64).

However, the shift to non-Communist sources of assistance in the 1960's took away part of the sting, as in the electronics industry :

The withdrawal of Soviet aid in 1960 forced China to turn to the non-Communist countries for assistance. These countries, principally Japan, West Germany, the United Kingdom, France, and Switzerland, are currently the source of

more than four-fifths of China's imports of electronic products and production equipment. In 1960-1970 more than \$200 million of technologically advanced electronic production equipment was imported from the non-Communist world. The imports consisted primarily of modern military and industrial electronics which China could have produced domestically only after a long development period. These imports as well as imports from the West of special electronics materials and technological know-how enabled China to forego the lengthy and expensive process of prototype development and to expand its electronics production base from 60 major electronics plants in 1960 to 200 in 1971. Years were saved in establishing the production of advanced electronic products for industrial and military programs (Reichers, pp. 87-88).

Ideally, continuation of Soviet aid to 1967, that is, through three 5-year plans would have served Chinese economic interests best. Yet, as Reichers suggests, the forced shift to Western industrial sources had tangible long-run benefits to the Chinese.

3. In view of its burgeoning population can the Chinese economy sustain its major priorities?

With the exception of the three disaster years of 1959-61, China has fed its huge and growing population currently estimated to be 865 million. Peking's approach to China's neo-Malthusian problem has been two-pronged—a new investment strategy for agriculture and sporadic birth control programs. The new investment strategy adopted in the wake of the Great Leap Forward involved an increase in chemical fertilizers, pumps for water control, improved transportation, and so forth, and a concentration of these additional resources on potentially high-yield rice land in the south of China:

The response of agricultural production to the new strategy—including the substantial increases in investments in agriculture and the concentration on high-yield acreage—resulted in (a) the restoration of the 1957 level of grain production by 1964, and (b) the growth of grain production at a somewhat faster rate than population in 1965-71.

. . . as a result of the changed strategy, a new trend line has been established in agriculture, distinctly higher and more steeply pitched than that prevailing under the low-investment policy of the first decade, yet lower than that which could be readily realized given even larger and better-balanced inputs. Output will exceed the trend value when weather is better than normal and fall below the trend value to the extent weather is unfavorable (Erisman, p. 142).

The three birth control campaigns have had no appreciable effect on demographic rates. Moreover—and this is the most striking point in the population paper—a successful attempt at fertility reduction probably would have little effect on the total size of the population over the next two decades. Aird's four population projections for 1990 range only between 1,319 million and 1,330 million:

These models imply that even a major and successful effort at fertility reduction in the PRC is not likely to make much difference either in the size of the total population or in the

size of the younger age groups, hence it cannot afford much relief from population pressure in general or from such specific problems as the need for education, employment, housing and other services for young people. To escape from such limited and rather discouraging prospects, the PRC would have to find a way to alter some of the factors that have thus far determined demographic experience in other developing countries.

The principal reason why these models show so little difference even for successful efforts at family limitation is that they assume a correlation between fertility—and mortality trends. It is, in fact, hard to conceive of circumstances favorable to a general acceptance of family limitation which do not also result in improvement in general health and a lowering of mortality. The dissemination of family planning in the PRC has often been associated and is currently being combined with a general drive for better medical care and sanitation throughout the countryside (Aird, p. 330).

In summary, the main line of thinking in these papers is that new investment will keep agriculture up with population but that agriculture will provide no extra margin for stepped-up economic growth.

4. *What burdens do military development and foreign aid—the power oriented programs—place on economic development?*

A reading of the papers suggests that the Chinese have been generally successful both in building up a heavy industrial base and in gradually modernizing their armed forces. Among the major factors contributing to this success are: (a) the control of consumption at relatively, austere, egalitarian levels; (b) the use of foreign trade to get high-technology machinery and materials, which could be produced at home at very high cost and after long delay; and (c) the partial insulation of the nuclear and other high-technology programs from political turmoil. The military programs command roughly one-tenth of China's GNP (Ashbrook, p. 45) and the foreign aid programs approximately \$400 million annually, or about one-third of 1 percent of China's GNP (Tansky, p. 371). During the next decade, when the cost of series manufacture and large-scale deployment of modern weapons will rise sharply upward, the leadership may face a much tighter squeeze on resources needed for growth. This squeeze would be compounded by the insistent pressure from the population to raise the level of consumption.

5. *How successful has Peking been in developing the various economic regions of China?*

The authors agree that Peking can point to substantial successes in building up regional transportation and industrial facilities:

When the Communists came to power, they inherited an undeveloped and badly damaged transportation network. Reconstruction of much of the old network was undertaken during 1950–52, and bold plans were formulated for the extension of the rail, highway, and inland waterway systems. Substantial progress was made during the 1960's and, after a pause during the early 1960's, expansion was again given high priority in the late 1960's. The rail network was extended into the southwestern and northwestern sections of the

country, and additional connecting links were built in the east and northeast. The highway network was expanded and improved especially in western areas such as Tibet where no railroads presently exist. The inland waterway network was restored, improved, and expanded. Inland and coastal ports were modernized and their capacities increased (Vetterling and Wagy, p. 147).

In summary, the Chinese have persisted in their plan for the regional development of the country through thick and thin. The original plan—which was first to repair the industrial centers damaged during World War II, then to build new industrial bases in North and Central China, and finally to develop the Southwest and the Northwest—has certainly been delayed, but the pattern of development has been retained. Pao-t'ou and Wu-han, for example, are now well-established industrial bases, and a large number of industrial construction projects are currently under development in Southwest China (Feld, p. 71).

PROSPECTS AND PROBLEMS

The papers in the volume almost certainly will prove of value to anyone interested in the relationship of the United States with the People's Republic of China. The authors have provided a surprising amount of detailed information on the People's Republic of China's economic history, its current economic situation, and its future economic prospects. Although it has not been the purpose of the authors to spell out the implications of their findings for U.S. policy, they have provided us with an informational and analytic basis relevant to that important task. Some future prospects and problems may thus be identified.

Past Western projections of Chinese performance have often seriously overstated or understated the actual future performance. In times of disruption and poor performance the recuperative capabilities of Chinese society have, apparently, often been underestimated. Now, in a period encouraging favorable forecasts it is well to be cautious. A number of problems may arise to disturb an extrapolation of currently favorable economic trends:

- Natural calamities may play their roles as they have throughout Chinese history; for example, floods, droughts, earthquakes, epidemics, and so forth.
- The food/population balance may be disrupted causing short or longer term economic retardation.
- The military burden on the economy may sharply rise in response to escalating weapons costs in their nuclear program, force expansion, and modernization to meet perceived needs on the Soviet border or in the Taiwan Straits, or other policy reasons.
- Leadership struggles either to develop a better Maoist state or choose a successor to Mao may disturb the current stability.
- Institutional changes, as China proceeds on its course of transformation from a traditional to a modern society, may continue to engender periods of instability and disruption. The Soviet experi-

ence has been a mixed blessing as a guide to Chinese institutional accommodation to change. From the rejection of the Soviet model the Chinese turned to a "search for a Maoist model". (Jones p. 58). An assumption that the search has ended and institutional stability will now facilitate Chinese economic development would seem premature at this point.

The People's Republic of China has become an economically strong, unified nation. Its capability simultaneously to meet requirements of feeding its population, modernizing its military forces, and expanding its civilian economic base must now be assumed from its record to date. Moreover, its expanding economy and military establishment provide a base for projecting increasing power in consonance with its enormous human resources. Chinese influence may also be felt both through direct use of economic and military aid and the indirect example of its model of development. Thus China may in the next decade or two join the United States, the Soviet Union, Japan, and the West European community in a pentagon of world powers.

Part I. ECONOMIC SETTING

(1)

CHINA: ECONOMIC POLICY AND ECONOMIC RESULTS, 1949-71

By ARTHUR G. ASHBROOK, Jr.

I. SUMMARY AND CONCLUSIONS

“China has stood up.” These words of Chairman Mao Tse-tung summarize China’s emergence as a strong nation-state after a century of humiliation at the hands of foreign powers. Since 1949, the Communist leadership has been directing China’s enormous human assets and rich natural resources toward the building of a modern industrial nation self-sufficient in technology and capable of supporting large armies equipped with nuclear weapons.

In pursuit of this overriding goal, the People’s Republic of China (PRC), under Chairman Mao, has vigorously pursued an economic policy of military-industrial expansion, agricultural collectivization, national self-sufficiency, and consumer egalitarianism. Priorities in the allocation of economic resources accordingly have called for—

- (a) rapid growth in military-industrial capacity and output;
- (b) provision of the minimum amount of consumption goods consistent with productive efficiency and popular morale; and
- (c) mastery of modern technology through large-scale absorption of foreign technology and a massive program for scientific-technical education.

The results of these policies and priorities, applied over two decades of Communist rule of China, have been mixed—striking economic successes, partial failures, and unfinished tasks. For the period as a whole, China’s economic growth has been strong but erratic. Two periods of social and political upheaval—the Great Leap Forward of the late 1950’s and the Cultural Revolution of the late 1960’s—have temporarily thrown economic policy into disarray and have interrupted the momentum of growth. Any economic survey of China must take account of the effects of these swings from settled political conditions to political turbulence and back again. Table 1 divides the 22-year span of Communist rule into six distinct economic periods and lists the economic policy prevailing in each period in key sectors of the economy. Tables 2 and 3, in parallel fashion, present the economic results.

(3)

TABLE 1.—CHINA: ECONOMIC POLICY, 1949-71

Period	Overall policy	Industrial policy	Agricultural policy	Foreign trade policy	Consumer welfare policy
1949-52, Rehabilitation.....	Imposition of order; restoration of prewar economic base.	Return of idle factories to operation.	Land reform and return of fields to cultivation.	Establishment of government control over trade	Reconstitution of orderly day-by-day economic life.
1953-57, First Five-Year Plan.....	Industrialization through Soviet-style five-year plan.	Expansion in basic fields—coal, steel, EP, simple machinery.	Collectivization and increase in output from own resources.	Exchange of basic products for Soviet machinery and technology.	Provision of minimum food, clothing, housing; material incentives.
1958-60, Great Leap Forward.....	Speedup of economic tempo by Maoist workstyle.	Doubling of pace of men and machines; backyard furnaces.	Formation of communes and frenzied drive for more output.	Support of industrial speedup.	Short-lived experimentation with "free supply."
1961-65, Readjustment and Recovery.	Quick reversal to orthodoxy to stave off disaster.	Support of agriculture; retrenchment of investment.	Return to smaller units and provision of inputs from industry.	Exchange of basic products for Western machinery, technology, and grain.	Recovery from food shortage and restoration of incentives.
1966-69, Great Proletarian Cultural Revolution.	Renewed attempt at Maoist workstyle.	Acceptance of short-term losses in output for political gains.	Verbal radicalism but moderation in practice.	Acceptance of short-term disruptions for political gains.	Playing down of material incentives and call for austerity.
1970-71, Resumption of Regular Planning.	Return to systematic planning; start of Fourth Five-Year Plan.	Orderly push toward higher capacity, output, technology.	Moderate policy; drive to make rural areas more self-sustaining.	Exchange of basic products for Western machinery, technology, and grain.	Quiet restoration of material incentives; austerity somewhat relaxed.

TABLE 2.—CHINA: ECONOMIC RESULTS, 1949-71

Period	Overall results	Industrial results	Agricultural results	Foreign trade results	Consumer welfare results
1949-52, Rehabilitation.....	Return to pre-Communist level of economic activity.	Reactivation of capacity as flow of raw materials resumes.	Return of fields to operation and distribution of land to peasants.	Imposition of strict government control and switch to Communist partners.	End of civil war, inflation, and gross starvation; hope rekindled.
1953-57, First Five-Year Plan.....	Successful build-up of industrial base under Soviet auspices.	Increased capacity and output of steel and other basic products.	Gains in output from own resources; collectivization in stages.	Growing volume, with basic products being exchanged for Soviet machinery	Stabilization of living standards at spartan but improved levels.
1958-60, Great Leap Forward.....	Disastrous overstraining of the economy's resources.	Ruinous increase in tempo and deterioration of quality.	Precipitous fall in output due to bad weather and ill-fated communes.	Sharp spurt, then downturn caused by domestic problems.	Near-starvation and collapse of morale when leap fails.
1961-65, Readjustment and Recovery.	Quick and successful recovery of economic balance.	Rationalization of output, with investment in priority branches.	Quick return to growth pattern with aid of new inputs.	Dramatic shift to Japan and Western Europe, with rising volume.	Restoration of living standards at spartan levels.
1966-69, Great Proletarian Cultural Revolution.	Short-lived break in economic momentum.	Sharp dip in industrial output with investment continuing.	Continued growth on basis of good weather and larger inputs.	Temporary dip because of domestic dislocations.	Maintenance of living standards in spite of political turmoil.
1970-71, Resumption of Regular Planning.	Resumption of economic growth across the board.	Gains in capacity and output in all directions.	Continued growth on basis of good weather and larger inputs.	Resumption of growth in line with domestic economic gains.	Gradual improvement in living standards.

TABLE 3.—CHINA: NUMERICAL ECONOMIC RESULTS, 1949-71

Period and year	GNP ¹ (in billions of dollars)	Population mid-year (millions)	GNP per capita (in dollars)	Industrial production (1957=100)	Agricultural production (1957=100)	Steel output (Millions of metric tons)	Grain output (Millions of metric tons)	Foreign trade	
								Volume (in billions of dollars)	Percent Communist
1949-52, Rehabilitation:									
1949	36	538	67	25	54	.16	108	.83	(?)
1950	43	547	79	31	64	.61	125	1.21	29
1951	50	558	90	42	71	.90	135	1.90	51
1952	59	570	104	51	83	1.35	154	1.89	70
1953-57, First Five-Year Plan:									
1953	63	583	108	64	83	1.77	157	2.30	68
1954	66	596	110	73	84	2.22	160	2.35	74
1955	72	611	117	74	94	2.85	175	3.04	74
1956	78	626	124	91	97	4.46	182	3.12	66
1957	82	642	128	100	100	5.35	185	3.06	64
1958-60, Great Leap Forward:									
1958	95	658	144	131	108	8.0	200	3.76	63
1959	92	674	137	166	86	10	165	4.29	69
1960	89	689	130	161-163	83	13	160	3.99	66
1961-65, Readjustment and Recovery:									
1961	72	701	103	107-110	78	8	160	3.02	56
1962	79	710	112	108-113	90	8	175-180	2.68	53
1963	82	721	114	119-125	90	9	175-180	2.77	45
1964	90	735	122	133-142	96	10	180-185	3.22	34
1965	97	751	129	148-161	101	11	190-195	3.88	30
1966-69, Great Proletarian Cultural Revolution:									
1966	105	766	137	165-181	106	13	195-200	4.24	26
1967	101	783	129	134-149	115	10	210-215	3.90	21
1968	100	800	125	144-163	106	12	195-200	3.76	22
1969	109	818	134	170-194	109	15	200-205	3.86	20
1970-71, Resumption of Regular Planning:									
1970	122	836	146	199-230	116	18	215-220	4.22	20
1971 ³	128	855	150	223-258	115	21	215-220	4.50	21

¹ For details on calculation of GNP, see app. A; China's GNP in this paper is presented in 1970 U.S. dollars. For a discussion of the general sources of information on which the figures in this table are based, see app. C.

² Negligible.

³ Estimates of production and foreign trade in 1971 are preliminary.

⁴ Preliminary.

NO ORDINARY LDC

The image of China as a desperately poor nation with most of its people living in misery and degradation is an image of the past. At the start of 1972, the People's Republic of China is by no means an ordinary less-developed country. No run-of-the-mill LDC could boast of the following achievements:

- The feeding and clothing of an estimated 865 million people.
- The detonation of 13 nuclear devices.
- The launching of two space satellites.
- The production of sizable numbers of jet aircraft, submarines, tanks, missiles, and other engines of war.
- The achievement of self-sufficiency in petroleum.
- The construction of huge industrial complexes in remote areas.
- The building of bridges across the Yangtze.
- The extension of the rail network through some of the world's most difficult terrain.
- The training and seasoning of a first-class industrial labor force.
- The conducting of extensive scientific research in various fields of knowledge.
- The maintenance of a sizable and growing economic aid program.

NOR A MODERN INDUSTRIAL NATION

While no ordinary LDC, China is not a modern industrial nation either. Eighty-five percent of its people live in rural areas and are engaged in most cases in backbreaking tasks in agriculture, construction, and transport. Even in urban areas only a fraction of the labor force works in modern factories, the great majority being hewers and drawers like their rural countrymen. Moreover, those fortunate enough to be in desk jobs are often sent into the fields and workshops for a month or two in line with Chairman Mao's determination to erase the distinction between manual and mental work.

Not only primitive working conditions but also spartan living conditions distinguish China from the modern industrial nations. In order to support a powerful military establishment and a massive investment program, Peking must treat the population as an input into the production process—to be fueled, maintained, and repaired, not catered to. Several factors have enabled the Communist leadership to successfully carry out this policy of spartan living conditions. No. 1, the Chinese people have taken tremendous pride in China's national resurgence and have been receptive to explanations of the necessity for self-sacrifice, even though the explanations seem to be wearing a little thin by now. No. 2, the policy of egalitarianism, especially the restrained living standards of the bigwigs, make low-living standards easier to accept. (Chairman Mao launched the Cultural Revolution in part because the bureaucrats were losing the spirit of egalitarianism.) No. 3, except for the near-starvation years of 1960-61, living standards have been stabilized under Communist rule, and the mass of people are palpably better off than in the pre-Communist era. No. 4, there have been gradual improvements in recent years in the quality and variety of food and clothing, the conditions of housing, the availability of consumer durables, and the level of social services. No. 5, the strong net of Communist controls makes grumbling dangerous.

THREE PARTIAL FAILURES

The drive for the collectivization of agriculture must be included among the partial failures of the regime. In the beginning there was the "land reform" of the early 1950's when the landlords were shot or dispossessed and the land distributed to individual peasants. This was quickly followed by a succession of campaigns for collectivization—leading to mutual-aid teams, next to small agricultural producer cooperatives, then to large cooperatives (akin to the Soviet collective farm), and finally to the notorious commune, the unwieldy super-collective of the Great Leap Forward era (1958-60). After the collapse of the Leap Forward, a three-tier system of agricultural control was established, consisting of a paler version of the commune with constituent "production brigades" and "production teams." The small production team was given responsibility for day-to-day agricultural decisions, and the regime was forced to permit a large amount of private farming, trade, and handicrafts. Agricultural policy today is a compromise between doctrinaire ideas about collectivization and practical measures necessary to stimulate output.

The policy of attaining economic self-sufficiency also must be reckoned a partial failure. In the 1950's the fledgling regime entered into agreements with the Soviet Union to supply 300 modern industrial plants which would have given the Chinese a tremendous shove toward self-sufficiency by the end of three five-year plans (1953-67). The orderly buildup of industrial capacity, however, was interrupted by the Leap Forward attempt at instant industrialization. The abrupt withdrawal of the Soviet technicians in mid-1960 when only half of the 300 plants were completed crushed any hopes for self-sufficiency over the near term. In the 1960's Peking turned to Japan and Western Europe for material and technical support, but political turmoil of the Cultural Revolution (1966-69) again postponed prospects for self-sufficiency by reducing the flow of outside support and shutting down the system of technical education for 4 years. In short, much of China's military-industrial success to date has rested on foreign assistance—on plants erected from Soviet blueprints, on production of Soviet-model weapons, and on machinery imported from the West or copied from Western prototypes.

The policy of economic self-sufficiency is an unqualified success in one important dimension. The Chinese have no long-term foreign debt in contrast to other developing countries such as India, Pakistan, Indonesia, and Egypt which are staggering under a heavy burden of external debt.

A third partial failure involves the system of economic motivation and incentives. In the 1950's the Communist government had built up a reservoir of good will among much of the populace—based on the pride and excitement of China's new independence and power. This reservoir was improvidently drained during the Leap Forward and the Cultural Revolution when political excesses interrupted the drive toward military-industrial power. Thereafter, people seemed to respond less rapidly to spiritual incentives. The persistent warnings of the propagandists against falling victim to the sugar-coated bullets of material incentives began to fall on deaf ears. The young people—two-thirds of the population have no personal memory of China's

humiliation—have had to be indoctrinated in order to understand the “past bitterness” of life under capitalism. They are not enthusiastic about settling down for a lifetime of hard work in the countryside even for Chairman Mao and the revolution. Finally, Peking ruefully admits that a majority of the scientists and educators do not really support the official ideology.¹

The major economic problems posed by the uncertain state of motivation are the extent to which spartan living conditions will have to be relaxed at the expense of military-industrial development and the extent to which material incentives and wider income differentials will have to be accepted by the Government. Dealing with these problems poses increasing difficulties to Peking. The economy is steadily growing more complex, witness the wider range and more advanced technology of military-industrial goods and the higher and more diverse skills required in the labor force. As people acquire more education and work at more technical jobs, they presumably will expect commensurate increases in living standards. And they will respond increasingly to technocratic, rather than ideological imperatives.

RATES OF GROWTH

In the 1950's the Chinese began the development of an elaborate economic statistical system, faithfully copying the Soviet statistical organization and procedures. This embryonic system was a victim of the excesses of the Leap Forward. Since that time Peking has enforced a statistical blackout so complete that only a handful of national economic figures have been released since 1960. Outside observers, however, have been able to piece together a good general appraisal of trends in the economy through use of foreign trade data, the accounts of travelers and refugees, and the cryptic discussions of economic issues in the Chinese press. Rough-hewn estimates of average annual rates of growth since 1952 thus may be derived, as follows:

Item:	<i>Long-term annual rate of growth</i>	<i>Percent</i>
Gross national product (GNP)-----		4
Population -----		2
GNP per capita-----		2
Agricultural production -----		2
Industrial production (1952 base)-----		8
Industrial production (1957 base)-----		6
Foreign trade -----		5

These numerical estimates show that economic results have paralleled economic policy in the PRC. Investment has been concentrated in the industrial sector, and industrial growth accordingly has outstripped agricultural growth. Agricultural growth, in turn, has been just sufficient to support the growing population at minimum standards. The growth of foreign trade was greatest in the 1950's when broad-scale Soviet support was forthcoming; in the 1960's, the total volume of trade never exceeded the level of 1959 (table 3), with selec-

¹ For an illustration of Peking's pessimistic appraisal of the attitude of scientists, see the discussion of the unsatisfactory ideological situation among scientific researchers at the Shanghai Silicate Research Institute of the Chinese Academy of Sciences, as presented in a Shanghai radio broadcast reported in *FBIS Daily Report: People's Republic of China*, February 8, 1972 (FBIS-CHI-72-77), p. C-3-5. "So far, it cannot be said that the majority of these intellectuals have completed this change [in their fundamental ideological outlook]," a theme repeated in other official commentary.

tive imports of key plants and equipment from non-Communist countries taking over the leading role.

Whereas the preceding tabulation showed the strength of China's economic growth, the following tabulation shows its erratic nature:

GNP Index 1957=100

Event:

Start of First Five-Year Plan (1952)	72
End of First Five-Year Plan (1957)	100
Top of Leap Forward (1958)	116
Fallback from Leap Forward (1961)	88
Post-Leap recovery (1966)	128
Cultural Revolution dip (1968)	122
Current level (1971)	157

COMPLEXITIES IN POLICY AND POLICYMAKING

The Communist leadership under Chairman Mao does not have a single clear-cut set of economic marching orders which are uniformly put into action at the lower party and economic administrative levels. In the first place, radical swings in economic policy occur at the top because of realignments of political power, changes in the underlying economic situation, and a cyclical pattern of advance and retreat in ideological matters. Moreover, there are inevitable delays in the implementation of new policies as well as varying interpretations and degrees of resistance at lower levels. Indeed, economic administration is marked by a bargaining process in which the needs of various interest groups must to a certain extent be negotiated and compromised. Furthermore, economic results often are not reported accurately to the center, especially when the reporting units are small and scattered. The central authorities may have only an imperfect notion of the economic situation in much of their vast territory. Peking's writ thus may have surprisingly little force in the outback of the economy, especially when there is conflict or uncertainty at the top. One important consequence of these institutional forces is that the amplitude of swings in economic policy is much greater than the amplitude of changes in actual economic events.

Contributing to the complexity in policymaking is the constant change in economic needs. The economy in two short decades has moved from the tasks of restoring operations in basic production facilities to the tasks of manufacturing and deploying complex weapons systems. Chairman Mao himself is aging and does not bring the same perspective to the economy and society as when he was a young guerrilla chieftain in beleaguered revolutionary areas. Mao can hardly welcome what he perceives as China's drift toward Galbraith's "new industrial state" with its hierarchy of technocrats. The Chinese Communist propagandists use the concept "red versus expert" to distinguish those persons with proper ideological credentials from those with mere technical expertise.

SCOREBOARD IN EARLY 1972

In early 1972, the second year of the Fourth Five-Year Plan, the PRC is pursuing a moderate economic policy with impressive economic results. GNP is running at an annual rate of roughly U.S. \$130 billion or \$150 per capita. In the various sectors of the economy—

Industrial capacity and production are expanding steadily with emphasis being put on the construction of large new industrial complexes in the interior and hundreds of medium and small plants in local areas;

Armaments output is increasing across the board, and a variety of new weapons are coming into production;

Agricultural production continues to need and get increased supplies of chemical fertilizers, pesticides, irrigation equipment, and improved seeds, although adverse weather in 1971 held production to the level of 1970;

Transportation and communication facilities are being expanded in capacity and extended to remote areas;

Foreign trade continues to serve as an indispensable conduit for modern equipment and technology from Japan and Western Europe; and

The lot of the rank-and-file worker and peasant is gradually improving.

PROSPECTS

Economic prospects for the remainder of the Fourth Five-Year Plan (1971-75) are good, barring a new outburst of radical economic policies or a succession of two or three bad harvests. Output from the industrial sector should grow at 5 percent to 10 percent per year based on new capacity now under construction or planned. Agriculture should continue to keep abreast of population. Foreign trade probably will increase in the 3 percent to 5 percent range annually with Japan continuing to be China's largest trading partner. China will still have to grapple with its unfinished economic tasks in this period—the feeding, training, useful employment, and proper motivation of its huge and rapidly growing population; the continued modernizing of its industry, armed forces, and educational system; and the establishing of an economic planning and control mechanism flexible enough to cope with the complexities of 20th century economic life. In the early 1970's China almost certainly will be widening its lead over the ordinary LDC's and yet at the same time it may be falling farther behind the dynamic industrial nations of Europe and, of course, Japan.

ORGANIZATION OF THE TEXT

Part II of this paper describes the economic assets, goals, and policies of the new Communist rulers of China. Parts III through VIII take each of the six economic periods since 1949 in turn, describing the economic policies and economic results that characterized each period. Part IX deals briefly with economic prospects through 1975. Part X uses estimates of China's GNP to give an overview of growth rates in industry and agriculture. Appendix A sets forth the methodology for the GNP series used in the paper. Appendix B gives a short explanation of the "production-possibility curve," a graphical device used in the text. Appendix C reviews sources of information on the Chinese economy.

II. ECONOMIC ASSETS, GOALS, AND POLICIES

A. Balance Sheet at the Start: Assets vs. Liabilities

A BATTERED ECONOMY

When the Communists under Mao Tse-tung came into power on October 1, 1949, the Chinese economy lay battered and broken from decades of war, flood, famine, and disease. Rail lines were cut. Factories were idle from lack of raw materials. Fields lay fallow, and dikes and irrigation canals over large areas were in disrepair. Tens of millions of people were destitute, many near death from starvation. Runaway inflation had rendered money useless as a medium of exchange.

ENORMOUS HUMAN ASSETS

Whereas the immediate situation was desperate, China's long-term economic prospects were reasonably good because of its enormous human assets and its rich natural resources. The population of the Chinese mainland is unsurpassed anywhere in the world as raw material for economic development. The Chinese are hardworking, durable, frugal, and quick to learn. They are the most ingenious people on earth in making do with a little and in milking small pleasures out of a hard life. The Chinese people have their share of leading thinkers and scientists and considerably more than their share of shrewd entrepreneurs. They are physiologically and culturally homogeneous. Only 6 percent of China's population are non-Han Chinese; these minority peoples live for the most part in the vast and sparsely settled border areas of China.

NATURAL RESOURCES OF A SUPERPOWER

China has the natural resources of a superpower. Its hydroelectric potential ranks first among nations. Its large deposits of coal and iron ore can support an iron and steel industry the size of those of the United States and the U.S.S.R. Petroleum, which was once thought to be the Achilles heel of China's resource endowment, has been found in widespread areas, and since 1965 China has been self-sufficient in crude oil and petroleum products. China is a leading world producer and supplier of mercury, tin, and tungsten.

As to deficiencies, China lacks sufficient quantities of three alloying metals—chrome, nickel, and cobalt—and rubber. Although production of copper has risen rapidly in percentage terms, large imports will remain necessary for the foreseeable future. China is also deficient in forest products. During recent centuries China's territory has been denuded of its forest cover by the intense need for land as farmland and for wood as fuel. In Marco Polo's time much of China was forested, today only 5 percent to 10 percent.

In absolute terms, China's agricultural resources are sizable. China has a wide variety of soils, temperature, and precipitation, and practically all types of agricultural crops are grown. However, only about 11 percent of the total land area—mostly in the eastern third of China—is suitable for cultivation. Multiplecropping increases the effectiveness of the cultivated area by one-half. In relative terms, China's

agricultural resources are grossly inadequate since they must feed more than 865 million people, compared with 208 million in the United States and 246 million in the U.S.S.R. It is the number of people, not the agricultural resources themselves, which causes the problem.

THE CENTRAL TASK

The task of the new Communist leadership has been to find the capital plant, the technology, and the economic organization to match China's superb human and natural resources. If a momentum could be achieved in building up capital plant, several favorable trends could result: (a) larger and larger numbers of people could be employed in productive industrial pursuits with little if any fall in the production potential of the agricultural sector; note that in the contrasting case of Soviet industrialization, the countryside was stripped of a large share of its males of prime productive age; (b) the productivity of the fixed land area could be increased by the provision of fertilizer, pesticides, and equipment and materials to strengthen the irrigation and flood-control systems; in this case, the function of capital and technology would be to increase yields, not to replace labor inputs; (c) the vast natural resources could be exploited at an increasing pace; and (d) a more rapid spread of science, technology, and other modernizing influences would be possible in old established industrial areas and in new industrial areas away from the coast. A second fundamental way to redress the imbalance between people and other resources would be to push down the rate of growth of population from 2 percent to 1 percent or lower. The leadership up to now has never been able to overcome its doctrinal reservations and follow this path in sustained fashion.

As for the factor of economic organization, the new Communist government possessed great advantages. The revolutionary government had no commitments to the vested interests of the past. It was hard-driving and ruthless. It started afresh and harnessed the nationalistic fervor of millions of young student sympathizers who share the excitement of the Communist vision of China's future.

Furthermore, the Communists under Mao had already demonstrated considerable skill in organization of their own party affairs in the tradition of Lenin. The Chinese Communist Party was a tight-knit elitist group of tough survivors. The Party moreover had experience in organizing the daily lives of millions of people in the so-called revolutionary areas. The Red Army was a highly disciplined and effective Party army, which aspired to live among the people rather than off the people. Finally, the Chinese Communists could study the lessons of more than three decades of Communist rule in Russia, drawing negative as well as positive conclusions on how to proceed.

B. General Economic Goal and Priorities

The overall goal of the Communists is clear—the establishment of a united, strong, and independent China which would assert its power first in Asia then on the worldwide stage. Within this overall goal, the general economic goal can be expressed as follows: the expansion and modernization of China's economy in directions that bolster China's international military and political strength. This general economic

goal can then be rephrased in terms of the three adjectives used above to describe the overall goal :

A *united* China means a single national economic unit, centrally directed from Peking and tied together by modern communication and transportation systems ;

A *strong* China means a rapidly expanding economy which is building up capacity in heavy industry and is producing an increasing volume and assortment of armaments ; and

An *independent* China means an economy which can rely on its own resources for heavy machinery, special alloys, petroleum products, advanced weapons, industrial technology, and food.

What economic priorities stem from this general economic goal ? At the highest level of abstraction, the economic priorities of the Chinese leadership are: (a) rapid growth in military-industrial capacity and output ; (b) provision of the minimum amount of consumption goods consistent with productive efficiency and popular morale ; and (c) mastery of modern technology through large-scale absorption of foreign technology and a large and well-supported program for scientific-technical education. Below this level of abstraction, priorities must be defined more concretely. Of great importance, for example, is the expansion rate for general industrial products—steel, machinery, and so forth—compared to military weapons. Within the armaments sector, resources can go alternatively to basic research, to development, or to production of weapons ; and choices must be made on the relative emphasis given to conventional and advanced weapons. Within the consumption sector, strict leveling of consumption is not the ideal solution but must be tempered by the acceptance of income differentials as incentives and by the inability of the economic control apparatus to shear all sheep to the same level. The import of foreign equipment and technology poses a problem of timing. The longer the process continues, the greater the gains to China from international specialization of labor and from imitation of machinery whose R. & D. costs were paid by someone else. On the other hand, the sooner the process is ended, the sooner will China be rid of its dependence on foreign sources of supply and foreign R. & D. activities. The general thrust of priorities seem clear enough but their formulation at lower levels of abstraction has been the subject of conflict within the leadership and has even resulted in abrupt changes in the pace and direction of the economy.

C. General Economic Policies

Policies are the operating guidelines that stem from goals and priorities. As indicated in table 1, overall economic policy in the PRC has fluctuated widely between 1949, when the problem was to get the economic machinery back in operation, and the present day, when the problem is to maintain a strong military-industrial push in the modern sector of the economy and to keep the great sprawling agricultural base moving steadily forward.

VIGOROUS MILITARY-INDUSTRIAL THRUST

The most conspicuous economic policy in China under the Communists has been the vigorous drive to expand military-industrial capacity and output. This drive has absorbed the resources available

to the economy over and above those needed for the minimum maintenance of the population. A second and related economic policy has dictated that this drive be based on China's own resources. China has skillfully avoided the primrose path of large-scale foreign borrowing which has left India, Pakistan, Indonesia, and Egypt with a crushing burden of external debt. The drive for military-industrial expansion has been successful, although the leadership grossly overextended the economy in the Leap Forward era. China's steel production, which was 1.35 million tons in 1952, is currently in the neighborhood of 21 million tons annually. The armaments industry has been rapidly developed so that China now builds jet aircraft, submarines, and tanks and is beginning the production of nuclear-armed missiles. Over two decades as a whole, the Government has achieved a remarkable expansion of both the general industrial base and the specialized branches of the armaments industry.

AGRICULTURE ON SLOWER TRACK

As a corollary to the vigorous expansion of military-industrial activities, the policy toward agriculture has called for a slower expansion without the boost of large-scale investment. At first, agricultural production benefited simply from the end of civil war and the settling down to the seasonal rhythms of the countryside. The new Communist rulers thought the collectivization of the agricultural sector would give sufficient impetus to production without the necessity of large inputs of centrally controlled resources. This strategy of agriculture as a "holding operation" became bankrupt in the general collapse of the Leap Forward, and from 1962 on, the agricultural sector has been bolstered by a growing flow of fertilizer, irrigation equipment, and other inputs. Notwithstanding this increased attention to agriculture, economic policy continues to favor industry, and the agricultural sector is continually admonished to live off its own resources.

SHIFT IN INDUSTRY'S CENTER OF GRAVITY

The development of industrial bases in widespread provincial centers away from the old Manchurian and coastal centers is another fundamental economic policy of the PRC. The reasons are evident—a desire to decrease vulnerability to military action and to modernize China's interior regions. However, the policy is hardly unique since all industrial nations typically have moved on from old centers to new centers of production. In early 1972, the most spectacular expansion of industry is taking place in the great interior province of Szechwan where electric power capacity, basic industry, the armaments industry, and the rail system are all benefiting from a huge investment program.

SUPPORT FROM ABROAD

Policy toward foreign trade is dominated by China's need for advanced equipment and technology and by Peking's determination to become independent of foreign sources of supply. In the 1950's foreign support came from the Communist countries which accounted for two-thirds of China's trade. After the widening of the Sino-Soviet rift, China turned to Japan and Western Europe for support in its

industrialization, and by the end of the 1960's the non-Communist world moved up to account for 80 percent of China's trade. In spite of many successes in absorbing outside technology and adapting foreign prototypes to its own purposes, China for the foreseeable future will continue to lag behind the major industrial nations by 5 to 20 years or more in the various branches of industrial technology. China thus will continue to exchange its textiles and agricultural and mineral products for modern machinery and technology. Because of its insistence on a balance of exports and imports, the rate at which China obtains foreign support depends largely on how much its agricultural sector can provide in export goods, that is, how much it can produce above minimum food requirements. In turn, minimum food requirements are a function of the rate of growth of population.

III. REHABILITATION, 1949-52

ENFEEBLED PACE

At the time of the Communist takeover in October 1949, the Chinese economy was operating far below its productive capacity. Two major elements in this low rate of operation must be distinguished. In the first instance, the long years of international and civil war had isolated the major cities and had ravaged much of the most productive rural areas. A large part of the industrial, agricultural, and transport capacity had long operated at an enfeebled rate. In a perverse way, this was an advantage to the new regime since the population had been trimmed back to the level that existing output could support. If the Communists could restore the productive apparatus to working order, total output would exceed the amount necessary to sustain the decimated population, that is, there would be a margin for investment in new capacity. According to Malthusian doctrine, this margin would have to be used promptly before the population surged back to fill the gap between total output and minimum food requirements.

But as the opposition to the Communist armies crumbled in 1949, there was a second and more immediate factor that pushed the rate of operation sharply below even the enfeebled rate described above. This factor was the collapse of much of everyday industry and commerce because of the flight of many political and business leaders, the drastic loss of confidence in the monetary unit, widespread hoarding, and the general difficulties in maintaining supplies of food and raw materials and essential transport services in the interregnum. Thus the Communist rulers had to face two sets of interrelated problems: (a) the immediate restoration of food supplies, essential utilities, and a stable medium of exchange; and (b) the rehabilitation of the severed rail lines, the idle factories, and the neglected dikes and irrigation systems.

RAPID RESTORATIVE MEASURES

In this period, the new government deferred some of its goals of political remolding in order to use the talents of experienced non-Communist businessmen, factory owners and managers, and bureaucratic administrators. The new regime rapidly revived the industrial sector through a system of government contracts, central control and al-

location of major raw materials, and fixed prices. Industrial wages were fixed at levels that reflected real economic possibilities and incentives rather than preferential treatment for the proletariat. Taxes and levies were used to guide production and to transfer ownership of those industrial facilities not already in government hands.

In agriculture, the debut of the new regime was marked by a bloody land reform—the distribution of land to the peasants and the shooting or dispossession of landowners, many of whom were possessors of pitifully small parcels of land. The loss of a substantial number of lives—the exact number is subject to a wide range of estimate²—apparently did little damage to the productive potential of the agricultural sector. In the first place, the agricultural population was so vast that the loss probably averaged less than one person per village, and in the second place, a large fraction of the victims were beyond their physical prime or were not engaged in actual agricultural operations.

The general policy of restoring the economy to operation was successful. The victorious Communists enlisted millions of young people in the party and administrative apparatus and drove single-mindedly toward their goal of putting the economic machinery back in operation. Not only the momentum of victory but also the great relief of the average Chinese at the end of the long period of chaos contributed to the initial success of the restoration process—it is only slight exaggeration to say the new government ended large-scale brigandage, starvation, inflation, epidemics, and corruption at one fell swoop. Furthermore, national pride in China's resurgence—which was shared even by the enemies of the regime—contributed to a spirit of hard work, ambition, and, often, self-sacrifice.

ECONOMIC LAW AND ORDER

The essence of the regime's success in this first period may be characterized in one phrase: "The restoration of economic law and order." The production-possibility curve below, in which guns—heavy industrial goods—are measured on the vertical axis and butter—consumer goods—on the horizontal axis, graphically illustrates the economic results of the period of rehabilitation.³ Any point on the curve represents an alternative combination of guns and butter that the economy could produce in 1949–52. The starting point, labeled 1949, is well inside the economy's production possibilities. The point reflects the existence of idle human and material resources. The point on the curve labeled 1952 is the ending point and represents full use of the economy's potential for the production of more of both guns and butter compared to 1949:

² Mao in early 1957 admitted that 800 000 enemies of the regime were liquidated by Chinese Communist security forces from October 1949 to the beginning of 1954 (see article by Sydney Gruson, *New York Times*, June 13, 1957, p. 1). Richard Hughes, Far East correspondent for the *London Times*, believes the true figure of executions is "as many as 2 million" as a result of the public trials of 1951 ("Mao Makes the Trials Run on Time," *New York Times Magazine*, August 23, 1970, p. 23); in his dispute with Prof. Allen S. Whiting over this figure (*New York Times Magazine*, Nov. 15, 1970, p. 40), he uses another phrasing "[an] estimated 2 million execution of 1951" and reveals his source as an off-the-record conversation with an information officer of the Chinese Foreign Ministry in 1957.

³ See app. B for a brief explanation of the "production-possibility curve."

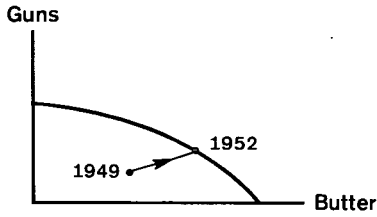


Figure 1. China: Rehabilitation, 1949-52

In this schematic diagram, the curve intercepts the guns axis at a much smaller distance from the origin compared to its intercept on the butter axis because China in 1949-52 was overwhelming an agriculture economy. Furthermore, the two points, "1949" and "1952," represent combinations of output heavily weighted toward consumer goods because China in 1949-52 was producing much more food than steel and machinery.

The economic results of the period of rehabilitation may also be expressed by a few key numbers:⁴

Item	1949	1952
GNP (billions).....	\$36	\$59
Population (millions).....	538	570
GNP per capita.....	\$67	\$104
Grain (million metric tons).....	108	154
Steel (million metric tons).....	.16	1.35
Foreign trade (billions).....	\$0.83	\$1.89

IV. FIRST FIVE-YEAR PLAN, 1953-57

LEANING TO ONE SIDE

Once the initial tasks were completed of establishing political and military control and of restoring the battered economy to operation, the new Communist government launched a vigorous program of industrialization under the tutelage of the Soviet Union. In the post-World War II struggle between the capitalist and Communist camps, China in Mao's oft-quoted phrase was to "lean to one side." Accordingly, starting in 1950, a series of agreements with the U.S.S.R. provided that the Soviet Union would supply China with 300 modern industrial plants over a span of three five-year plans (1953-67). These plants, worth roughly \$3 billion, were a balanced package of basic industrial facilities (such as iron and steel mills and electric power stations), machine-building plants (such as general machinery plants and a truck plant), and armaments plants (such as aircraft plants, shipyards, and a tank plant). The location and scheduling of the plants was designed to keep the supplies of raw materials and components in balance with the requirements of users. Thus the completion of an electric powerplant was to be followed by the completion of an aluminum plant and in turn by an aircraft plant. New technology was to be rapidly but systematically introduced. The schedule of completions provided for a progression from basic plants producing fuels and in-

⁴ Table 3 sums up the numerical economic results in the PRC, 1949-71; app. A furnishes the details on the calculation of the GNP numbers used in this paper.

dustrial materials to more complex plants producing heavy industrial machinery and modern armaments.

Soviet equipment, technology, and technical people began to flow to China in increasing volume during this period. Several thousand Chinese scientists and technicians went to the Soviet Union for training, and the Chinese technical education system adopted Soviet textbooks and technical materials.

A COMMAND ECONOMY

The Chinese Government took over lock, stock, and barrel the system of Soviet economic planning. China became a "command economy" with the following Soviet-style features:

Government ownership and operation of major industrial and transport facilities.

Collectivization of agriculture.

Annual and five-year plans administered by a huge bureaucratic apparatus of planning bodies and economic ministries.

Emphasis on investment in heavy and military industries.

Provision of the minimum consumer goods needed to sustain the population.

The First Five-Year Plan was a solid success. The small industrial base inherited by the new government and located mainly in Manchuria and a few major port cities was rapidly expanded, and a beginning was made on the development of major industrial centers in the interior. Overall industrial production doubled, led by advances in key industrial materials—coal, steel, cement, and crude oil.

COLLECTIVIZATION OF AGRICULTURE

In agriculture, the peasants were not left long in the possession of their newly acquired land. During the First Five-Year Plan, they were organized into successively larger collectivist units—first the mutual aid team, then small agricultural producer collectives (APC's), then the larger agricultural producer collective, which was roughly equivalent in economic function and organization to the Soviet collective farm of that period. The income of rural families was determined by the shareout of their collective's net income which was distributed on the basis of work points.

Agriculture was not regulated from the center in the same detail as heavy industry or S. & T. activities. The main economic concern with agriculture was that it deliver its quotas of food and raw materials to feed the urban population, to supply industry, and to earn foreign exchange. Taxes in kind and forced sales to the Government at low fixed prices were the mechanisms used to obtain the needed agricultural quotas.

Agricultural output appears to have increased somewhat faster than population during the First Five-Year Plan, even if the probable upward bias in the official production data is taken into account. Peking's economic strategy was to concentrate investment in heavy industry, and agriculture was left more or less as a "holding operation." Growth in agricultural production during these 5 years seems to have been

based on continued improvements in irrigation and flood control, on additional gains realized from the "settling down" of the countryside after decades of disaster and disorganization, and on the resumption of traditional and gradual improvements in structures, tools, seeds, and techniques rising from local initiatives.

A CASE OF COMPARATIVE ADVANTAGE

Foreign trade in this period was marked by the exchange of Chinese raw materials for Soviet industrial equipment, a textbook case of the principle of comparative advantage. China used its growing margin of output (above subsistence requirements) to acquire machinery which it could have produced at home only at a much higher cost in resources or after long delays.

The expansion of the economy's capacity and output during the First Five-Year Plan shows up in figure 2 as an outward shift of the production-possibility curve and a movement to a point on the new curve. The shift of the curve symbolizes not only additions to physical capacity but also the acquisition of Soviet technology, the increased level of technical training and experience, and the return to China of gifted individuals trained in Western universities.

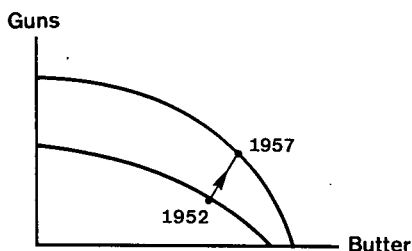


Figure 2. China: First Five-Year Plan, 1953-57

Since investment was so heavily concentrated in heavy industry the outward shift of the curve is much greater on the guns than on the butter axis. And since industry doubled its output whereas agricultural production increased by only 20 percent, the movement of the economy from 1952 to 1957 is a north-northeastward movement, that is, weighted toward guns. The sum total of agricultural-related activity in 1957, however, still was twice as large as industrial-related production.

Key figures that express the success of the First Five-Year Plan period are :

Item	1952	1957
GNP (billions).....	\$59	\$82
Population (millions).....	570	642
GNP per capita.....	\$104	\$128
Grain (million metric tons).....	154	185
Steel (million metric tons).....	1.35	5.35
Foreign trade (billions).....	\$1.89	\$3.06

V. GREAT LEAP FORWARD, 1958-60

ATTEMPT AT INSTANT INDUSTRIALIZATION

The Second Five-Year Plan, which was to have begun in 1958, was superseded by the Great Leap Forward, a frenzied attempt at instant industrialization. Instead of being content with the excellent strategy and considerable gains of the First Five-Year Plan, the government under Mao became impatient with the pace of growth and dissatisfied with the wholesale aping of the Soviet model. The policy of a forceful but rapid expansion in heavy industrial capacity was replaced by a policy of cramming a decade of industrialization into 1 or 2 years. China was supposed to take advantage of its huge and allegedly under-used labor force and to "walk on two legs"—expand in forced-draft fashion in its primitive as well as its modern sector.

Managers of industrial plants were ordered to meet greatly increased quotas at any cost, and machines and workers were driven mercilessly to meet these quotas regardless of the effect on quality or the balances of raw materials and finished products.

Hundreds of thousands of little backyard "steel" furnaces, primitive fertilizer plants, and tiny coal pits were opened; much of their product was of little use in spite of huge inputs of labor energy and raw materials. The results of the Leap in industry were a spectacular but unsustainable jump in industrial production in 1958-60, then a quick collapse back to the 1957 level; 3 years of frantic effort left the labor force exhausted, a large part of capital plant damaged through abuse, and inventories encumbered with huge piles of useless output.

The flavor of the Leap Forward madness is neatly caught in the following account by Wang Po-hwai, an engineer at Wuhan:

We had two tremendous Russian cranes at my foundry. Everyone was very proud because they could lift such heavy loads and because they speeded up our work so much. But one day two of the younger engineers came forth with a brand-new suggestion. They told the Party Secretary that their calculations showed the cranes could lift 30 percent more than the weight specified. Both the Russian experts and I said this was impossible, and we warned that such loads would break the cranes. The Secretary denounced me as a "negativist" and went ahead. First one crane collapsed and soon the second. Then came the craziest thing of all—the two younger engineers were commended for their inventive spirit, but warned mildly to be more accurate in the future. I was subjected to public criticism for my "negative attitude and lack of faith in China's potential."⁶

COMMUNES

The Leap Forward in agriculture was different in form but equally ill-starred. In 1958, Peking ordered the instantaneous formation of agricultural supercollectives or "communes." An average of 25,000 people were lumped together in each of these all-purpose units, which were to take charge not only of agriculture but also of rural industry, transport, trade, finance, and militia. The commune was supposed to be a more effective unit for mobilizing great swarms of workers for labor-intensive projects, and indeed it was so effective in

⁶ Quoted in Robert S. Elegant, *The Center of the Universe*, rev. ed., New York, Funk & Wagnalls, 1968, p. 350. Elegant does not give the original source of this statement but does say the event occurred in 1958.

this respect that in 1958 China suffered a sizable deficit of able-bodied hands at harvest time. For a short time, most of the rural population was forced to eat in communal messhalls. However, the unpopularity and high overhead costs of these messhalls caused their quick abandonment. The parallel idea of communal living arrangements did not get off the ground because of the lack of the necessary physical facilities. Finally, the "free supply" of essential consumer goods was quickly brought to an end when consumption rose to intolerable heights.

Harebrained agricultural schemes from the center—such as directives for deep plowing and close planting of crops and for hasty irrigation projects, regardless of local conditions and accumulated local wisdom—compounded the confusion in the countryside. The bumper harvest of 1958 was followed by 3 years of bad weather. The combination of manmade and natural disasters caused agricultural production and food supplies to plummet. By the winter of 1960–61 average food available per capita had dropped 25 percent below the already meager diet, and people were starving over wide areas of China. Discontent spread even to the armed forces because of cuts in army rations and the news of starvation back in the home villages.

EXIT TECHNICIANS AND BLUEPRINTS

From the beginning, the Soviet leadership sneered at Peking's claim that the Great Leap Forward was a faster road to the advanced stage of pure communism. The Chinese on their part began ignoring the advice of the resident Soviet experts and even tried to indoctrinate them in the Chinese side of the festering political dispute. In the summer of 1960, their patience exhausted, the Soviets abruptly withdrew the 1,200 technicians then in China. At this time, about half of the scheduled 300 Soviet-aid projects were completed. Work on projects under construction ground to a halt—the blueprints went back with the technicians—and production in some plants already in operation was curtailed because of the lack of Soviet troubleshooters and ready access to Soviet replacement parts.

BEYOND THE CURVE

The collapse of the Leap Forward was a compound of many factors which might be summed up under three headings: Mad policy, poor harvests, Soviet withdrawal. The production-possibility curve during this period shifted outward on the guns axis in spite of the damage done to industrial equipment, because great new industrial plants were being commissioned all through 1958, 1959, and the first half of 1960; the curve has the same intercept on the butter axis on the assumption that damage to agricultural land was offset by a variety of small local improvements. In brief, Peking's policy in this period was an ill-advised attempt to operate far beyond maintainable production levels; that is, far beyond the production-possibility curve, as illustrated below:

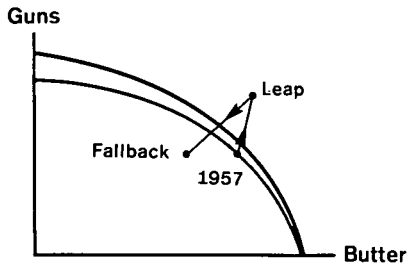


Figure 3. China: Great Leap Forward, 1958-60

Note that the fallback of the economy, as schematically shown in figure 3, was to the level of industrial production of 1957 and to a level of agricultural production considerably below 1957—even more so in per capita terms. The Leap Forward was a dangerous break in the economic momentum built up in 1949-57:

First, to view it in Malthusian terms, the Leap wasted 3 years during which the margin that had been opened between total output and basic subsistence could have been substantially widened.

Second, the Leap squandered the popular pride in China's national achievements and the popular willingness to accept a threadbare existence as the price of national greatness; both cadres and the rank-and-file began to give much more weight to their own individual interests.

Third, the Leap interrupted the strategy of trading part of China's increased production of raw materials for Soviet machinery and technology; if Peking had found it possible to wait 7 more years, the whole integrated group of 300 Soviet-aid plants would have been onstream; as it was, great new industrial plants were left without customer plants or without supplier plants or without experienced troubleshooters.

POLITICS IN COMMAND OF STATISTICS

Another casualty of the Leap Forward was the Soviet-style statistical system which was rapidly developing during the First Five-Year Plan and which had become the source of published production estimates for several dozen important commodities. The statistical claims of the Leap Forward were notoriously exaggerated—"let politics command statistics"—and the lack of reliable information added to the planning and managerial headaches throughout the economy. With the collapse of the Leap, a statistical blackout was imposed, so effectively that for 10 whole years no official national aggregate figure was published in China.⁶

Numerical estimates of the results of the Great Leap Forward are as follows:

⁶ App. C on the sources of information on the Chinese economy gives a fuller account of these statistical problems.

Item	Base	Leap Forward high		Post-Leap collapse	
	line 1957	Amount	Year	Amount	Year
GNP (billions).....	\$82	\$95	1958	\$72	1961
Population (millions).....	642	658	1958	701	1961
GNP per capita.....	\$128	\$144	1958	\$103	1961
Grain (millions of tons).....	185	200	1958	160	1960-61
Steel (millions of tons).....	5.35	13	1960	8	1961
Foreign trade (billions).....	\$3.06	\$4.29	1959	\$2.68	1962

VI. READJUSTMENT AND RECOVERY, 1961-65

QUICK TURNAROUND

The Communist leadership moved rapidly to avert the breakdown of the regime by making a complete turnaround in industrial and agricultural policy. The excesses of the Leap Forward were quickly abandoned, and emergency measures were taken to restore the food supply. Peking dispatched medical teams and released food stocks to aid the worst-hit areas; accepted a sharp reduction in the work pace in order to permit people to recover their health and expend less energy; consented to a revival of the peasants' private plots which had been swept away in the commune program; ordered large acreage shifted from cotton to grain; and, beginning in 1961, arranged for the annual import of 5 million tons of wheat, primarily from Canada and Australia. The wheat was a convenient way of feeding the large cities of the northeast and also reduced the internal tensions associated with the extraction of the final 5 million tons of grain from the countryside.

A PALER COMMUNE

In addition to these emergency measures, the government changed two fundamental agricultural policies, one involving the basic organization of agriculture, the other, the basic allocation philosophy toward agriculture. As for organization, the commune was practically abandoned except in name. Its nonagricultural functions—industry, commerce, finance, the militia—were handed back to the central bureaucracy. It was reduced to one-third its former size. The programs under which it had dragooned thousands of peasants into gigantic public works projects were suspended or abandoned. The ridiculous farming techniques it had imposed were dropped, and day-to-day decisions on agricultural operations were made the responsibility of the smaller constituent units—the production brigades of, say, a thousand people, and their production teams, each a village of, say, 150 people.

As for allocation policy, instead of being forced to supply its own resources for investment, agriculture began to receive a steady growing volume of inputs from industry—chemical fertilizer; pesticides; piping, pumps, and other irrigation equipment; tractors (both standard and the two-wheeled walking variety), trucks and other farm equipment; and technology in the form of better seeds and growing methods. The new policy was conscientiously implemented beginning in 1962.

RETRENCHMENT IN INDUSTRY

The changes in the industrial sector were equally swift and dramatic. The hundreds of thousands of mini-installations producing steel, chemical fertilizer, and machinery were closed down. Industrial investment also was sharply curtailed. A substantial portion of industrial capacity had been idled after the collapse of the Leap Forward because of shortages of raw materials, the withdrawal of the Soviet technicians, the food crisis, and the chaos in planning and management. Thus, no further investment was needed in many branches. The small available investment resources were logically concentrated on a narrow range of priority industries—the petroleum refining, chemical fertilizer, and advanced weapons industries. Because of the change in policy toward agriculture, the industrial sector placed more emphasis on activities supporting agriculture.

China's domestic economic difficulties resulted in a decline of more than one-third in the volume of foreign trade. Even in 1965, foreign trade was still 10 percent below the peak level of 1959. Because of the Sino-Soviet rift, the direction of trade also was greatly altered. Whereas in the 1950's, two-thirds of China's trade was with other Communist countries, by the late 1960's only 20 percent was with the Communist world. (See table 3 for year-by-year changes in this percentage.) The theme of the 1950's had been the wholesale import of Soviet industrial equipment for the planned 300 plants. In contrast, in the early 1960's China bought only two dozen whole plants from its new suppliers—Japan and Western Europe—and sought specialized machinery at a high level of technology to supplement its domestic production of basic machinery.

STILL A MARGIN FOR GROWTH

The readjustment of policy in 1961–65 achieved its objectives. The floor under consumption was reestablished, and sufficient investment was provided to agriculture to accommodate the continued rise in population. Useless industrial output was stopped and primitive industrial facilities abandoned. On the positive side, a number of priority industries expanded rapidly in this period. By 1965, for example, the Chinese had become self-sufficient in crude oil and petroleum products. The armaments industry was another pacesetter. It was during this period—in October 1964—that China set off its first nuclear device. A number of the old Soviet-aid projects were revived, and Japan and Western Europe began to supply key industrial equipment and technology. These results clearly demonstrated that the Great Leap Forward had not permanently crippled China's ability to escape the Malthusian trap; there still was a margin for military-industrial expansion.

In terms of the production-possibility curve, the Chinese had boosted the capacity for both guns and butter and had moved northeastward back up on the curve. (Figures 4, 5, and 6 are on a smaller scale than figures 1, 2, and 3):

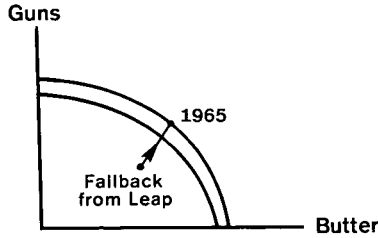


Figure 4. China: Readjustment and Recovery, 1961-65

In figure 4 the year 1965 is shown as being on a curve although there still remained some unused capacity, for example, in cotton textiles, that had not been taken up in this period.

The numerical results for the period follow :

Item	Postleap collapse		1965
	Annual	Year	
GNP (billions).....	\$72	1961	\$97
Population (millions).....	701	1961	751
GNP per capita.....	\$103	1961	\$129
Grain (million tons).....	160	1960-61	190-195
Steel (million tons).....	8	1961	11
Foreign trade (billions).....	\$2.68	1962	\$3.88

VII. GREAT PROLETARIAN CULTURAL REVOLUTION, 1966-69

DECEASED OLD UNCLE

The readjustment of economic policy that pulled China out of the tailspin of the Great Leap Forward rankled with Chairman Mao.⁷ Not only had many of his ideas about ideological motivation and communal living been suspended but also he himself had been relegated to largely honorific status and was being treated like a "deceased old uncle" as he put it. Chairman Mao thus had scores to settle in the early 1960's. He made his first move toward restoring his authority when in 1962 he inaugurated a new "socialist education campaign" to push his line of thinking down through party and government ranks. He was supported in his quest for ideological purity by Defense Minister Lin Piao who began to carry out a thoroughgoing indoctrination of the People's Liberation Army (PLA) in Mao thought.

As a result of the moderate policies of the period of readjustment and recovery, the economy, by late 1965, had achieved a strong comeback but under conditions that were anathema to Mao:

(a) The large party and economic bureaucracies had become more rooted and less responsive to the ideas and educational campaigns of the chairman;⁸

(b) the motivation of workers and peasants was shifting from devotion to the revolution and pride in China's new national structure to material considerations such as bonuses and perquisites in the fac-

⁷ For an interesting analysis of Mao's psychological drives, see Robert Jay Lifton, *Revolutionary Immortality*, New York, Random House, 1968.

⁸ For an intriguing account of how bureaucracies operate and how they rise and fall, see Anthony Downs, *Inside Bureaucracy*, Boston, Little, Brown, 1967.

tories, private plots and private trade in the countryside, and a less rugged style of life in general;

(c) The new generation of youth had had no contact with actual revolution. Moreover, the greatly expanded educational system was instructing the youth in alarmingly bourgeois fashion because the teachers and educational practices still had many pre-Communist features. For example, a common attitude in education was "study to become an official." The ancient Chinese preference for the lily-handed scholar or official was being promulgated under the Red banner. In short, Mao rightly feared that no worthy revolutionary successors to the veterans of the Long March were being bred.

REVENGE OF THE UNCLE

Mao's response to this backsliding was to launch an intensified socialist education campaign labeled the Great Proletarian Cultural Revolution, 1966-69. The date often given for the start of the Cultural Revolution is November 1965 when an article in the November 10 issue of the radical *Shanghai Liberation Daily* savagely attacked a play written by Wu Han entitled "Hai Jui Dismissed From Office." The play was a veiled attack on Mao's dismissal of the former Defense Minister Peng Te-huai in 1959 because of Peng's advocacy of greater military professionalism and of closer cooperation with the U.S.S.R. in developing the Chinese armed forces.

The first half of 1966 was marked by attacks on Mao's enemies in the cultural and propaganda fields and in the Peking municipal government. In August 1966 millions of teenage Red Guards were mobilized and paraded before Mao in Peking. These Red Guards, armed with youthful fervor and little red books of Maoist maxims, were sent out in groups to carry the revolutionary message throughout the country. The colleges and middle schools were shut down. During the remainder of 1966, millions of young Chinese, their logistics provided by the PLA and other government organs, traveled to all points of the compass in order "to be steeled in revolution."

NO ECONOMIC EFFECTS IN 1966

The Cultural Revolution had no appreciable economic effects in 1966. In spite of the political turmoil the economic expansion continued. In fact 1966, in an economic sense, actually belongs to the period of readjustment and recovery discussed in the previous section. Gross national product, industrial output, agricultural output, and foreign trade all made substantial gains, as shown in table 3. Because the Red Guards were mainly students, their political activities were not at the cost of national output. Minor economic losses resulted in the second half of the year when rail facilities were temporarily clogged by companies of itinerant Red Guards and when reserve stocks of food and clothing were drawn down.

ADVERSE IMPACT IN 1967-68

In December 1966 the Red Guards were given a mandate to invade party offices, Government bureaus, and factories and workshops in order to drag out the capitalist remnants who were opposing Chairman Mao. Starting in January 1967 the unleashed youths went on a ram-

page that continued sporadically for the better part of 2 years. The local officials under attack, although somewhat slow to perceive their danger, mobilized their own squads of youthful supporters, and street fighting between factions, each swearing complete fealty to Chairman Mao, assumed grave proportions in several major cities. Senior professors, respected Communist officials, and dedicated scientists suddenly found themselves paraded with dunce caps and placards, beaten up, subjected to merciless interrogation, and dispatched to tours of hard labor in remote areas.⁹ A reluctant PLA was dragged into the revolution with conflicting orders—"support the left" (i.e., the true Maoists) and restore order. Since all factions gave lip service to Mao, the local PLA commanders were confused; and since the PLA leaders sympathized with the conservative local officials and as military persons were biased toward orderliness and organization, the PLA usually sided against the most radical factions. For an eyewitness account of the twists and turns and bizarre events of the Cultural Revolution in China's largest city, the reader should consult Neale Hunter's *Shanghai Journal*.¹⁰ In any event, the Cultural Revolution was an extremely serious phenomenon for the tens of thousands of people who lost their lives and for the host of top party, Government officials, and educators who lost their positions.

The entry of the Cultural Revolution into the factories and economic bureaus in January 1967 inaugurated 2 years of turmoil in the nonagricultural parts of the Chinese economy:

(a) In industry.—Sporadic work stoppages, shortages of raw materials, and shutdowns of major facilities for several weeks or even months; severe shortages of coal and electric power in limited areas for short periods of time.

(b) In transport.—Disruption of schedules and delays in delivery of raw materials and finished products.

(c) In foreign trade.—A sharp cut in goods available for export, delays at ports, and confusion in commercial dealings with foreign countries.

(d) In economic planning.—The sacking of many high-level planners; an inability to take new planning initiatives.

Whereas industrial production in 1967 should have increased at least 5 percent over 1966, it went down 15 to 20 percent and remained depressed in 1968. The production of planes, tanks, and other military equipment suffered the same sharp drop as civilian production. The substantial loss in industrial output in 1967-68 constitutes the main short-term economic effect of the Cultural Revolution.

Although subject to shortages and delays similar to those bedeviling industrial production, the *construction* of new plant facilities continued at a high rate during the Cultural Revolution. One helpful factor was that the great new construction projects were normally located far away from the most severe of the urban disturbances. But regardless of precisely how far the Cultural Revolution reduced the volume of construction below the planned level, the important conclusion is that considerable capacity was added to industry during this period.

⁹ For a graphic account of the fatal badgering of a physics teacher during the Cultural Revolution see "The Making of a Red Guard," *New York Times Magazine*, Jan. 4, 1970, p. 84. For a followup discussion of this article, see *New York Times Magazine*, Feb. 1, 1970, p. 20.

¹⁰ New York, Praeger, 1969.

WANING OF REVOLUTION

In mid-1968 the youthful Red Guards were decommissioned as the instrument of revolution and were rusticated to a more sober life in remote areas of China. By this time, the PLA was playing an increasingly important role, not only in restoring order but also in participating in the management of factories, research institutes, and Government bureaus. Even so, the Cultural Revolution continued to flare up intermittently until the Ninth Party Congress in April 1969, which declared the Cultural Revolution a success. The dislocations of economic activity practically ceased in 1969, even though sharp political infighting continued during the long months in which the shattered party and Government bureaucracies were being rebuilt.

The winding down of the Cultural Revolution in 1969 permitted a comeback in industrial production, to a level slightly above the level of 1966. Since a considerable expansion of capital plant had taken place in the meantime, the economy had substantial amounts of unused capacity in 1969. Foreign trade, however, failed to regain its 1966 level until 1970.

AGRICULTURE UNSCATHED

The Cultural Revolution was mostly an urban phenomenon and barely touched the agricultural sector. The flow of inputs of fertilizer and equipment into the agriculture sector continued to increase although at a slower pace than anticipated because of disruptions in industry and transport. Extremely good weather in 1967 led to record crops, a lucky break for the Government since the problems of procuring and distributing food were greatly eased at the very time the Government administrative apparatus was being badly shaken. The three-tiered level of organization in agriculture remained the same—the (scaled-down) commune, the production brigade, and the production team. As part of the cultural revolution, tremendous propaganda blasts were loosed against material incentives and private activity in the countryside. The Peking radicals, however, were not allowed to interfere with the private plots, private trade, and rural handicrafts in practice. So long as there were no blatant extensions of existing private activity in the countryside, the peasants were allowed to supplement their diets and incomes through private activity.

LIVING STANDARDS

For the 85 percent of China's people in the countryside, living standards were little affected by the Cultural Revolution. The time spent in political meetings increased, urban youth sent to the rural areas had to be fed and housed, and clothing rations were delayed, but otherwise the villagers were able to make whatever small improvements they could manage on their own. The partial dismantlement of the party and governmental apparatus during the Cultural Revolution gave the rural areas more leeway and bargaining power.

It was urban dwellers who suffered the casualties and losses of rank and place during the Cultural Revolution. They also were the people mainly affected by the shortages in coal and electric power, the delays in rail transport, and the dislocations in foreign trade. Their

living standards suffered in quite random fashion—some cities like Wu-chou in Kwangsi were torn apart by fighting whereas most suffered only minor damage; thousands of urbanites were victimized by hooliganism and crime or caught in riot-torn areas, but the great majority of citizens were unharmed. Wages in particular industrial plants were sometimes raised by antiradical cadres in order to curry favor with local workers. In general, however, industrial workers were subject to a strict wage freeze and often lost their bonuses and incentive pay, which were denounced as bourgeois incentives. Finally, the cadres, educators, and well-to-do people were the chief sufferers, being much more in the line of fire than rank-and-file urban workers. And the young people, who did the actual gang fighting and most of the dying and were later banished to the countryside, also were ultimately victims.

CULTURAL REVOLUTION VERSUS LEAP FORWARD

The Cultural Revolution did far less economic damage to China than that other great political upheaval, the Great Leap Forward. The Leap Forward left capital plant damaged, agriculture in chaos, and the people starving; the Cultural Revolution caused a short-lived dip in industrial production in 1967–68 and shut down higher education for 4 years. The Leap Forward caused severe damage to China's development momentum and its living standards; the Cultural Revolution caused temporary damage to development momentum and slight damage to living standards. Yet the production-possibility curve still moved out perceptibly during the Cultural Revolution. Construction continued on new military-industrial facilities, and the investment program in agriculture was maintained at a high level. In 1969, industrial production had recovered to a level above the 1965 level but short of China's enhanced industrial capacity, as follows:

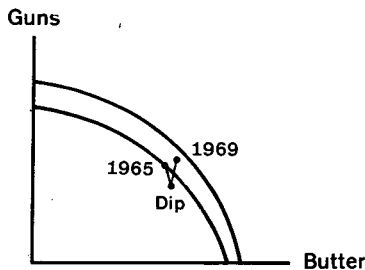


Figure 5. China: Great Proletarian Cultural Revolution, 1966-69

The numerical results for the period of the Cultural Revolution follow.¹¹ They reflect continued economic growth in 1966, the industrial dip in 1967–68, and the rebound in 1969, which was less marked in foreign trade than in industry:

¹¹ In contrast to the numerical tabulations for the other economic periods, the tabulation for the Cultural Revolution does not include figures for grain because the agricultural sector went its independent way in these years. (See table 3 for the entire grain series.)

Item	Base line 1965	1966	Industrial dip 1967-68 ¹	Rebound 1969
GNP (billions).....	\$97	\$105	\$100	\$109
Population (millions).....	751	766	791	818
GNP per capita.....	\$129	\$137	\$127	\$134
Steel (million tons).....	11	13	11	15
Foreign trade (billions).....	\$3.88	\$4.24	\$3.83	\$3.86

¹ Annual average.

PERSISTENCE OF MATERIALISTIC ATTITUDES

Mao's renewed attempt to revitalize the revolutionary spirit in Chinese society failed. By dismantling much of the bureaucratic mechanism—which he regarded as becoming increasingly unresponsive to his wishes—Mao ironically gave far more play to individual initiatives and material incentives in the economy. Private activity in the PRC is always pressing against the limits of official permissiveness; when the strength of the control mechanism was weakened during the Cultural Revolution, many individuals and small groups took advantage by increasing the scope of private activity. A further irony is that Mao wished to steel the young people in revolution, but the young revolutionaries quickly became organized in a chaotic collection of vested interest groups struggling for power. A final irony is that the instrument finally adopted by Mao to push the Cultural Revolution, the PLA, is (at least at the combat command level) inherently a nonrevolutionary force with anti-Maoist ideas about organization, motivation, and the role of expertise.

In retrospect, the Cultural Revolution demonstrated that the economic society developed under the Communists in China since 1949 had sunk fairly strong roots.¹² In spite of the political turbulence during the Cultural Revolution, the institutional organs in the economy continued to function. Most people most of the time took the bus to the factory in the morning or trudged out to the rice paddies. There was no breakdown in the systems for procuring and distributing grain, meeting payrolls and financing large construction projects, keeping factories operating under quotas, or providing medical care. Except in the immediate riot-torn areas, the fabric of everyday economic life remained essentially intact. The Communist government had succeeded, sometimes unconsciously, in developing economic institutions that worked and that allowed enough breathing room for the little tasks of life to be accomplished. Furthermore, where the structure of civilian control became inadequate because of Red Guard buffets, the PLA intervened to act as a stiffening element. Mao and his radical cohorts never were disposed to, or perhaps never able to, push the Cultural Revolution beyond a certain state of disruption. Toward the end, the sting had gone out of their blows, and their initiatives met almost universal resistance.

¹² In more than two decades of Communist rule, the economic society has developed many, but by no means all, of the attributes of *The New Industrial State* (John Kenneth Galbraith, Boston, Houghton Mifflin, 1967): for example, leadership by hierarchical ranks of technocrats, detailed planning of what capacity ought to be built and what consumption goods people ought to consume, and an incestuous interlocking of the industrial, military, and academic structures. In general, Galbraith argues that the United States and Soviet industrial states are converging whereas Mao is rightly afraid that this may be the case with the Soviet and Chinese industrial states. Mao refers to the Soviet trend toward the technocratic (that is, nonpolitical) state as "revisionism."

VIII. RESUMPTION OF REGULAR PLANNING, 1970-71

SETTLING DOWN

In 1970, the workers, managers, and technical people had settled down to work again. Great new military and civilian industrial facilities—petroleum refineries, electric power plants, metallurgical plants, and so forth—were coming into operation, many in new industrial centers in the interior. The import of advanced machinery and materials from Western Europe and, especially, Japan was bringing China into the age of petrochemicals, computers, and cryogenics. In Peking, the economic planners were back in business, but no public announcement of the resumption of regular economic planning was made until Premier Chou En-lai's speech on the eve of National Day in late 1970. Chou exhorted China's workers and peasants to make 1970 a banner end year for the Third Five-Year Plan (1966-70)¹³ and a strong base for a new Fourth Five-Year Plan (1971-75). Subsequent discussions in the official press, while furnishing no hard figures, made it clear that the new plan called for sharp rates of increase in industrial and agricultural production and for accelerated progress in achieving independence in industrial technology.

Chou's theme of rapid economic progress was echoed in his long conversation with the American author Edgar Snow in late 1970. Chou partially lifted the 10-year statistical blackout by giving Snow a few preliminary production estimates for 1970:

Grain (MMT).....	240+
Crude Oil (MMT).....	20+
Chemical Fertilizers (MMT).....	14
Steel (MMT) (range in 1966-70).....	10-18
Cotton cloth (bil lm).....	8.5

FORWARD ON A WIDE INDUSTRIAL FRONT

The general industrial results are clear for the 2 years 1970-71—substantial increases across the board in the output of major industrial products such as steel, coal, electric power, crude oil and petroleum products, transportation equipment, and a wide variety of modern weapons. Because the large additions to capacity made during the Cultural Revolution were not being fully used at the start of 1970, industrial production shot up by 18 percent through "catch up" gains.¹⁴ In 1971, industrial production advanced another healthy 12 percent. The level of industrial production in 1971 represents an average rate of growth of 6½ percent compared to 1966, the year before the Red Guards invaded industrial facilities. Much of this expanded industrial output consisted of construction materials and machinery for still more industrial facilities, and construction in 1970-71 was an especially dynamic element in the economic picture. Growth in capacity was proportionally more rapid in the new industrial centers in the hinterland.

¹³ The Third Five-Year Plan (1966-70) was mentioned by Chou in December 1964 and by *People's Daily* in January 1966 but had disappeared from public notice during the Cultural Revolution.

¹⁴ The industrial production index used throughout this paper is the one constructed by Robert Michael Field and described in his paper in this volume.

AGRICULTURE ON A SLOWER TRACK

Economic policy toward agriculture in 1970-71 continued to feature the steady increase in the flow of fertilizer and equipment from industry to the agriculture sector. Thus agricultural production in 1970 reached new heights even though weather was merely good compared to the excellent weather of 1967, the previous record year for production. In 1971, a series of floods, droughts, and insect infestations hampered agriculture and offset the effect of larger inputs. Grain production remained about the same as in 1970, and cotton production fell off because of poor weather and a curtailment of acreage. The Government maintained its grudgingly permissive policy toward private activity in the countryside. This policy seems necessary to maintain morale and efficiency in the countryside. Press reports in mid-January 1972 scored "leftist deviations" in rural economic policy and thus suggested that, while pragmatism continues to prevail in economic policymaking, the doctrinaire opponents of material incentives have not been completely squelched.

SMALL PLANTS PROGRAM

Even before the Cultural Revolution had faded away, the economic policymakers were renewing their efforts to reduce the use of centrally controlled resources by the agricultural sector. The resulting program for the construction of medium-size and small industrial plants in local areas has been pushed even harder in 1970-71. Hundreds of steel, cement, fertilizer, and machinery plants have been built or expanded in provincial and county centers. These plants share the following characteristics:

They are built for the most part with local construction materials and labor, although at least part of their equipment normally comes from China's most advanced equipment plants.

They usually embody the latest technology available in China for that size plant and type of operation, that is, they are a far cry from the innumerable jerry-built enterprises of the Leap Forward era.

They take advantage of the millions of young people pouring into the labor force each year, including thousands of the middle school graduates sent out from the larger urban centers to work at these plants.

They supply a local agricultural area and thus operate with minimum use of modern transport facilities.

So far the output of these small industrial plants has supplemented rather than replaced the flow of centrally controlled resources to the countryside. The program makes sense for the Chinese economy, since: (a) it enables the agricultural sector to get increasing supplies of fertilizer and equipment with minimum additional commitment of the economy; (b) it makes use of middle-school graduates and manual workers whose opportunity costs (best alternative contribution to the economy) are quite low; and (c) it speeds up the general process of modernization in the hinterland. The small plants program dovetails with—but is to be carefully distinguished from—the development of

giant industrial complexes in interior areas which are dedicated to the production of heavy industrial and military products.

SANER WATER MANAGEMENT

Another important aspect of investment in the agricultural sector in 1970-71 was the large-scale effort in water management. Since 1949, the Government has had a variety of short-run and long-run programs for building dams, dikes, storage reservoirs, irrigation canals, runoff channels, and other instruments of water management. These programs were set askew in the frenzied years of the Leap Forward and have generally suffered from megalomania and amateurism. The great multipurpose Sanmen Gorge project, for example, was rapidly silted up—as the bourgeois experts had predicted. And in the years following the Leap Forward, the official press warned about soil being ruined by ill-advised irrigation projects. In 1970-71, the general settling down of the economy has been accompanied by a saner approach to water management. One river basin after another is being slowly tamed, and the worst ravages of flood and drought are gradually being brought under control.

Reforestation is a related problem. The Communist system in China, with its ability to mobilize masses of hardy workers, is ideally suited to the task of replanting large sweeps of land, including the upper reaches of China's great rivers. Like other economic programs since 1949, reforestation has suffered from the wide swings in political and economic policy. In some cases the populace is mobilized for short-term production programs at the expense of reforestation and other desirable long-term programs; at times, existing trees are indiscriminately felled for industrial and personal use. In 1970-71, reforestation was going on in widespread areas, apparently in orderly fashion.

FOREIGN TRADE REBALANCED

By 1970, the volume of foreign trade had returned to the 1966 level as part of the general upturn in economic activity. The internal needs of the economy for increased food and industrial raw materials prevented exports from mounting as rapidly as imports in 1970. Consequently the economic authorities in 1971 reasserted the firm policy of pay-as-you-go by pushing exports hard and reining in imports, as shown by the following tabulation (billion \$U.S.):

	Exports	Imports
1970.....	2.05	2.17
1971 preliminary.....	2.30	2.20

Imports of grain, which have amounted to from 4 million to 5 million tons in recent years, slid to 3.2 million tons in 1971. Otherwise, the foreign trade pattern in 1971 continued much as before: (a) the composition of trade remained fundamentally an exchange of China's textiles, foodstuffs, and raw materials for foreign grain, fertilizer, industrial raw materials, and equipment and technology; (b) the direction of trade remained 80 percent non-Communist, with the \$700 millions

in net earnings through dealings with Hong Kong¹⁵ serving to cover the substantial trade deficits with Japan and Western Europe; and (c) the reserves of gold and hard currencies remained in the neighborhood of three-quarters of a billion dollars, a comfortable level given the controlled nature of China's foreign trade and the absence of long-term external debt.

TRANSPORTATION NO CONSTRAINT

In 1970-71, the transportation sector was being systematically strengthened in support of military, industrial, and agricultural needs and posed no perceptible constraint on the continuing rise in the level of China's economic activities. The rail network in the interior was being extended and filled in; for example, a new major rail line will connect the expanding industrial bastion of Szechwan directly to Wuhan, Shanghai, and the East. Rail roadbeds and signal equipment were being steadily improved, and new rolling stock—including diesel locomotives and tank cars—were being added. Rail transportation will remain the chief means of transport in the modern sector of the economy. Waterways and the road network are simultaneously being strengthened and are an important adjunct to the rail system. The means of transport in the nonmodern sector—which is physically the overwhelming bulk of China—remain primitive and continue to be characterized by animal and human musclepower.

SOLID START ON NEW PLAN

Economic results for the 2-year period 1970-71 clearly indicate that the Chinese economy has strong momentum. Output and capacity in industry, agriculture, and transport continue to mount with GNP advancing at an average annual rate of 8 percent for the 2 years.

The mysterious political upheavals of the last 4 months of 1971, which involved the status of Defense Minister Lin Piao and other high-ranking PLA officers, had no discernible impact on the course of economic events. The role of PLA representatives in economic administration seems to be slowly ebbing but their presence in any case has not appreciably changed the direction or effectiveness of the economy. Now that the economic bureaucracy is back in action, the need for the PLA as a stiffening factor in maintaining discipline in the economy no longer exists.

The production-possibility curve for 1970-71 simply shows the curve shifting out on both axes and production moving out in a northeast direction:

¹⁵ Divided approximately as follows: more than \$400,000,000 from provisioning Hong Kong with food, water, and other goods; \$100,000,000 from goods exported to Hong Kong and reexported to third countries; and more than \$100,000,000 from the remittances of overseas Chinese and from repatriated profits earned by Communist-owned enterprises.

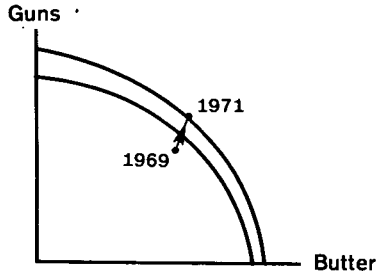


Figure 6. China: Resumption of Regular Planning, 1970-71

Preliminary numerical results for 1970-71 repeat the theme of substantial gains on all fronts:

Item	1969	1971
GNP (billions).....	\$109	\$128
Population (millions).....	818	855
GNP per capita.....	\$134	\$150
Grain (million tons).....	200-205	215-220
Steel (million tons).....	15	21
Foreign trade (billions).....	\$3.86	\$4.5

IMPROVEMENT IN LIVING STANDARDS

Developments in 1970-71 reflected not only China's long-term economic policy of emphasizing military-industrial development but also the policy of maintaining sober living standards. Part of the denunciation of the "bourgeois line" in economic thinking in this period—a line associated with the disgraced "renegade, hidden traitor, and scab," the former No. 2 man Liu Shao-chi—covered the sin of seeking a comfortable life. Wages in the city were kept frozen at low levels even though the government during the Cultural Revolution had promised the workers to reexamine wage scales after conditions became settled. Incomes in the countryside were kept in line by the growth of population, which meant more mouths to feed, and by the continued pressure for more deliveries to the state at low fixed prices. One constantly reiterated theme in 1970-71 was the leveling of incomes between city and countryside. If taken seriously, this theme would mean no rises in city incomes for a long time, since the task of raising the real income of the 85 percent rural part of the population to city levels would require a huge increase in resources going to consumption.

In spite of the stern policies toward income payments, the two years 1970-71 on the whole saw small but definite increases in household consumption:

- (a) The quality, variety, and availability of food gradually improved.
- (b) The clothing ration, which had not been fully honored in recent years, was restored.
- (c) Additional apartments for factory workers were built, especially around new industrial facilities; conditions in rural areas were being steadily improved as rural people used local materials and their own spare time to build and renovate houses.

(d) The inventory of basic consumer durables—fountain pens, watches, radios, bicycles, and sewing machines—grew steadily, and furniture and kitchen utensils also increased in per capita amount.

(e) The total amount of medical care rose, most of the increment benefiting the countryside; thousands of young “barefoot doctors,” who are trained to treat minor ills and screen major ills, were sent to remote areas and urban doctors and nurses were also assigned to tours of duty in rural areas.

(f) The educational system was gradually restored after the hiatus of the Cultural Revolution, although training at the college level was still in a fluid state as of early 1972.

IX. ECONOMIC PROSPECTS FOR 1972-75

Detailed information on China's economic goals for the Fourth Five-Year Plan, 1971-75, presumably will be forthcoming when the long-delayed National People's Conference (the top legislative body) is convened. In the meantime, the economic planning apparatus is a going concern, and the economic goals, priorities, and policies that have dominated the allocation of China's resources since 1949 will be carried forward. In two decades China has made great strides toward its general economic goal of becoming a modern industrialized nation with substantial capacity for producing the weapons of war. The Chinese land mass has been forged into a single national economic unit through the imposition of forceful central control. Instead of a small foreign-dominated industrial sector confined to Manchuria and a few treaty ports, China now possesses an effective industrial base that is remarkably strong in basic industrial materials, heavy machinery, and armaments. China's entry into the nuclear club in 1964 was a landmark as was the achievement of self-sufficiency in petroleum in 1965.

BULLISH PROSPECTS FOR INDUSTRY

In early 1972 prospects are good for a continuation of this drive toward industrialization. The capital plant needed to achieve substantial growth in industrial output in 1972-75 is *already in existence or under construction*. The accumulation of on-the-job experience of tens of thousands of high- and middle-level managers and engineers continues. There is no shortage of ambitious young workers at the bottom of the ladder. Industrial technology is being spread forcefully from large plants to small plants and from the big industrial cities to the hinterland. Even though the colleges were shut down 4 years, 1966-70, the loss of scientific and technical training is not likely to have quantifiable effects on the short-run pace of industrial development. Furthermore, since China is still 5 to 20 years or more behind Japan and the other major industrial powers in industrial technology, it can continue throughout the 1970's to make large catch-up gains through the low-cost assimilation of foreign technology. China will have little difficulty in continuing its imports of modern machinery and technology since its suppliers are eager to sell to China and since Peking does not labor under the burden of foreign debts. In short, the prospects for industry in 1972-75 are for sizable gains in the output of heavy industrial products and modern weapons, with overall industrial pro-

duction advancing at an average annual rate of 5 to 10 percent per year.

Of course, a return to radical economic policies could upset this sanguine picture. At present, chances are good that political infighting at the top will affect the pecking order of the top leaders but will *not* interfere with the basic priority and momentum of military-industrial development. A second qualification of the rosy industrial picture is the future burden on industry of serial manufacture and widespread deployment of missiles and other modern weapons. To date, Peking has been successful in advancing both basic industrial capacity and armaments capacity. An overloading of the system is possible, including the appropriation of resources needed for the next phase in basic industrial expansion.

FOOD/POPULATION BALANCE

The population series used in this paper is one developed by the U.S. Bureau of the Census and rests upon (a) the acceptance of the Chinese census figure of 583 million people for midyear 1953, and (b) judgments about specific birth and death rates in the various age-sex cohorts, including judgments about the effects of the lean harvest years of 1959-61.¹⁶ This series gives a figure of 855 million as China's population at mid-1971 and 874 million at mid-1972. The overall growth rate 1949-72 in this series lies between 2.1 and 2.2 percent. Pakistan, India, and Indonesia—which have large, dense rural populations—are thought to have growth rates of about 2½ percent. Since China, under the Communists, has effectively reduced famine and epidemic disease, a growth rate of 2.1-2.2 percent seems conservative in comparison with the rates for these three other Asian nations. Nonetheless, alternative estimates of China's population tend to be lower and to imply growth rates as low as 1½ percent.

The Chinese Government itself does not know the true figure for the population with any degree of accuracy. Its speechmakers use a standardized rounded number, which is raised in increments of 50 million every few years. Chou's righthand man for economic administration, Vice Premier Li Hsien-nien, in an interview with a Cairo journalist published on November 18, 1971, made some unprecedentedly frank remarks on the different estimates of population held within the Chinese bureaucracy:

... We have been racing against time to cope with the enormous increase in population. Some people estimate the population at 800 million and some at 750 million. Unfortunately, there are no accurate statistics in this connection. Nevertheless, the officials at the supply and grain department are saying confidently, "The number is 800 million people." Officials outside the grain department say the population is "750 million only" while the Ministry of Commerce affirms that "the number is 830 million." However, the planning department insists that the number is "less than 750 million." The Ministry of Commerce insists on the bigger number in order to be able to provide goods in large quantities. The planning men reduce the figure in order to strike a balance in the plans of the various state departments.¹⁷

Population control measures so far have not made an appreciable dent in China's demographic pyramid. This is because the overwhelm-

¹⁶ For a detailed description of population issues in China, with special reference to population control, see the paper by John S. Aird in this volume.

¹⁷ Carlo Al-Jumhuriyah in Arabic, p. 9, as reported in *FBIS Daily Report: People's Republic of China* (FBIS-CHI-71-238), Dec. 10, 1971, p. A-8.

ing majority of China's people are rural and because population control measures have been imposed intermittently—generally waxing in periods when the “experts” are riding high and waning in periods when the “reds” are having their innings. The present campaign is a mixture of administrative pressure for later marriages (men at age 30 instead of 25, women at age 25 instead of 20), contraceptive pills and devices, liberalized abortion and sterilization, and threats to cut off welfare benefits for children beyond the second or third child. These measures if persistently applied might be surprisingly effective toward the late 1970's because powerful social forces are moving in a parallel direction; to wit, the higher level of education, the increased participation of women in political and economic life, the decreased economic value of children, and the ability to insure the genealogical line with fewer children. An offsetting force is the continued improvement in rural health standards, attributable to gradually improved living conditions and, more recently, to the services of thousands of “barefoot doctors.”

The Chinese leaders, with their imperfect statistics, seem to be thinking in terms of reducing the rate of population growth from 2 percent to 1 percent. Such a reduction would be of enormous long-run economic benefit. In one decade, it would mean 100 million fewer people than otherwise¹⁸—100 million fewer mouths to feed and no loss to GNP. No dramatic cut in the growth rate is likely, however, in 1972-75.

If recent trends continue, agricultural output can readily feed China's growing population in 1972-75. A pattern of steady increase in inputs of fertilizer and equipment has been established. The small plants program, described above, will reduce the pressure on the central military-industrial core of the economy to increase its support of agriculture. Payoffs may also be expected from better management of water resources and the broadening of agricultural expertise.

The Government will continue its emphasis on the reclamation and improvement of marginal land. Additional land, perhaps 3 percent of the total land acreage, can be brought under cultivation but further extensions will run into sharply rising costs in labor and materials. This effort is all the more important because the development of urban areas, new transportation routes, and military installations is nibbling away at existing agricultural acreage.

As in industry, there are still important catch-up gains to be obtained from the experience of foreign countries. However, truly advanced agricultural research and development of the kind leading to the “green revolution” in other Asian countries has not been emphasized in China's structure of priorities, and agricultural research teams suffered during the general anti-intellectualism of the Cultural Revolution. Thus, it will be some time before these potentially important developments affect Chinese agriculture. If China's agricultural sector should suffer from sustained bad weather or oddish policies, the immediate economic result will be belt tightening in the countryside. If the difficulties persist, larger imports of grain and/or chemical fertilizer are well within Peking's financial power.

In general, both parts of the food/population balance could move in the right direction given favorable Government policy. With a siz-

¹⁸ The population of 855,000,000 (mid-1971) growing at 1 percent for 10 years would reach 944,000,000, at 2 percent, 1,042,000,000.

able reduction in population growth and an enlightened policy toward agricultural inputs and incentives, the problem of deploying expensive weapons systems toward the end of the 1970's would be greatly eased. Whatever the outcome, the food/population balance remains the single most important element in China's economic equation.

FOREIGN TRADE AND TECHNOLOGY

Over the near term, the Chinese leadership will continue to buy equipment and technology from Japan and Europe at the same time it tries to advance China's own technological competency. It is here that the effects of the Cultural Revolution may be most strongly felt. The purge of Western-oriented professors and scientists, the shutdown of the universities for 4 years, and the reorientation of education toward short-run production problems have damaged basic research in China and have delayed the introduction of new technology.¹⁹ The Chinese leadership is alert to the damage. Toward the end of 1971, a campaign in the official press warned that political indoctrination must not be allowed to cripple education in science. Nonetheless, foreign trade and technology will continue to be at the mercy of shifts of political attitude in 1972-75.

The volume of foreign trade is likely to increase more slowly than GNP in the next few years, perhaps at 3 percent to 5 percent per year. First, the agricultural sector, which supplies the bulk of exports, is a slowly growing sector and will be pressed to meet the internal needs of an expanding population. Second, China remains a poor nation with low per capita income, thus a poor prospective customer. Third, China is pursuing a longstanding policy of self-sufficiency and is deliberately moving to reduce its dependency on foreign sources of supply. Fourth, the leadership has indicated that it will continue its highly successful policy of avoiding foreign debt.

X. TRENDS IN GROSS NATIONAL PRODUCT

China's Gross National Product (GNP) in 1952, the year in which the economic machinery was restored to operation, was about \$59 billion or \$104 per capita. By 1971, China's GNP had more than doubled, to \$128 billion, and per capita income had risen to \$150. The long-term rate of economic growth under the Communists thus has averaged 4 percent a year, or 2 percent per capita.²⁰

RESULTS PARALLEL POLICY

A breakdown of the GNP figures shows how economic results have paralleled economic policies. The favored industrial sector has grown at an average rate of 8 percent since 1952, or 6 percent if the larger 1957 base is used. The agricultural sector, which until 1962 had to rely

¹⁹ For a stimulating appraisal of the future of technological innovation in China, see Bruce McFarlane, "Mao's Game Plan for China's Industrial Development," *Innovation*, No. 23, August 1971, pp. 2-12. The author feels that the Chinese leadership is on the right track in emphasizing motivation as against investment and technology as the vital force in economic development. At the same time, he recognizes that certain measures that stimulate innovation in the short run may make it more difficult to meet the long-run requirements of industry, e.g., for the standardization of parts.

²⁰ The series for GNP and for GNP per capita are presented in table 3 in rounded numbers. The method of calculation and the unrounded figures are presented in app. A. An analysis of the fluctuations in GNP in the 6 economic periods since 1949 is included in the discussion in secs. III through VIII above.

on its own energies, has grown at an average rate of 2 percent or about the same as population. The GNP figures also reflect the erratic course of growth, as follows:

Event	GNP		
	Amount (billions)	Year	GNP index (1957=100)
Start of First Five-Year Plan	\$59	1952	72
End of First Five-Year Plan	82	1957	100
Top of Leap Forward	95	1958	116
Fallback from Leap Forward	72	1961	88
Post-Leap recovery	105	1966	128
Cultural Revolution dip	100	1968	122
Current level	128	1971	157

DEVELOPMENT THRUST PACKAGE

If, for the sake of argument, \$100 is taken as the per capita GNP figure of an LDC that is just feeding its people and maintaining its capital plant, the advance of China's per capita GNP from \$100 to \$150 may be taken as a symbol of its economic momentum. In a crude sense, the Chinese economy today has a \$100 maintenance package and a \$50 "development thrust" package which goes for industrial development and military modernization. Of course, the matter is not quite this simple because the Chinese were able to squeeze a development margin out of the \$100 in the early 1950's; the impact of this margin was greatly magnified with the assistance of the U.S.S.R. through the processes of "comparative advantage" as described above in section IV on the First Five-Year Plan. Moreover, consumption standards since 1952 have moved upward in a number of small but cumulatively significant ways. Other observers who estimate China's current per capita GNP at only \$100 would have to explain how the Chinese can generate so much economic momentum today and how they could manage a takeoff in the early 1950's when per capita GNP was only two-thirds as large. A highly speculative division of China's current GNP among end uses—based on an examination of aggregative information and estimates such as the GNP figures in appendix A ²¹—is as follows:

	<i>Percent</i>
Consumption	70
Investment	18
Defense	10
Government Administration	2
Total	100

INDUSTRY ABREAST OF AGRICULTURE

As to the sectors of origin of China's GNP, in 1957 about one-third of China's GNP originated in industry-related activities and two-thirds in agriculture-related activities (see appendix A). If industry is assumed to coincide roughly with urban areas and agriculture with the countryside, then the GNP originated per capita in the industry-related sector in 1957 was three times as great as the GNP originated per capita in the agriculture-related sector. Labor in the industrial sector was being combined with considerably more capital per head

²¹ For the general reasoning behind this breakdown of GNP into end uses, see the section in app. A entitled "Division of GNP Into End Uses."

than in agriculture. In 1970-71, industry-related production had caught up with agriculture-related production, and the 15 percent of the people in the urban areas were producing six times as much per capita as their country brethren. Again, these GNP estimates reflect the general economic policy of adding capital to industry on a priority basis.

OUTLOOK FOR GNP

So long as Peking's policy is successful in giving top billing to the "development thrust" component of GNP, investment should increase as a share of GNP and the rate of growth of GNP should rise, *ceteris paribus*. The ability to reduce the population growth rate and to keep the lid on consumption are the two most important elements involved. Within the "development thrust" component itself, the balance between investment and defense is important, especially since Peking soon will have to make major decisions on the rate of manufacture and deployment of costly missile systems. Moreover, there will be a sharpening of the conflict between the imperatives of the "new industrial state" as envisaged by Galbraith and the imperatives of the new revolutionary society as envisaged by Mao. In short, the long-term rate of growth of China's GNP, 4 percent, can be dislodged up or down by known and unknown forces in the 1970's.

Although Chinese society under the Communists will remain remarkably egalitarian by the standards of other major powers, the distribution of income is likely to drift slowly away from equality in the 1970's. The drift has already started in the countryside where two factors have led to greater inequality:

(a) The bulk of the new inputs has been going to the well-favored communes and brigades with the result that the problem of "rich brigades" versus "poor brigades" has become an important topic for ideological clucking. The regime will continue to add inputs where the return is highest, and the rich thus will get richer.

(b) The increased ability of rural people to engage in private activity since the weakening of the control structure during the Cultural Revolution also suggests increased opportunities for differential income.

The continued rapid growth in the size and technical complexity of the industrial system means that within urban areas the number of people with incomes substantially above the modal levels will increase. This coupled with the expected expansion of technocratic influences (and perquisites) suggests that the distribution of income in the nonagricultural part of the economy also will become more unequal.

APPENDIX A

METHODOLOGY FOR THE CALCULATION OF CHINA'S GNP

THE 18 LINE ITEMS

The dollar estimates for the gross national product (GNP) of China, 1949-71, presented in this paper were calculated by: (a) constructing an index of aggregate physical output by combining indexes of agricultural and industrial output, and (b) converting this index series to a series in U.S. dollars through use of the calculated dollar value of Chinese GNP in 1955. Table 4 presents 18 line items which represent the successive steps in the procedure. The use of two extra digits in some line items is for the purpose of making intermediate calculations

and does not mean that these digits are themselves significant. The origin and meaning of the 18 line items are as follows:

Line 1.—The series for grain production set forth by Alva Lewis Erisman in his paper in this volume was adopted.

Line 2.—The grain series was rewritten, using the midpoints for years for which a range was given in line 1.

Line 3.—The grain series in line 2 was set in index form with 1957 equal to 100.

Line 4.—A food index was derived from the grain index in line 3 on the assumption that grain represented 85 percent of the value of food production in all years except the 3 "disaster years" of 1959-61 when it represented 90 percent. This assumption is based on (a) the conclusion that the Leap Forward policy of cracking down on private plots reduced the production of nongrain foods in relation to grain in these years, and (b) an unpublished analysis of ration data for Chinese refugees which confirms that a reduction of approximately this magnitude in nongrain foods occurred in these 3 years.

Line 5.—The series for cotton production set forth by Alva Lewis Erisman in his paper in this volume was adopted.

Line 6.—The cotton series in line 5 was set in index form with 1957 equal to 100 and was taken to represent nonfood agricultural production. This nonfood index series runs low in the 1960's compared with the food index series in line 4 because the regime shifted some cotton acreage to grain acreage to help meet the food crisis.

Line 7.—The food production index of line 4 was multiplied by 0.85. An unpublished calculation for 1957 shows that the internal yuan value of the food portion of agricultural production was approximately 85 percent of the total value of agricultural production, with the nonfood portion being 15 percent.

Line 8.—The nonfood production index of line 6 was multiplied by 0.15.

Line 9.—Line 7 and line 8 were added to obtain an index of agricultural production with 1957 equal to 100.

Line 10.—Line 10 was derived by multiplying line 9 by 2 in preparation for the combining of the agricultural index with an index of industrial production. The selection of a 2 to 1 weight of agriculture to industry for 1957 was made on the basis of the following breakdown of GNP by sector of origin (on a value added basis) in 1957:

	[Billion, 1957 yuan]
Agriculture	47.5
Industry	17.6
Construction	4.2
Transportation and communications	7.3
Trade and miscellaneous business services	9.9
Personal services and housing services	7.1
Government services	5.7
GNP (at factor cost)	99.3

The sectors outside of agriculture and industry were regarded as playing a supporting role to the two main sectors with their support distributed equally between the two sectors—that is, their support was assumed to be considerably greater per unit of industrial activity than agricultural activity. Under these assumptions, the agricultural "constellation" of economic activity represented 65 percent of total activity and the industrial "constellation" 35 percent, or a ratio of approximately 2 to 1 in 1957.

Line 11.—The industrial production index set forth by Robert Michael Field in his paper in this volume was adopted, but the base year was shifted from 1956 to 1957.

Line 12.—The industrial production index was rewritten, using the midpoints for years for which a range was given in line 11.

Line 13.—Line 10 and line 12 were added as an intermediate step in obtaining the GNP index series.

Line 14.—Line 13 was divided by 3 to obtain a GNP index in which 1957 is equal to 100 and in which the weight of agriculture-related to industry-related activity in 1957 is taken as 2 to 1.

Line 15.—A series for GNP in billions of 1970 U.S. dollars was obtained by the use of an estimated value of Chinese GNP for 1955 of \$48.19 billion in 1955 U.S. dollars. As part of these calculations, the 1955 GNP's of China and the United States were valued in both yuan and dollar prices. Under these valua-

tions, Chinese GNP in 1955 was in the range of 6.67 percent to 21.98 percent of U.S. GNP, or \$26.55 billion to \$87.48 billion. The geometric average of these dollar values of 1955 Chinese GNP is \$48.19 billion. The index of real GNP for 1955 in line 14 was 87.57, and the U.S. GNP price deflator index (1958=100) for 1970 was 148.90 of the index in 1955.²² Therefore, the index series in line 14 was multiplied by 0.8194, which is 48.19 divided by 87.57 multiplied by 1.4890, to get line 15.

Line 16.—A population series, in millions of persons, was obtained from the Foreign Demographic Analysis Division of the U.S. Bureau of the Census. This series uses the Chinese figure from the census of 1953 (582.6 million persons) as its base and makes certain assumptions about specific birth and death rates in the various age-sex cohorts.

Line 17.—Line 15 was divided by line 16 to get a series of GNP per capita in 1970 U.S. dollars.

Line 18.—Line 17 was divided by the per capita GNP figure for 1957, and the result multiplied by 100, to obtain an index series of GNP per capita with 1957 equal to 100.

"REASONABLE MAN" TESTS OF THE GNP FIGURES

The series for China's GNP that result from this methodology stand up satisfactorily to various "reasonable man" tests in spite of the wobbly statistical base and the heroic quality of the underlying assumptions. The GNP index series in line 14, which gives the relative fluctuations in GNP, is especially solid. This GNP trend line accurately portrays the major features of China's overall growth as described in the body of this paper, including the strong long-term growth in output, the disastrous short-term collapse as the result of the Leap Forward, and the milder dip ascribable to the Cultural Revolution. The weakest link in the chain of GNP calculations is the process of converting the GNP index series of line 14 into the dollar GNP series of line 15. The yuan-dollar calculations are based on a long-past year (1955); moreover, "the" index number problem²³ is especially severe because of the great differences in the two price systems and the two product mixes. The per capita series in lines 17 and 18 are subject to the uncertainties surrounding the estimates of China's population. John S. Aird has described these difficulties in his well-known monograph.²⁴

The first of the "reasonable man" tests is a comparison of the present China estimates with the estimates of GNP of other nations. Many observers have noted the inherent difficulties in collecting economic data for GNP purposes, especially in the less developed countries, and the conceptual difficulties in dealing with two often radically different price systems. Therefore, the following tabulation of approximate per capita GNP in various countries in 1970 can only help to show that the estimate for China is not unreasonable:

<i>Per capita gross national product (U.S. dollars)</i>	
Country:	
United States -----	4, 800
West Germany -----	3, 000
U.S.S.R. -----	2, 200
Japan -----	1, 900
Rumania -----	1, 200
Taiwan -----	350
China -----	145
Pakistan -----	120
India -----	100

The listing makes sense in showing China with less than half the per capita GNP of a prosperous Taiwan and with considerably more per capita GNP than the troubled economies of Pakistan and India. The listing also highlights China's inferior economic position in relation to Japan.

²² The index was 90.86 in 1955, according to *Economic Report of the President*, February 1971, table C-3, p. 200. Washington, Government Printing Office: the index was 135.29 in 1970, according to *Economic Indicators*, November 1971, Council of Economic Advisers, Washington, p. 2.

²³ The index number problem is the uncomfortable fact that in many cases of index number construction there exist two alternative equally plausible sets of weights which yield different numerical results.

²⁴ John S. Aird, *Estimates and Projections of the Population of Mainland China: 1953-86* (U.S. Bureau of the Census, International Population Reports, series P-91, No. 17), Washington, 1968.

A second test of reasonableness makes use of foreign trade data. China's dollar value of imports is known independently of its GNP through the detailed statistics of its trading partners. Therefore, a check of the percentage its imports bear to the dollar estimate of its GNP against the same percentage for other major nations gives a second "reasonable man" test of the GNP figure:

Imports as percent of gross national product

Country :		
China -----		1.8
U.S.S.R. -----		2.2
United States -----		4
India -----		5
Japan -----		10
West Germany -----		16
United Kingdom -----		18

The low percent for China is not unreasonable, given (a) its huge and diversified land area, (b) its vast, relatively primitive, and largely self-sufficient rural area in which 85 percent of the people live; and (c) its long-term policy of economic autarky, including its avoidance of long-term foreign debt. This test is not very sensitive, however, since a considerably lower figure for China's GNP would still yield a reasonable (higher) percent for this tabulation.

A third consideration, which overlaps the first, deals with the reasonableness of a per capita figure of \$150 for 1971 in relation to (a) the dollar yardstick, and (b) the per capita estimate for the early 1950's. For perhaps 10 years observers have adopted a \$100 per capita GNP as a fundamental characteristic of LDC's. Because of the U.S. inflation, the equivalent of \$100 in 1961 would be about \$130 in 1971. In this respect, then, a \$150 figure is conservative for China, which clearly has a substantial margin above subsistence for both investment and defense. Furthermore, the per capita GNP for China in the present series is roughly \$100 for the early 1950's; that is, the series presents a believable pattern of advance for China—from an economy getting back on its feet to an economy with striking achievements in industrial growth and military modernization.

The upshot of these tests of reasonableness is: Various consideration suggest that the aggregate and per capita figures for China's GNP used in this paper may be either too high or too low but that their general level is not conspicuously unreasonable.

OTHER DOLLAR ESTIMATES OF CHINA'S GNP

In his conversations with the American author Edgar Snow in December 1970, Premier Chou En-lai gave a figure of \$120 billion for "the total value of production of agriculture, industry, and transport" in China in 1970 divided as follows:²⁵

	<i>Billion</i>
Industry and transport-----	\$90
Agriculture -----	30
Total -----	120

Although Chou's figure is close to the estimate of \$122 billion for 1970 presented in this paper, the Premier's estimate is based on a markedly different concept of natural output. As Chou himself pointed out to Snow, the Communist concept of material national output omits many important elements counted in Western GNP, such as educational, medical, and governmental services. At the same time, there is gross double counting in the Communist system, for example, the value of a machine, its components, and the steel used in their manufacture may all be summed up. Since the double counting is notoriously common in industry but less prevalent in agriculture, Chou can come out with the value of output from industry (and transport) three times as great as the value of agricultural production. The 1-to-1 ratio of industry-related output to agriculture-related output arrived at in this paper for 1970-71 is much more credible. Finally, whereas Snow reports that Chou's figure involved use of the longstanding international exchange rate of 2.4 yuan to \$1,²⁶ the figure used in this paper involves a

²⁵ For Snow's article, in the Yugoslav press, on his conversations with Chou, see *FBIS Daily Report: Communist China*, Mar. 25, 1971 (FBIS-CHI-71-58), pp. B-6-11; Snow also reported these conversations in the Italian and United States press.

²⁶ Because of the U.S. devaluation in December 1971, the rate changed to 2.25 yuan to \$1. See *New York Times*, Dec. 24, 1971, p. 31.

dual calculation of Chinese and United States GNP, first in yuan prices and then in dollar prices, as explained above. The closeness of Chou's figure to the figure in this paper is, in short, a coincidence. There are deep differences in coverage, in the relation of industry to agriculture, and in the method of conversion into dollars.

A second dollar estimate of China's GNP was reported from Tokyo as a Japanese Government estimate of \$75 billion for 1970.²⁷ This estimate evidently was based on an estimate of the yuan value of GNP (without double counting) and the conversion of this value to dollars at the nominal exchange rate. Because this estimate would give a per capita GNP of \$100 more or less, depending on what figure for population was used, it seems much too low as an indicator of the status of the Chinese economy.

This latter Japanese estimate and two other estimates in the neighborhood of \$65 billion to \$75 billion are cited approvingly in *Communist China and the World Balance of Power*.²⁸ This range appears too low for reasons discussed above.

DIVISION OF GNP INTO END USES

The division of GNP into end uses presented in section X should be regarded only as an illustrative sketch of the distribution of the PRC's economic energies. It is not the result of detailed calculations of prices and costs, for which data do not exist. The percentages—consumption, 70 percent; investment, 18 percent; defense, 10 percent; and government administration, 2 percent—are based on general considerations, such as the following:

(a) The lion's share of output is needed for consumption in order to meet even the austere egalitarian standards of the regime; the percentage figure for consumption implies that average per capita consumption was \$105 in 1971 (in 1970 U.S. dollars); it also implies that almost all of agricultural related production goes to consumption, plus 40 percent of nonagricultural production, in the form of (a) substantial medical, educational, and housing services; (b) the bulk of light industry output; and (c) small amounts of consumer durables.

(b) An investment percentage of 15 percent to 20 percent is consistent with the long-term growth rate in GNP of 4 percent and with the observation of concrete activities in construction and machine building; as a contrasting case, Japan with its 10 percent plus growth rate allocates more than one-third of its GNP to investment; on the other hand, in order to get the strong forward thrust observed in Chinese economic expansion, a rate of investment of considerably more than 10 percent of GNP is required.

(c) There is no direct information and little indirect evidence on the magnitude of China's military spending. To judge from the absolute size of its GNP, the size of its military establishment, and the percentage defense that takes of GNP in other major nations, however, defense almost certainly takes more than 5 percent of Chinese GNP and less than 15 percent. In terms of manpower, the Chinese military establishment is roughly as large as those of the United States and the U.S.S.R. But the cost of maintaining the Chinese soldier is much lower. Moreover, the value of equipment and weapons purchased and operated is only a small fraction of that in the United States. On the other hand, China is involved in expensive missile and nuclear weapons development programs and appears to be rapidly expanding its military production. Although the problem of translating these programs into GNP values is difficult, 10 percent appears to be a workable approximation of the share of defense in China's GNP.

(d) Government administration involves several million people and a sizable investment in office buildings and equipment. It is taken at 2 percent, the same percentage that government administration is estimated to claim of Soviet GNP.

A FINAL COMMENT

All estimates of the GNP of China are suspect. The estimates in this paper are no exception. Nonetheless, they appear to accurately picture the general trend in Chinese economic affairs since 1949 and, less certainly, to meet "reasonable man" tests as to their absolute level. The methodology for these estimates of GNP is primitive. In view of the fragmentary nature of the data, it is doubtful that a more sophisticated methodology would yield significantly more reliable results.

²⁷ Tokyo *Kyodo* in English, Feb. 27, 1971, as reported in *FBIS Daily Report: Communist China*, Mar. 1, 1971 (FBIS—CHI—71—40), p. B-1.

²⁸ Yuan-II Wu (American Institute for Public Policy Research Special Analysis No. 13) Washington, October 1971, p. 11.

TABLE 4.—CHINA: LINE ITEMS IN CALCULATION OF GNP, 1949-71¹

Line item	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
1. Grain (million metric tons).....	108	125	135	154	157	160	175	182	185	200	165	160
2. Grain, midpoints (million metric tons).....	108	125	135	154	157	160	175	182	185	200	165	160
3. Grain index (1957=100).....	58.38	67.57	72.97	83.24	84.86	86.49	94.59	98.38	100	108.11	89.19	86.49
4. Food production index (1957=100).....	58.38	67.57	72.97	83.24	84.86	86.49	94.59	98.38	100	108.11	84.23	81.68
5. Cotton (million metric tons).....	.44	.69	1	1.3	1.2	1.1	1.5	1.4	1.6	1.7	1.5	1.4
6. Nonfood production index (1957=100).....	27.50	43.12	62.50	81.25	75	68.75	93.75	87.50	100	106.25	93.75	87.50
7. Food index×0.85.....	49.62	57.43	62.02	70.75	72.13	73.52	80.40	83.62	85	91.89	71.60	69.43
8. Nonfood index×0.15.....	4.12	6.47	9.38	12.19	11.25	10.31	14.06	13.12	15	15.94	14.06	13.12
9. Agricultural production index (1957=100).....	53.74	63.90	71.40	82.94	83.38	83.83	94.46	96.74	100	107.83	85.66	82.55
10. Agricultural index×2.....	107.48	127.80	142.80	165.88	166.76	167.66	188.92	193.48	200	215.66	171.32	165.10
11. Industrial production index (1957=100).....	24.84	31.41	41.72	51.26	64.15	73.32	73.78	91.44	100	131.47	166.06	{161.32- 163.46
12. Industrial production index, midpoints (1957=100).....	24.84	31.41	41.72	51.26	64.15	73.32	73.78	91.44	100	131.47	166.06	162.39
13. Line 10 plus line 12.....	132.32	159.21	184.52	217.14	230.91	240.98	262.70	284.92	300	347.13	337.38	327.49
14. GNP index (1957=100).....	44.11	53.07	61.51	72.38	76.97	80.33	87.57	94.97	100	115.71	112.46	109.16
15. GNP (billion 1970 U.S. dollars).....	36.14	43.49	50.40	59.31	63.07	65.82	71.75	77.82	81.94	94.81	92.15	89.46
16. Population, midyear (million persons).....	537.9	547.4	558.1	569.9	582.6	596.3	610.9	626.1	641.9	658.1	674.2	688.8
17. Per capita GNP (1970 U.S. dollars).....	67.19	79.45	90.31	104.07	108.26	110.38	117.45	124.29	127.65	144.07	136.68	129.88
18. Index of per capita GNP (1957=100).....	52.64	62.24	70.75	81.53	84.81	86.47	92.01	97.37	100	112.86	107.07	101.75

Line Item	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971 preliminary
1. Grain (million metric tons).....	160	175-180	175-180	180-185	190-195	195-200	210-215	195-200	200-205	215-220	215-220
2. Grain, midpoints (million metric tons).....	160	177.5	177.5	182.5	192.5	197.5	212.5	197.5	202.5	217.5	217.5
2. Grain index (1957=100).....	86.49	95.95	95.95	98.65	104.05	106.76	114.86	106.76	109.46	117.57	117.57
4. Food production index (1957=100).....	81.68	95.95	95.95	98.65	104.05	106.76	114.86	106.76	109.46	117.57	117.57
5. Cotton (million metric tons).....	.9	.9	.9	1.3	1.3	1.6	1.8	1.6	1.7	1.7	1.6
6. Nonfood production index (1957=100).....	56.25	56.25	56.25	81.25	81.25	100	112.50	100	106.25	106.25	100
7. Food index $\times 0.85$	69.43	81.56	81.56	83.85	88.44	90.75	97.63	90.75	93.04	99.93	99.93
8. Nonfood index $\times 0.15$	8.44	8.44	8.44	12.19	12.19	15	16.88	15	15.94	15.94	15
9. Agricultural production index (1957=100).....	77.87	90	90	96.04	100.63	105.75	114.51	105.75	108.98	115.87	114.93
10. Agricultural index $\times 2$	155.74	180	180	192.08	201.26	211.50	229.02	211.50	217.96	231.74	229.86
11. Industrial production index (1957=100).....	106.75- 109.60	108.18- 112.54	118.70- 125.13	132.89- 141.93	148.33- 160.53	164.81- 180.73	133.71- 148.57	144.48- 162.66	170.43- 194.43	198.95- 229.97	* 222.82- 257.57
12. Industrial production index, midpoints (1957=100).....	108.18	110.36	121.92	137.41	154.43	172.77	141.14	153.57	182.43	214.46	240.20
13. Line 10 plus line 12.....	263.92	290.36	301.92	329.49	355.69	384.27	370.16	365.07	400.39	446.20	470.06
14. GNP index (1957=100).....	87.97	96.79	100.64	109.83	118.56	128.09	123.39	121.69	133.46	148.73	156.69
15. GNP (billion 1970 U.S. dollars).....	72.08	79.31	82.46	89.99	97.15	104.96	101.11	99.71	109.36	121.87	128.39
16. Population, midyear (million persons).....	700.6	710.1	721.3	735.4	750.5	766.3	782.5	799.6	817.6	836	854.9
17. Per capita GNP (1970 U.S. dollars).....	102.88	111.69	114.32	122.37	129.45	136.97	129.21	124.70	133.76	145.78	150.18
18. Index of per capita GNP (1957=100).....	80.60	87.50	89.56	95.86	101.41	107.30	101.22	97.69	104.79	114.20	117.65

¹ An explanation of the methodology and assumptions used in deriving the various series in this table is presented in app. A. The index number series of this table are presented with 2 extra digits for the purpose of making intermediate calculations; the extra digits are not themselves significant digits. Similarly, the GNP figures in line 15 and the per capita GNP figures in line 17 are presented

with 2 extra digits for the purpose of making intermediate calculations. Also, the population figures in line 16 are presented to four digits for the same purpose.

² Preliminary estimate of +12 percent.

APPENDIX B

THE PRODUCTION-POSSIBILITY CURVE

The production-possibility curve is a graphical device used to describe the alternative ways in which an economy can use its resources of land, labor, and capital. The curve illustrates the basic economic principle of *scarcity*; that is, the principle that an economy normally can increase its production of "guns" (heavy industrial goods) only at the cost of giving up some of its production of "butter" (consumer goods). In the diagram below, the annual production of guns is measured on the vertical axis and the annual production of butter on the horizontal axis. Each point on the curve represents an alternative combination of guns and butter that the economy has the capacity to produce with its particular package of resources.

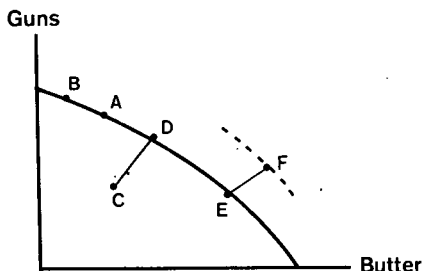


Figure 7. Prototype Production-Possibility Curve

The lettered points in the diagram represent three distinct situations:

(1) At point A, the resources of the economy are fully employed in producing a certain combination of guns and butter. A movement from point A to point B represents a movement along the production-possibility curve, that is, the production of additional units of guns at the cost of giving up some units of butter.

(2) At point C, the economy is operating inside its production-possibility curve. A portion of its resources lie idle. By moving northeastward from point C to point D on the curve, the economy can obtain both more guns and more butter.

(3) A movement beyond the production-possibility curve, from point E to point F, also permits the production of both more guns and more butter. This movement would be possible if the whole curve shifted out because of additions to the economy's resources, such as—

- The reclamation of barren land;
- An increase in the average skill of the labor force;
- Additions to capital plant;
- A rise in the level of technology; or
- Improvements in economic planning and management.

ADDITIONAL CONSIDERATIONS

This brief discussion of the nature of the production-possibility curve should be supplemented by four comments which are relevant to the main body of the paper. First, the very process of economic development may be viewed as a continued shifting outward of the production-possibility curve. Second, the curve may be presented on either an aggregate or per capita basis, an important distinction in Malthusian countries like China where population increases eat into the margin for economic growth. Third, since the definition of the production-possibility curve assumes a normal work pace and a regular schedule for maintaining and repairing capital equipment, an economy may temporarily operate at a point beyond the curve through working its labor force overtime and deferring the maintenance and repair of equipment; this was the case in China during the Great Leap Forward. Fourth, the simple production-possibility curve of this paper divides output into two classes only—guns and butter—whereas the division of guns (heavy industrial goods) between military output and industrial investment is also of fundamental importance to the PRC's economic strategy; in this regard, as argued in the body of the paper, Peking has succeeded in expanding and upgrading the quality of both its military establishment and its

industrial production facilities; in similar fashion, one could further subdivide the allocation problem, for example, the division of investment resources between the expansion of basic steel capacity and steel-finishing capacity, or the division of land resources between grain acreage and cotton acreage.

APPENDIX C

SOURCES OF INFORMATION ON THE CHINESE ECONOMY

A considerable quantity and variety of information exists on the Chinese economy. Some of this information is precise and trustworthy, some is vague and dubious. On the whole, this information enables the economic observer to piece together a good general picture of policies and trends in the economy and to make reasonable estimates of major national aggregate figures.

FOREIGN TRADE AN OPEN BOOK

One of the key sources of information on the economy of China is the foreign trade data released in varying detail by most of China's trading partners. Some 80 percent of China's trade is with the non-Communist countries, and the more important of these trading partners publish great sheaves of trade data. The Soviet Union and some of the Communist countries of Eastern Europe also publish details of their trade with China in their annual trade handbooks. Since China depends on the outside world for equipment and technology at the "leading edge" of its industrialization process, this valuable information on foreign trade furnishes the analyst with insights on the capacity and level of technology in various branches of Chinese industry. In some circumstances, the level of imports of wheat and chemical fertilizer also are important clues to the state of the agricultural sector.

TEN GREAT YEARS

The economic releases of the Chinese Government itself are a second important source of information. In the 1950's the new regime adopted wholesale the accounting and statistical practices of the U.S.S.R. An increasing volume of information, including claims for the production of several dozen major commodities, was published during the First Five-Year Plan (1953-57). Unfortunately, the embryonic statistical system was among the casualties of the Great Leap Forward when "politics commanded economics." The most startling example of statistical malfeasance was the publication of the claim that grain production had doubled in 1958 to 375 million tons compared to 185 million tons in 1957. In August 1958, this claim was slashed by one-third, to 250 million tons. The actual figure was probably about 200 million tons. Whereas the figures for early years were subject only to the normal bias of the Soviet-style statistical system (notably the lack of independent checks by disinterested and adversary parties) and the growing pains of a new statistical organization, the figures for 1958-59 were often grossly distorted. With the collapse of the Leap Forward, a statistical blackout was imposed, and practically no aggregate national economic figures appeared for a decade. The indispensable reference source for the 1950's is the handbook compiled by the State Statistical Bureau, *Ten Great Years*, which gives detailed statistical claims for 1949-58.²⁰

The statistical base of the 1950's has been fading into the past, and judgments and extrapolations based on the *Ten Great Years* have become increasingly fragile. Nonetheless, the student of China's economy is far better off than he would be in the absence of the data released in this period.

READING BETWEEN THE LINES

The Government economic releases in the 1960's were low-grade ore, confined largely to adjectival claims and a few percentages of unclear parentage. The follower of the Chinese economy had to read between the lines. For example, when the Chinese press reports "excellent to bumper" harvests in six Provinces and then commends the peasants in a seventh Province for a stout fight against floods and insect pests, the reader can conclude that things are going pretty well in six Provinces and are in woeful condition in the seventh. Or if a Prov-

²⁰ The subtitle of the volume is "Statistics of the Economic and Cultural Achievements of the People's Republic of China." The Chinese edition was published by the People's Publishing House of Peking, September 1959. An English-language edition was published by the Foreign Language Press in Peking in 1960.

ince is reported as being "basically self-sufficient" in grain, this means it is *not* self-sufficient in grains. The experienced reader also knows that claims of percentage increases in industrial production usually go down, the longer the periods being compared. For example, industrial production in Nan-ching (Nanking) in the first 3 months of 1971 was said to be 47.2 percent above the first 3 months of 1970; for the first 8 months, 36.8 percent above the first 8 months of 1970; and for the first 9 months, 30+ percent above the first 9 months of 1970. As to living standards, claims of improvements must also be generously discounted. Whereas the cumulative impact of the claimed improvements would have meant a substantial rise in well-being over the past years, other evidence shows that the per capita availability of food and the level of rations is roughly the same in early 1972 as it was 15 years earlier in 1957.

A strange breach in the Government's policy of carefully managing information occurred during the Cultural Revolution when warring factions of Red Guards put up wall posters to support their respective positions. Until suppressed, these wall posters washed a lot of dirty linen in public. The subject matter was usually polemical politics rather than hard economic data. Nonetheless, the posters helped to identify the economic disruptions of the Cultural Revolution and to clarify the disputes over economic policy.

The statistical blackout was partially lifted in late 1970 when Premier Chou En-lai gave several national aggregate figures for 1970 to the visiting American writer Edgar Snow. Beginning in 1970 and continuing through 1971, the official press published a growing number of percentage claims and even a few absolute figures, such as the amount of sown acreage. In November 1971, Vice-Premier Li Hsien-nien, as described in section IX of this paper, gave an unprecedented frank account of the alternative numerical estimates of the Chinese population held by different government bureaus. Finally, at yearend 1971, Peking published percentage claims of substantial gains in production of a dozen major industrial items as well as two absolute claims—steel, 21 million tons, and grain, 246 million tons. Prospects for 1972 are for a continued easing of the statistical blackout and even for a major breakthrough, such as the publication of details of the Fourth Five-Year Plan.

VISITING FIREMEN

A third source of information is the eyewitness reports of refugees and of journalists, businessmen, technical people, and other visitors to China. The visitors are normally persons who are favorably disposed toward the regime. The economic encomiums of an Edgar Snow or a Han Su-yin need to be taken cautiously and to be contrasted with the sour views of the occasional skeptic who slips through, like Jacques Marcuse, the permanent correspondent of the Agence France-Press in Peking, 1962-64. In *The Peking Papers*.³⁰ Marcuse tells of his efforts to penetrate behind the official claims of universal success in production and universal popular support for Mao's policies. Since the recent thaw in United States-China relations, a few American reporters and academics have spent several weeks in China and have added a new dimension to the outside appraisal of Chinese economic developments.

Travelers, especially those who visit China at intervals, are able to supply information on such matters as the food supply and the pace of industrial construction. The parlous state of the economy in 1960-61, for instance, was confirmed by travelers who for the first and only time since the revolution saw widespread malnutrition in the populace. The Japanese are by far the most numerous travelers in China and have the advantages of cultural, linguistic, and physiognomic kinship with the Chinese. Recently a growing number of Americans of Chinese extraction have visited China and have reported their impressions on living conditions.³¹ Most travelers are confined largely to tourist routes and show places; nonetheless, they are now so numerous and variegated that reports of their experiences in the public press can contribute to an understanding of what's going on in China. Visitors with special background and entree, such as Audrey Topping and John S. Service,³² give especially interesting details on the attitudes of the leadership toward economic development.

³⁰ New York, Dutton, 1967. Marcuse comments on the frustrations of the permanent foreign correspondent in Peking who is faced with the problem of interpreting China to his readers through studying the official press and attending briefings by official spokesmen. The attempt to make sense out of this raw material drove the correspondents to a permanent state of roaring mirth, according to Marcuse. "It was like watching a film version of Orwell's 1984 starring the Marx brothers" (p. 11).

³¹ *New York Times*, Dec. 20, 1971, p. 20.

³² See Audrey Topping, "Return to Changing China," *National Geographic*, December 1971, pp. 801-833, and the four articles in the *New York Times*, Jan. 24-27, 1972, by Service, who gives an incisive account of the new egalitarianism in China.

Refugees come mainly from Kwangtung province and are thus a geographically biased sample. Furthermore, they are a special group, namely, those with a reason and an opportunity for fleeing. Refugees are valuable in furnishing grubby details on how the Communist system works, for example, how the sharing-out of the commune's net income is accomplished at the end of the year.

SOVIET ANALOGIES

A fourth source of information is from Soviet analogies. The majority of the major heavy industrial plants in China were either built or planned under Soviet auspices. Until recently, the output of the Chinese armaments industry was made up almost entirely of Soviet weapons or of Chinese modifications of Soviet weapons. A large number of middle-level economic officials either were trained in the Soviet Union or on the job by Soviet instructors resident in China. As a result, estimates of the cost, productive capacity, and certain of the production methods of many Chinese industrial facilities may be made with considerable confidence.

SCHOLARLY APPRAISALS

A fifth source of information is the result of scholarly research on the Chinese economy. An example of a thorough and thoughtful appraisal of the Chinese industrial scene is Prof. Barry M. Richman's *Industrial Society in Communist China*.³³ Professor Richman draws on his long experience as a management consultant in the United States, the U.S.S.R., and India to compare the workings of management and the welfare of employees in the four countries. When visiting China, Richman had access to more industrial plants and more management spokesmen than perhaps any other visiting management expert has had.

Although directed to the problems of the society as a whole, Prof. Ezra F. Vogel's *Canton Under Communism*³⁴ is topnotch in giving a feel for the way in which the Communist system deals with the problems of economic organization in one large city (Canton) and one populous province (Kwangtung). Professor Vogel correctly argues that the organizational patterns and responses—such as the succession of “campaigns” and the problems they pose for local officials—seen in his microcosm apply to China as a whole.³⁵

LIGHT AND SHADOWS

To sum up: The best economic information on China is on the foreign trade sector. Information on economic policies and general economic trends is good, whereas information on the absolute value of economic aggregates—population, GNP, and national output of major industrial and agricultural products—is subject to a considerable margin of error. Even though production of military goods is closely held by the Government, enough information is available from foreign trade data, Soviet analogies, and other sources, to identify general trends. Information on living standards is fairly good; information on the attitudes of the Chinese people toward these living standards is necessarily vague and speculative. The general opening by China of diplomatic and commercial relations with the outside world, together with the publication of an increasing amount of hard economic information in the official press, suggests that the flow of economic information will increase substantially in the next few years after the statistical drought of the 1960's.

³³ New York, Random House, 1969.

³⁴ Cambridge, Mass., Harvard Press, 1969.

³⁵ For an up-to-date and informative appraisal of the Chinese economy by a Soviet writer, see M. Sladkovskiy, “The Maoist Course Toward Militarization and Its Consequences for the PRC Economy”; Moscow, *Voprosy Ekonomiki*, Russian, No. 11, November 1971, pp. 71–83.

CULTURAL REVOLUTION : IN SEARCH OF A MAOIST MODEL

By EDWIN F. JONES

I. INTRODUCTION—POLICIES AND POLITICS

Over the past 23 years the PRC has initiated a significant process of economic development. A self-sustaining dynamics of growth has been established, as the PRC has acquired the capacity to save, invest, and develop its technology and human resources. The government accepts the fostering of economic growth as a central objective, and the people are conditioned to participate in and adjust to the imperatives of economic growth.

Still, economic growth has been erratic. Rapid growth has been the norm, but it has been periodically disrupted by political upheavals. The result has been a rather low average growth rate, as shown by the following data (average annual GNP growth rates ¹) :

[In percent]

Period	Growth	Decline	Trough-to trough	Peak-to-peak
1952-58.....	8.1			
1952-61.....			2.2	
1958-61.....		-6.6		
1958-66.....				1.3
1961-66.....	7.8			
1961-68.....			4.7	
1966-68.....		-2.5		
1966-71.....				4.1
1968-71.....	8.8			
1952-71.....	4.1			

The PRC has argued that these political movements were necessary to secure an egalitarian and dedicated revolutionary society, but the cost should be noted. Had the PRC maintained an average annual growth rate of 8 percent, or even 6 percent, over the 19 year period, its per capita GNP would be double or half again higher, respectively, what it is today.

It is difficult to speak of a Chinese model of development, for the PRC has followed varied economic strategies. At first, Chinese leaders hoped over an 18 year period to follow the path and pace of the USSR, which in its initial industrialization raised the urban share of the Soviet population from 18 percent in 1926 to 33 percent in 1938. In China the lack of a farm surplus and Stalin's refusal of massive credits at the 1952-53 aid negotiations dashed these hopes. The USSR did, however, agree to support a respectable industrial program paid for currently through Chinese exports, and during 1950-57 the PRC employed a modified Soviet model, adopting Soviet organiza-

¹ See Ashbrook, *supra*, p. 5, for GNP estimates.

tional methods and concentrating on the construction of a complete modern industrial complex.

However, Mao independently seized on the notion that an alleged vast reservoir of under-employed rural labor could be mobilized politically to accelerate economic growth and restore a revolutionary atmosphere to the bulk of society left untouched by the capital-intensive industrialization. Against the nearly unanimous opposition of his top lieutenants, he pushed through collectivization and socialization during 1955-56. But by 1957 the disruptions of this program had loosed bitter criticism and were seemingly forcing major retrenchments.

Mao was stung into doubling his bets, launching in 1958 a total political mobilization of Chinese society through communes and the Leap Forward. Technical and fiscal controls were largely abandoned in the political drive. There was brief, heady talk of achieving an economic miracle in a few years, such as an annual steel output of 40 million tons and an urban population of 200 million. Instead, the Leap Forward disintegrated into chaos, and ended in mid-1960 with a collapse of farm output, massive economic imbalances, and the Soviet Union contemptuously washing its hands of responsibility of China's industrialization.

In the ensuing crisis, China's leaders hammered out a new 20-year strategy stretching to 1980, which placed great stress on rational techniques and technology. The goal was to regain economic balance, attain a marked degree of independent self-sufficiency, and restore conditions for renewed rapid industrialization and urbanization. The initial task for the 1960s was to raise farm output and to elevate industrial technology, a prerequisite to regain social stability and to secure a domestically-based recovery of industrial output. For this purpose, the planners chose to concentrate resources in the most efficient bases, the rich farm areas and the old industrial cities. The plans proposed that, as these bases developed surpluses, development would be extended to other areas of China in the 1970s, but selectively along lines dictated by economic considerations.

The initial results of the strategy were dramatically successful. By 1964, a satisfactory growth of farm output had been secured at low cost, firmly rooted in the supply of industrial inputs to agriculture. Technological developments permitted a rapid recovery of industrial output during 1964-66, with extreme sophistication found in certain areas, such as advanced weapons.

But the very success of the strategy apparently turned Mao against it. As in the 1950's, he found economic development becoming the preserve of technical bureaucracies and touching only a small share of China's population. His lieutenants and much of the Party were increasingly convinced that improved techniques rather than revolution would secure China's future. The "socialist education campaign," the counterpart of politics to the economic program, was being carefully circumscribed at every turn to prevent social disruption, and accordingly was ineffective. As the Third Five-Year Plan (1966-70) approached, Mao apparently believed he had to take drastic action to change China's political course before it became irretrievably congealed.

In 1966 Chairman Mao precipitated the Cultural Revolution which has shaken up China's politics and society as it has wound a tortuous way through a radical phase, a military government phase, and now

possibly a more relaxed phase seeking a return to normal political processes. How has it changed China's strategy and what are its prospects? To gain some insight on this question we may examine Mao's thought or his requirements, the changing appreciation of China's situation as seen through the three successive phases of the Cultural Revolution, and altered social and economic conditions.

A. Mao's Thought

Mao's beliefs can be related to his nature and experience. A charismatic leader, skilled politician, and shrewd judge of men, he has tended to rationalize an ideal world that would provide full scope for the use of these talents. He has come to view institutions, such as bureaucracies and incentive systems designed to guide men's activity and to chart and administer the nation's course, as instruments which might appeal to lesser nations and insecure leaders but which inevitably defend the status quo and are non-revolutionary. The higher organization he prescribes for China emphasizes political persuasion and direct communication between the political leaders and the masses, to the exclusion of an intervening bureaucracy. Political movements reveal the thought of the masses, and national decisions are based, not on a bureaucrat's calculations, but on political judgments of the enthusiasm and understanding of the masses.

These beliefs developed and strengthened in over two decades of rule. In the 1950s he was obliged to give lip service to the bureaucratic Soviet model, and to present his later aberrations of collectivization before mechanization and of communes as Asian adaptations of this model. In the 1960s, freed from this inhibition and under compulsion to defend the Chinese brand of socialism against that of the Soviets, he organized his analysis systematically in an exchange of letters with the CPSU. These letters spelled out precisely where, in Mao's view, the USSR had strayed from the path of revolution and had become "revisionist," and constituted a commitment that China would not follow this path.

Mao appears to have been the despair of the economic planners. He seems to have been bored by the economic affairs, and by his own testimony did not involve himself deeply in economic work for 13 of the 16 years of PRC existence up to 1966. Yet in this period he has brought to a halt two soundly functioning economic programs and strategies. His calculus differs from the planners. He is not concerned with the return on invested resources, but rather with how many people were affected and how it did alter their thinking. His predilection for political campaigns disrupts orderly development.

Mao's lieutenants in charge of practical affairs have attempted to influence him in various ways with limited success. After over 35 years of Party rule, Mao's leadership has become institutionalized and unchallengeable. He is a proud man, and his enormous political successes have justified the extension of the normal large ego of a political leader to a mystic sense of destiny. Liu Shao-ch'i's efforts to deflect Mao in the early 1960's through bureaucratic footdragging, noncooperation, and subtle alteration of directives led eventually to Mao's destruction of Liu's party bureaucracy in the Cultural Revolution. Peng Teh-huai's direct confrontation and criticism in 1959 to halt the "Great Leap" proved fruitless and may have prolonged the "Great Leap."

Chen Yun criticized Peng's approach as impetuous and counter-productive, arguing that the proper way to influence Mao was to provide him the facts and let him make his own decision. Chen believed that Mao, unchallenged, would have terminated the "Great Leap" on his own accord on receiving the 1959 harvest estimates.

Chen's point highlights a certain flexibility on Mao's part. Mao's commitment is to a revolutionary style or process, and not to any program or fixed end. Mao's campaigns are begun for vague ends where the political opportunities lie, assume form and purpose in the course of the drive which may be quite altered from the original aim, and are terminated when the political profit wanes without any compulsion to reach fixed goals. In short, Mao is a practical politician who knows when to fish and when to cut bait.

There is some reason to suspect that Mao's conflict with the economic planners may be less acute in the future than in the past. The political campaign of the Cultural Revolution is now over, and the harshness of its initial aims has moderated. As in the early 1960's, Mao seems likely to accept political compromises to restore a stable government, and to refrain for some time from controversial drives which might strain its fabric. At the same time, the economic program of the future may be more to his liking, since it seems likely to extend more broadly over the population in an emphasis on farm development, a slow improvement of living standards, and possibly renewed urban growth. Such a program could generate political support and enthusiasm, in which Mao's requirements and the planners' objectives may tend to converge.

B. Search for the Maoist Model Through Three Governments

Beginning with the "socialist education campaign" of 1963, Mao may be said to have presided over and charged four governments with the implementation of his ideas, and has discharged three of these in disgrace. The first was the Liu Shao-ch'i regime (1963-66). The three Cultural Revolution "governments" did not have a formal structure or authority, but rather represented phases in which one of the three ranking leaders under Mao after the start of the Cultural Revolution played a dominant role. The initial radical phase may be termed the Chen Po-ta regime (1966-68) after the head of the Cultural Revolution group, followed by a military government phase, which may be labelled the Lin Piao/PLA regime (1968-71). With the fall of Lin Piao in September 1971 a new and as yet unproved regime under Chou En-lai has begun.

The Cultural Revolution has in many respects been a typical political campaign, beginning with vague but apparently extreme "asking demands" that were pressed in the initial violent, radical phase. After this phase reached its political limits, a new consolidating phase began in which the aims were moderated. Here complications appear to have arisen from the extreme reliance on the military to restore order and production levels, related to administrative style, resource priorities, and a blockage of a return to more normal political processes.

The Chou En-lai regime, charged with completing the consolidation, is faced with the over-riding issue of political instability and weakness in the state administrative structure. It appears likely that it will be accorded a relatively free hand to moderate policies as

required to further this end. Although it must still bargain with the military over resources, there are signs it intends to press comprehensive farm development more vigorously, since this is one Cultural Revolution objective that holds promise of contributing to political stability and popular approval.

1. *The Chen Po-ta regime (1966-68)*.—This amorphous and anarchic phase of the Cultural Revolution introduced exhilaration, excitement and change to the social and political scene, particularly for the formerly despondent youth. A new political openness appeared, as Red Guard posters revealed purloined official documents and the government's dirty linen to a fascinated public which for the first time gained an intimate glimpse of the men and the policy processes that had governed. It was also a period for letting off steam and airing deep-seated grievances. Youth pilloried their elders under the slogan, "investigate everyone over 40," and took their delight in enforcing a repudiation of the "four olds" (traditional practices) on the older generation. Citizens felt free to harass and torment the officious petty *apparatchiks* who had formerly tyrannized them.

In the end, all this proved empty of substance and purpose. Extreme policy aims were implied in a negative fashion in the condemnation of most of the policies of the previous regime, but there was relatively little positive discussion of the shape and character of the regime that would replace it. With the extreme disruption of civil order and production between mid-1967 and mid-1968, it became necessary to terminate this phase.

2. *The Lin Piao/PLA regime (1966-71)*.—The army was the one institution that had retained an integrity throughout the preceding regime, and in the second half of 1968 it was given full authority to impose civil order and restore production. There was a radical transition phase in the winter of 1968-69 when the lectures to peasant discussion groups implied major rural reforms, such as eliminating private plots, expanding the production unit to the brigade level, and imposing various egalitarian income distribution systems. But by the spring of 1969, these impulses were countermanded, and the military imposed a nonsense program which involved little change but sent the workers back to the plants, the students to school or to the rural area, and reestablished civil authority.

However, a moderate rural program involving limited resources took shape at this time. The production brigades were to be built up with increased planning functions and responsibility for health and education programs. The large number of small fertilizer plants on which construction had been suspended in 1967 were to be completed, while a beginning was to be made on establishing a comprehensive farm machinery production and repair system throughout all provinces and counties. Rural industrialization was to be promoted on a small and experimental scale.

This government established an authority by moving military men into critical executive posts throughout the government and society with responsibility for final decisions. Well over half the officers, although a much smaller proportion of enlisted men, of the PLA appear to have been engaged in this program, with the proportion declining somewhat as the regime progressed with the return of many civilian cadres to active work. These military men have not been transferred on

a permanent basis, and many have served on rotating assignments of various lengths, retaining a primary military function. This government, while effective in imposing stability, has not been adept at innovation and political work. With the rapid rise in industrial output during this period and a return to a more normal situation, there has been increasing dissatisfaction with its functioning, leading to open press criticism in its last year that the officers were "arrogant and complacent."

Also in its last year, this regime appeared to come under fire for excessively diverting resources into military enterprises, reflected in a curious press debate of "steel vs. electronics" priorities. The point appeared to be made that basic economic needs took precedence over exotic military requirements. The passing of this regime is shrouded in mystery, but the signs suggest that Mao had become increasingly unhappy with it.

3. *The Chou En-lai regime (1971-?)*.—The present government has yet to show its distinguishing marks. It appears committed to unity, conciliatory politics, relaxed tensions, and an appeal to the national interest over petty partisanship. It is led by a respected original revolutionary, untainted by overweening ambition which tarnished the previous two regimes. Chou has alliances in all camps and a knack for staying clear of the crossfires of political feuds. He is indefatigable, with an acute sense of political timing and the art of the possible. He is thus a strong man for the present task.

However, the present political scene shows the catastrophic aftermath of a severe power struggle within a formerly strong regime. Bitter enmities and irrational feuds have evidently arisen among strong leaders who will not cooperate and cannot be purged without serious political cost and is reflected in the extreme number of vacancies existing in the top structure of power. Peking has also attested to its concern over the paralysis among middle level officials who tend to avoid decisions and concern themselves with trivia. It does not seem likely that the new regime can afford to move quickly to replace the military officers who now provide authority to the structure and the normalization of government may be a slow process. We may judge that Chou En-lai would seek a new balance by tailoring policies to internal social trends but we do not know how forcefully he can proceed against the political riptides that still plague his government.

III. ECONOMIC IMPERATIVES FOR THE FUTURE

For a generation the Chinese have lived a frugal, Spartan existence. Resources and development activities were constrained to small sectors in a drive for independence and self-sufficiency, and China acquired a substantial heavy industry complex, the advanced technology to operate it, and a well-equipped military including a nascent advanced weapons capability. But the development touched only a small share of the Chinese population, although redistribution of income improved the lot of the majority of the people while social programs and contrived political campaigns imparted a sense of progress and change.

Current social, political, and economic changes seem likely to alter this pattern in the coming decade. Development logic, the 20-year Plan, and the thrust of the Cultural Revolution point to a much wider geographical spread of modernization, affecting a larger share

of the population. The human resources are now available to support this trend. The huge post-Liberation wave of youth is now entering maturity and has received a huge investment in its training and education.

Political forces are also strong in this direction. The youngest 75 percent of the population had not passed puberty at the time of the Liberation; they have less of an appreciation of how far China has come, and tend to see China as basically strong but stagnating. The Cultural Revolution fixed the blame for this situation on aged and out-moded leaders, and despite the return of many of these leaders to power, satisfying domestic progress may be needed to legitimize the future political structure.

However, economic growth priorities must still be balanced against other national goals. The economic planning of the early 1960s, when economic survival was in question, was challenged with some justification during the Cultural Revolution for subordinating politics, social change, and national power to exaggerated requirements of economic growth and efficiency. The Third Five-Year Plan growth targets were very conservative, enabling Chou En-lai to claim they were "substantially fulfilled" despite the Cultural Revolution disruptions.

Currently, there is a rapidly reviving emphasis on economic growth priorities and organization. The large growth in output over the past three years has brought problems of management and coordination, particularly with a weakened planning apparatus and a decentralization of power to the provinces. Claims on output are also increasing, as in national defense, foreign aid, and a recent nationwide wage increase. Moreover, the Fourth Five-Year Plan, which emphasizes major infrastructure investments in roads, railroads, transport, public utilities, and resource development, is one which requires careful and specialized planning. Some sectors also appear to be lagging; for example, farm output, using the bench-mark years of good crop weather, grew by 6 percent annually during 1964-67 but by less than .5 percent annually during 1967-70,² presumably due to disruptions in the fertilizer supply and unsuitable farm production policies.

These growth requirements should encourage a continued return to pragmatic policies. However, given the weakened politics and the uncertain turns of the internal political succession, it is uncertain how Mao and his lieutenants may calculate China's immediate requirements. Until a more stable regime appears, it is difficult to chart the pace and pattern of China's development.

² See Ashbrook, *op. cit.*, p. 5.

Part II. ECONOMIC SECTORS

CHINESE INDUSTRIAL DEVELOPMENT: 1949-70

By ROBERT MICHAEL FIELD

I. INTRODUCTION

The index of Chinese industrial production presented in this paper is an elaboration of the index I prepared for the Joint Economic Committee in 1966.¹ For the years 1949 through 1959, because the Chinese published data on the physical output of a large number of industrial commodities, it was possible to construct an index that can still be used with confidence. The index for these years has not been changed. For the years 1960 through 1970, however, the index is a revision and extension of my earlier work.² The major difference is that the index for these years is presented in the form of a range rather than as a single-valued series because of the deterioration in the coverage and accuracy of the physical output data.

Although data on the output of specific military items were not available, these items had to be included in the index by imputation, because the weights could not be adjusted satisfactorily to exclude military production. Because most military production is concentrated in the metal processing industry, the assumption implicit in the construction of the index is that the military component of the metal processing industry grew at the same rate as the civilian component. It is almost certain, however, that the military component actually grew more rapidly than the civilian component. If the weight for the metal processing industry could have been adjusted, the rate of growth shown by the resulting index of civilian industrial production would have been lower than that of the index presented in this paper. On the other hand, if military production could have been included explicitly, the indexes for the metal processing industry and for total industrial production both would have been raised.

The accuracy of physical output data used to construct the index for the years since 1959 varies considerably from commodity to commodity. In general, it varies directly with the priority assigned by the Chinese to the industry producing the commodity and inversely with the number of enterprises producing the commodity. For example, with at least 200 cotton textile mills in China and the generally low priority accorded to the industry, the estimates for the production of cotton cloth are much less accurate than those for the production of crude steel, 80 percent of which is produced by the 10 largest steel mills. In spite of the deficiencies of the data, the trend in industrial production shown by the index is consistent with the information that is

¹ See Robert Michael Field, "Chinese Communist Industrial Production," *An Economic Profile of Mainland China*, Joint Economic Committee of the U.S. Congress, Washington, 1967, pp. 289-295.

² The methodology used in the revised version of the index was published in Robert Michael Field, "Industrial Production in Communist China: 1957-68," *The China Quarterly*, April-June 1970, pp. 46-64.

available and gives a reasonable picture of the state of Chinese industry.

Section II presents the index of total industrial production during the years 1949–70. The index is essentially the same as the one presented previously extended through 1970, but a series for the production of machine tools has been added, and some of the physical output series have been revised. The net effect of these changes is minor.

Section III presents indexes and relative shares for broad functional sectors of industry during the years 1952, 1957, 1965, and 1970. The growth of industrial production over the last 20 years has been accompanied by a substantial shift in the structure of industry. The data have been reworked in order to present the indexes in a form that makes clear the extent to which the structure of industry has changed. The conclusions are consistent with, but more explicit than, those presented earlier.

Section IV presents indexes and relative shares of industrial production for the coastal and inland areas during 1952, 1957, 1965, and 1970. The historical process of development resulted in an unbalanced geographical distribution of industrial capacity that the Chinese Government has tried to correct. The indexes show that its regional development plans have been quite successful, but that it still has a long way to go to redress the balance. The analysis in this section of the paper is entirely new.

Finally, achievements during 1971 and the prospects for the growth of industrial production during the Fourth Five-Year Plan period (1971–75) are discussed in section V. The construction of the index is described in detail in appendix A and the statistical tables in appendix B present the data used in the calculations.

II. A SUMMARY OF THE GROWTH OF INDUSTRIAL PRODUCTION

Industrial production in China, as measured by the index presented in table 1, grew rapidly during the years 1949–70. The average annual rate of growth was 11 percent for the entire period, but was 8 percent if the first 3 years of abnormally high growth are excluded. The average annual rates for these and other selected periods between 1949 and 1970 are presented in table 2.

A. Economic Rehabilitation, 1949–52

During the period of economic rehabilitation, the index shows that industrial production more than doubled, growing at an average annual rate of 27 percent. This rapid rate of growth was characterized by large increases in employment but by little or no growth in the net value of fixed capital assets. The capacity damaged by the war or lost through the Soviet removal of equipment from Manchuria in 1945 was repaired or replaced and put back into operation, and supplies of raw materials were improved.

TABLE 1.—INDEXES OF CHINESE INDUSTRIAL PRODUCTION, 1949-70

Year	1949=100	1952=100	1957=100	1959=100
1949	100			
1950	126			
1951	168			
1952	206	100		
1953	258	125		
1954	295	143		
1955	297	144		
1956	368	178		
1957	403	195	100	
1958	529	256	131	
1959	668	324	166	100
1960	649-658	315-319	161-163	97-98
1961	430-411	208-214	107-110	64-66
1962	435-453	211-220	108-113	65-68
1963	478-504	232-244	119-125	71-75
1964	535-571	259-277	133-142	80-85
1965	597-646	289-313	148-161	89-97
1966	663-727	322-353	165-181	99-109
1967	538-598	261-290	134-149	81-89
1968	582-655	282-317	144-163	87-98
1969	686-783	332-379	170-194	103-117
1970	801-926	388-449	199-230	120-138

TABLE 2—AVERAGE ANNUAL RATES OF GROWTH FOR CHINESE INDUSTRIAL PRODUCTION, SELECTED YEARS, 1949-70

Year	1949	1952	1957	1959	1961	1966	1967
1952	27						
1957	19	14					
1959	21	18	29				
1961	13	9	2	-19			
1966	12	9	6	1	10		
1967	10	7	4	-2	5	-18	
1970	11	8	6	2	8	6	15

There are no reliable indexes of industrial production by branch of industry for the pre-Communist period with which the indexes for the period of economic recovery can be linked. In their absence, the production of key industrial commodities may be used as a rough measure. The percentage decline in the production of key commodities from their pre-Communist peak to the level of output achieved in 1949 is highly correlated with the rates of growth shown by individual branches of industry for the years 1949-52. Thus the rapid growth of total industrial production in this period represents a return to previously achieved levels of output rather than a growth in the productive capacity of industry.

B. The First Five-Year Plan, 1953-57

During the First Five-Year Plan period, industrial production is estimated to have doubled again, reaching a level more than four times that of 1949, but the rate of growth was slower and less steady than it had been during the period of economic rehabilitation. Different factors determined the pattern of growth in the two periods: The relative rates of growth during the period of rehabilitation reflect the extent to which war damage had been repaired, whereas the pattern of growth during the First Five-Year Plan period was determined by the decisions on investment policy made by the Government.

The 25-percent increase in output in 1953 resulted from a 9-percent increase in the net value of fixed capital assets and a 16-percent in-

crease in the average number of workers. This slow growth in capital assets and rapid growth in employment, however, are more typical of the period of economic rehabilitation than they are of the remainder of the First Five-Year Plan period, when capital assets increased at a rate in excess of 20 percent annually, and employment at only 7 percent. These data, together with fragmentary evidence on the continued increase in the extent to which existing capacity was used, indicate that the large increase in output achieved in 1953 was a continuation of the rapid growth achieved during the period of economic rehabilitation and suggest that the pre-Communist peak level of production was not reached until 1953. Because 1953 was really part of the period of economic rehabilitation, the average annual rate of growth of 12 percent achieved during the years 1954-57 is a better measure of industrial growth in China than the 14 percent for the First Five-Year Plan as a whole.

C. The Leap Forward, 1958-60

In 1958, after the successful completion of the First Five-Year Plan, orderly industrial development was abandoned and the Leap Forward inaugurated. Industrial production increased about 66 percent in 1958-59, but the Leap Forward proved to be an ill-conceived attempt to speed up the rate of growth by letting "politics take command" and by driving men and machines at a pace that could not be maintained. The rate of growth, which had surged to 31 percent in 1958, dropped to 26 percent in 1959; and production declined somewhat in 1960 as the Leap Forward began to collapse.

Most of the growth in industrial production during the years 1958-60 would have occurred even without a Leap Forward. The acceleration of the existing industrial construction program during 1958 and 1959 resulted in large additions to capacity. For example, of the 921 major industrial construction projects started during the First Five-Year Plan period, 428 were completed and operating normally by the end of 1957, and 109 were in partial operation. But in 1958 alone, many new construction projects were started, and 500 were completed. Merely putting these new plants into operation would have been enough to guarantee China substantial gains in industrial production. Thus the political excesses of the period masked what was a truly substantial achievement in expanding industrial capacity.

D. Recovery and Readjustment, 1961-66

In 1961, industrial production fell sharply to a level slightly above that of 1957 but only two-thirds of the peak reached in 1959. After the withdrawal of the Soviet technicians in mid-1960, the Chinese found that they could not operate many of the heavy industrial plants built as Soviet aid projects, and they were forced to cut production drastically. In light industry, the levels of output achieved during the Leap Forward, could not be maintained, because of shortages of agricultural raw materials. Even without these blows to the economy, however, the dislocation of industry, the exhaustion of the labor force, and the crisis in the food supply would probably have been severe enough to cause the collapse of the Leap Forward

By 1962, more rational policies prevailed and industry began to recover; by 1966 most major commodities were being produced at earlier peak levels. This recovery, however, consisted primarily of regaining lost ground and resulted from a fuller use of existing capacity. Industrial policy during the period was aimed more at increasing the range of finished products in support of a few major programs than at a general expansion of the industrial base.

E. The Cultural Revolution and Its Aftermath, 1967-70

The industrial revival that started in 1962 after the collapse of the Leap Forward was interrupted toward the end of 1966 by a new period of turmoil, the Great Proletarian Cultural Revolution. Unlike the Leap Forward, the Cultural Revolution was not primarily an economic movement; nevertheless, it was the source of widespread, often violent, change that affected the performance of industry.

During the autumn of 1966 the Chinese leaders were concerned about the potential impact of the Cultural Revolution on industrial production and made deliberate efforts to keep Red Guard units out of the factories and mines. Some incidents caused a loss in production, but the regime was fairly successful in isolating the economy from the impact of the Cultural Revolution.

The first large-scale disruptions occurred in the winter of 1966-67, when the Cultural Revolution was extended to industrial enterprises. Workers and students were encouraged to conduct political campaigns in factories and mines, to "exchange revolutionary experiences," and to appeal grievances over the heads of local authorities—even to the extent of traveling to Peking to petition central leaders. Industrial production was affected almost immediately by work stoppages, shortages of raw materials, and disruptions of transportation.

Efforts were made to restore production during the spring of 1967, but they were only partly successful. In May 1967 a new and more disruptive phase of the Cultural Revolution began which lasted until September. Civil disorder was widely reported in major industrial centers during the period. Transport in all parts of China became subject to severe, although sporadic, disruption that choked the flow of raw materials to industrial installations. Factories representing a broad spectrum of industry and all major industrial areas were forced to curtail operations or shut down completely for days or even weeks. In September 1967 Chinese military authorities were given sweeping authority to deal with civil disturbances and restored a semblance of order to the country. Shortages of coal, however, were extremely serious in the winter of 1967-68 and contributed to a continued low level of production in many other industries. Only in the late spring and early summer of 1968 did industrial production begin to return to normal levels.

Thus work stoppages, shortages of raw materials, and disruptions of transportation caused by the Cultural Revolution forced industrial production below the 1966 level in both 1967 and 1968. No accurate measure of the decline in production can be made, but it may have been on the order of 15 to 20 percent in 1967. Production remained at a low level at least through the first half of 1968, and then began to recover rapidly. By 1969, it had regained the pre-Cultural Revolution peak of

1966, and in 1970 went on to grow at a rate of about 17 percent. The average annual rate of growth for the period 1966-70 as a whole, however, was a modest 6 percent.

III. THE SECTORAL DISTRIBUTION OF INDUSTRIAL PRODUCTION

The adoption of Soviet economic priorities and the concentration of investment in heavy industry for the last 20 years has not only resulted in a respectable growth in total industrial production, but has also brought about a substantial change in the relative importance of the broad functional sectors of industry. Indexes and the relative shares of industrial production by sector for the years 1952, 1957, 1965, and 1970 are presented in table 3.

A. Fuels and Power

During the First Five-Year Plan period, the fuels and power sector grew only slightly faster than industry as a whole, rising from 12 to 13 percent of total industrial production. In contrast, during the Leap Forward, the sector received an extremely high priority and showed the most rapid growth. Production reached a peak level in 1959 or early 1960, a level that was not equalled until at least 1966 and not surpassed until 1969. With the collapse of the Leap Forward, production fell sharply. This decline was less than in any other sector of industry, and even the lowest levels of production were considerably higher than those prevailing in 1957. With recovery, the petroleum industry resumed its remarkable growth, a growth which continued right through the Cultural Revolution. The major factor in the rapid growth of crude oil production is the opening of the Ta-ch'ing oilfield in northwest China, which began large-scale production in 1963 and now accounts for at least half of China's total production. Since 1965, China has been essentially self-sufficient in crude oil and has produced a complete line of petroleum products, although it must still import additives for high quality and specialized products.

TABLE 3.—CHINESE INDUSTRIAL PRODUCTION, BY SECTOR, 1952, 1957, 1965, AND 1970

	1952	1957	1965	1970
Index:				
Total industrial production.....	100	195	289-313	388-449
Fuels and power.....	100	209	395-427	567-655
Industrial materials.....	100	270	489-529	669-773
Machinery.....	100	233	405-438	570-659
Light industry.....	100	156	165-179	202-234
Relative shares:¹				
Total industrial production.....	100	100	100	100
Fuels and power.....	12	13	16	17
Industrial materials.....	20	27	33	34
Machinery.....	13	16	19	20
Industry.....	56	45	32	29

¹ The relative shares may not add to 100, because of rounding.

The electric power and coal industries also recovered from the low levels of production that prevailed after the collapse of the Leap Forward, but rates of growth have been lower than for the petroleum industry. Although the production of electric power recovered its peak level in 1966, the production of coal did not, largely because a high proportion of the peak output attained in 1959 came from small coal pits worked by handicraft methods and was supplied to back-

yard steel furnaces. The Cultural Revolution appears to have affected the electric power industry mainly through shortages of coal. As a result, the production of electric power in 1967 was nearly 15 percent below the 1966 level, but the loss was regained in 1969 and a new peak level achieved in 1970. Coal production declined about 20 percent in 1967 but had recovered by 1969 and also achieved a new peak level in 1970. Because of the growth in all three branches, the output of the fuels and power sector increased to about 17 percent of total industrial production in 1970.

B. Industrial Materials

The industrial materials sector, which had grown from 20 percent of total industrial production in 1952 to 27 percent in 1957, continued its rapid growth during the Leap Forward, reaching a peak level in 1960. With the collapse of the Leap, production fell to about two-thirds of this peak level but remained considerably above the 1957 level. Production remained low in 1962 and then began to recover fairly rapidly. By 1966, production had reached a new peak level.

The iron and steel industry recovered its peak level of production by 1966. In 1967, however, the output of crude steel declined by roughly 3 million tons as a result of work stoppages, the most serious of which occurred at the An-shan Iron and Steel Works, and shortages of raw materials, particularly coal. Production in 1968 had nearly recovered the 1966 level, and production in 1970 set a new record.

After the collapse of the Leap Forward, the production of chemicals—particularly chemical fertilizer—was given a high priority and grew extremely rapidly. However, this period of rapid growth was interrupted by the Cultural Revolution. In particular, the production of chemical fertilizer declined by about one-fourth in 1967, when the curtailment in the output of coal, coupled with the disruptions in the transportation system, crippled the industry and forced a number of important plants to suspend operations. Production remained low in 1968, but recovered rapidly, reaching a new peak level in 1970. Although the chemical industry has grown more rapidly than any other major branch of industry, its production is still grossly inadequate to meet domestic demand.

The production of the building materials and timber industries recovered more slowly than other branches producing industrial materials—timber because of overcutting during the Leap Forward and building materials because of the lower levels of construction activity. However, the production of cement grew fairly rapidly, reaching a new peak level in 1966. The production of both cement and timber dropped sharply during the Cultural Revolution but have recovered in response to the current higher levels of construction activity. The production of cement was at a record level in 1970. By 1970, the production of the industrial materials sector had grown to about 34 percent of total industrial production.

C. Machinery

The machinery sector, which represented 13 percent of total industrial production in 1952 and 16 percent in 1957, has grown impressively since then. In 1960, production reached a peak which was about double

the level of 1957. In 1961, production declined sharply and it remained at a low level in 1962. By 1966 the output of the machinery sector had reached a new peak, but it declined sharply in 1967 both because of the disruptions of the Cultural Revolution and because of the low level of demand for new machinery and equipment. Thereafter, the production of machinery recovered rapidly. By 1970 the sector had reached a new peak level and accounted for about 20 percent of total industrial production.

The machinery sector produces most types of finished industrial machinery and equipment—including machine tools, antifriction bearings, agricultural machinery, tractors, trucks, steam and diesel locomotives, oceangoing vessels, metallurgical equipment, electrical equipment, chemical equipment, and petroleum extraction and refining equipment—and it supplies a large proportion of the machinery required. Technical capabilities in certain fields of machine building, however, still lag behind the capabilities of Japan and the industrial nations of Europe. Although the machinery sector has made considerable headway, many of its products such as metal-forming equipment, chemical equipment, and petroleum equipment reflect much slower progress, and its capability for the independent design of industrial machinery is not great.

D. Light Industry

During the First Five-Year Plan period, light industry (including food processing) was the largest but slowest growing industrial sector. It declined from 56 percent of total industrial production in 1952 to 45 percent in 1957. It continued its relatively slow growth during the Leap Forward, and in 1959 reached a peak about 40 percent above the level of 1957. However, output collapsed in 1960, fell even further in 1961, remained at a low level during 1962, and only then began to recover gradually. Although by 1966 production in the light industrial sector had grown more than one-third compared with 1962, it was still below the peak level achieved in 1959, largely because the production of agricultural raw materials had not recovered.

The output of textiles suffered a particularly sharp decline because cotton acreage was diverted to grain production during the agricultural crisis of 1959–61. The production of cotton cloth fell so sharply in 1961 and 1962 that the annual ration had to be lowered to an estimated 2 meters per person as compared to about 6.3 meters in 1957. By 1966, production was well above the 1957 level, but it fell again in 1967–68 because of work stoppages in textile plants. In 1969, it recovered dramatically and went on to regain its previous peak level of 1970.

Since 1957 the food processing industry has grown more slowly than most other branches of industry. Beginning in 1960, shortages of agricultural products caused widespread disruption in the industry. As agriculture recovered, production began to increase, and probably reached a peak level in 1966. The food processing industry declined again in 1967, but suffered less than most other branches of industry because 1967 was a good agricultural year and because much of the food processing is done at the local level. After the Cultural Revolution, the light industrial sector continued to decline in importance and by 1970 accounted for only about 29 percent of total industrial production.

IV. THE REGIONAL DISTRIBUTION OF INDUSTRIAL PRODUCTION

China's natural resources are well dispersed. In contrast the historical process of development had resulted in a highly uneven geographical distribution of industrial capacity at the time the Communists came to power. Chinese industry was marked by a heavy concentration of industrial capacity in Northeast, North, and East China,³ where a combination of relative political stability, a modern transport system, readily available agricultural and industrial raw materials, and large markets had attracted foreign capital. Smaller industrial centers had developed in Southwest China during World War II when industrial plant and equipment were removed from coastal cities in the face of advancing Japanese armies and in several provinces where enterprising warload had built small industrial complexes.

One way of summarizing these differences is to examine the contrast between the coastal and inland areas. For example, the seven coastal provinces and three centrally administered municipalities have only 11 percent of the land area of China but, according to the census of 1953, had 40 percent of the population. The distribution of the rural population reflects centuries of subsistence farming, but the distribution of the urban population reflects the historical pattern of industrial development. Of the 102 municipalities that had a population of 100,000 or more in 1953, 49 were concentrated in the narrow coastal area, where the urban population represented about 18 percent of the total. In the inland area, the urban population represented only about 9 percent of the total.

As measured by the indexes presented in this section, two-thirds of total industrial production in 1952 originated in the coastal area. Nearly three-quarters of modern industrial production originated there whereas more than half of handicraft production originated in the

³ The groupings of provinces, autonomous regions and centrally administered municipalities used in this paper are as follows:

	Coastal area	Inland area
Northeast.....	Liaoning.....	Hellungkiang. Kirin.
North.....	Peking..... Tientsin..... Hopeh..... Shantung.....	Honan. Inner Mongolia. Shansi.
East.....	Shanghai..... Chekiang..... Kiangsu.....	Anhwel.
Central.....		Hunan. Hupeh. Kiangsi.
South.....	Fukien..... Kwangtung.....	Kwangsi.
Southwest.....		Kwelchow. Szechwan. Tibet. Yunnan.
Northwest.....		Kansu. Ningsia. Shensi. Sinkiang. Tsinghai.

inland area. As a result, handicrafts accounted for about 13 percent of total industrial production in the coastal area and 33 percent of the total in the interior. Thus industry in the coastal area was both larger and more modern.

Faced with this unbalanced concentration of industrial capacity, the Chinese undertook a deliberate policy of developing the interior which is summarized in the First Five-Year Plan :

The geographical distribution of our new industrial capital construction must conform to the long-term interests of the state, and take account of conditions at different stages of our development. It must follow the principle of appropriately distributing our industrial productive forces over various parts of the country, locating industries close to sources of raw materials and fuel and areas of consumption, and complying with the need to strengthen national defense, so as to change gradually the irrational distribution of industry and develop the economy of backward areas.⁴

In accordance with this general statement of principle, the First Five-Year Plan contained the following specific provisions governing the geographical distribution of industrial capital construction: (1) expansion of existing industrial bases, especially in Northeast China, in order to support the construction of new industrial areas; (2) construction of new industrial bases in North China and Central China, centering around two new iron and steel complexes to be built in Pao-t'ou and Wu-han; and (3) preparation for the construction of a new industrial base in Southwest China.

The first principle enumerated above—that of locating production close to sources of raw materials and to areas of consumption—sprang from the belief of Chinese planners that most transportation is an uneconomical use of resources. Shanghai was frequently cited as an example of an industrial area located far away from its sources of raw materials and fuel. As the leading textile center of China, 60 to 70 percent of its cotton supply had to be transported from North or Central China or even from abroad. In addition, several million tons of coal had to be brought in from North China each year to support Shanghai's industrial production.

The second principle—that of national security—has been a prominent feature in all discussions of regional economic development. In 1952, when about three-quarters of total industrial production and more than 80 percent of the output of the ferrous metallurgy and machine-building industries were located in the coastal area, the Chinese considered themselves peculiarly vulnerable to foreign attack. This concentration of modern industry in the coastal provinces was a major consideration in the decision to locate in China's interior 472 out of the 694 major industrial construction projects listed in the First Five-Year Plan.

The third principle—that of the economic and cultural elevation of peoples in backward areas—is largely ideological in character. The economic and security considerations embodied in the first two principles are the major factors underlying Chinese plans for regional development; the Chinese are nevertheless genuinely concerned with raising the standard of living in the backward inland areas.

⁴ *First Five-Year Plan for Development of the National Economy of the People's Republic of China in 1953-57*, Peking, 1956, p. 40.

The geographical redistribution of a nation's industry takes time, yet even during the First Five-Year Plan period there was a noticeable shift. Indexes and relative shares of total industrial production in the coastal and inland areas during the years 1952, 1957, 1965, and 1970 are presented in table 4. By 1957, production in the inland area had more than doubled, whereas production in the coastal area had grown by about 84 percent. Although the spread between the rates of growth during the First Five-Year Plan period was not great, the relative importance of the inland area grew from 32 percent to about 36 percent.

TABLE 4.—CHINESE INDUSTRIAL PRODUCTION, BY REGION, 1952, 1957, 1965, AND 1970

	1952	1957	1965	1970
Index:				
Total industrial production.....	100	195	289-313	388-449
Coastal.....	100	184	240-260	316-365
Inland.....	100	218	394-426	540-624
Relative shares:				
Total industrial production.....	100	100	100	100
Coastal.....	68	64	56	55
Inland.....	32	36	44	45

By 1965, most of the large-scale industrial construction projects started during the 1950's had been completed and the full impact of the regional development program was more apparent. Industrial production in the interior was nearly double that of 1957 whereas production had grown by only about two-fifths in the coastal area. As a result, the share of the inland area grew from 36 percent in 1957 to 44 percent in 1965. During the Cultural Revolution, however, the rate of change in the concentration of industry slowed drastically, both because fewer large-scale construction projects were completed and because the rate of growth was much lower in both areas. Nevertheless, by 1970 production in the inland area had risen to 45 percent of the total.

In summary, the Chinese have persisted in their plans for the regional development of the country through thick and thin. The original plan—which was first to repair the industrial centers damaged during World War II, then to build new industrial bases in North and Central China, and finally to develop the Southwest and the Northwest—has certainly been delayed, but the pattern of development has been retained (see fig. 1). Pao-t'ou and Wu-han, for example, are now well established industrial bases, and a large number of industrial construction projects are currently under development in Southwest China.



Figure 1. China: Major Industrial Centers

V. INDUSTRIAL ACHIEVEMENTS IN 1971 AND PROSPECTS FOR 1972-75

The Fourth Five-Year Plan got off to a good start, according to the percentage increases that the Chinese reported in the New Year's Day editorial and my preliminary estimates for 1971 (as summarized in table 5). Production of coal in 1971 was up to 325 million tons from 300 million tons in 1970. This increase of about 8 percent was modest in comparison to the more rapid growth in tonnage carried by the railroads and in the production of commodities which consume large quantities of coal, such as steel, chemicals, and electric power. The fuels sector as a whole grew by 14-15 percent because of the rapid growth in the production of electric power and crude oil. The production of electric power rose from 60 billion kilowatt hours in 1970 to 70 billion kilowatt hours in 1971, largely in response to increased industrial demand. And with the exploitation of large new oilfields,

the production of crude oil jumped from 18 million tons in 1970 to 23 million tons in 1971, an increase of 27 percent in a single year.

TABLE 5.—INDICATORS OF CHINESE INDUSTRIAL PRODUCTION, 1971

	Officially reported percentage increases		Author's preliminary estimates
	Physical output	Gross value	
Fuels:			
Electric power ¹	18		70 billion KWH.
Coal ¹	8+		325 million M.T.
Crude oil ¹	27.2		23 million M.T.
Ta-ch'ing oilfield	20+		
Natural gas	25		
Industrial materials:			
Iron ore	26.1		
Pig iron	23		
Crude steel ¹	18		21 million M.T. ²
Rolled steel	15		
Chemical fertilizer:			
Product weight ³	20.2		
Standard weight ^{1, 4}			9.6 million M.T.
Cement	16.5		
Large-scale plants ¹			14 million M.T.
Timber ¹			(?)
Machinery:			
Machine building ⁵		18	
In Liaoning		15.3	
Mining equipment		62	
Metallurgical equipment		24.7	
Agricultural machinery		21	
Machine tools ¹			55 thousand units.
Light industry:			
In Shanghai		4.9	
Paper ¹			(?)
Cotton Cloth ¹			7.5 billion lin. M.
Sugar ¹			1.9 million M.T.

¹ These commodities are included in the index presented in this paper.

² Crude steel is the only industrial commodity for which an absolute figure has been reported for 1971.

³ Product weight is the shipping weight of all types and grades of domestically produced chemical fertilizer.

⁴ Standard weight is the weight after conversion to units of fixed nutrient content. For nitrogen fertilizer, the standard is 20 percent nitrogen; for phosphorus fertilizer, 18.7 percent phosphoric acid; and for potassium fertilizer, 40 percent potassium oxide.

⁵ Not enough data were available to make estimates for the production of these commodities in 1971.

⁶ Machine building is 1 of the 3 branches included in the machinery sector. The other 2 are metal products and repair

The industrial materials sector also grew rapidly in 1971. Production of crude steel grew from 18 million tons in 1970 to 21 million tons in 1971, an increase of 18 percent. Although steel capacity has been expanded and the production of rolled steel is reported to have grown by 15 percent, the industry continues to be hampered by a shortage of rolling and finishing capacity for special types of steel products. And in spite of the rapid rate of growth in the production of pig iron, crude steel has overtaken pig iron, and China changed from a net exporter of pig iron to a net importer in 1971. Other industrial materials also grew rapidly. The production of chemical fertilizer rose from 7.4 million tons in 1970 to 9.6 million tons in 1971, and the production of cement at large-scale plants grew from 13 million tons in 1970 to 14 million tons in 1971. The industrial materials sector as a whole probably grew by at least 15 percent in 1971.

The gross value of the machine-building industry is reported to have grown by 18 percent, but this claim is difficult to accept because officially reported gross value data have tended to overstate the rate of growth in the past. In particular, during the 1950's when a more detailed comparison was possible, the gross value of output for the machine-building industry had the greatest upward bias of all branches

of industry that were measured. Although the officially reported increase overstates the rate of growth, the true rate cannot be estimated accurately because data on the physical output of the major types of machinery necessary for an independent evaluation of the performance of the machine building industry are not available. Machine tools, the sole commodity for which an estimate of physical output for 1971 is available, grew only about 10 percent in 1971, yet the rate of growth for the machinery sector as a whole may have been as high as 15 percent.

The light industrial sector appears to have grown only slowly. The production of cotton textiles in 1971 was probably no higher than the 7.5 billion linear meters produced in 1970 despite a slight increase in the cotton crop. Production in 1970, however, was considerably higher than had been expected because stocks of ginned cotton that had accumulated during the Cultural Revolution were drawn down. Growth in the food processing industry was low because there was little or no increase in agricultural production during 1971. On the positive side, the production of light industrial commodities produced from nonagricultural raw materials increased, and Shanghai, the most important light industrial center in China, reported an increase of 4.9 percent in the production of light industrial commodities. On balance, the production of the light industrial sector probably grew by less than 5 percent in 1971.

With increases in the fuels, industrial materials, and machinery sectors averaging about 15 percent and an increase of less than 5 percent in the light industrial sector, total industrial production probably grew about 12 percent. Although substantially below the 17 percent increase achieved in 1970, this is nevertheless a rapid rate of growth.

With present production at peak levels in all four sectors, the continued growth of industry in 1972-75 will depend on the level of construction activity that has prevailed over the last several years. During the early 1960's, construction was limited primarily to the completion of projects that had been started in the late 1950's. By 1964 or 1965, a broader construction program appears to have been started. For example, new crude steel capacity was added even though rolling and finishing capacity was the bottleneck. During the Cultural Revolution, however, when the production of steel, cement, and timber was down substantially and transportation disrupted, construction activity was undoubtedly affected, but a surprising amount of work appears to have been continued, especially on the major new complexes in Central, South, and Southwest China.

One area for which construction data are available is the electric power industry. Indexes of installed generating capacity and the production of electric power for the years 1957-70 are plotted in figure 2, together with the index of industrial production from table 1. The amount of generating capacity installed has varied considerably from year to year, but significant additions were made every year throughout the period even though there was a substantial amount of excess capacity. Thus, the additions to capacity can only have been building ahead for long-run industrial growth.

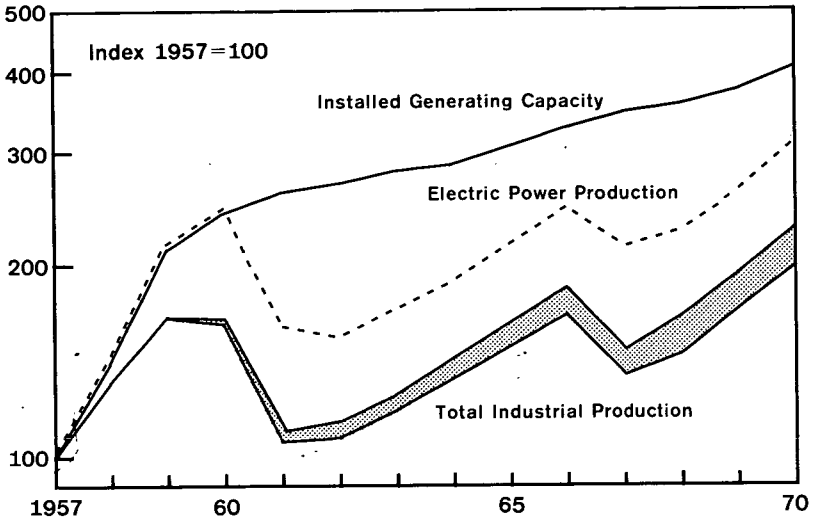


Figure 2. China: Indexes of Installed Generating Capacity, Electric Power Production and Total Industrial Production

I expect that industry will grow rapidly over the next few years and that this rapid growth will be accompanied by a continued shift in structure. Most of the resources available for investment will be allocated to heavy industry, and industrial crops will continue to be sacrificed in favor of food crops. The growth of light industry should keep well ahead of population growth, but by 1975 it will probably account for less than 25 percent of total industrial production.

I also expect that the interior will continue to be developed at the expense of the coastal area. Even though construction in the coastal area has continued, most of the effort has been and will continue to be in the inland area, especially in Southwest China. Thus, by 1975, more than half of total industrial production will probably originate in the inland area.

APPENDIX A

DESCRIPTION OF THE INDEX

The index of Chinese industrial production presented in this paper is an elaboration of the index I prepared for the Joint Economic Committee in 1966.⁵ The construction of the aggregate index is discussed briefly in part I of this appendix; and the procedures used to distribute production by functional sector and geographic region are discussed in parts II and III, respectively.

I. THE AGGREGATE INDEX

A. For the Years 1949-59

Indexes showing the growth of production for individual branches of industry, for industry and handicrafts, and for total industrial production during the years 1949-59 are presented in table A-1. The construction of these indexes is described below:

⁵ See Robert Michael Field, "Chinese Communist Industrial Production." *An economic Profile of Mainland China*, Joint Economic Committee of the U.S. Congress, Washington 1967, pp. 269-295.

TABLE A-1.—DERIVATION OF THE INDEX OF INDUSTRIAL PRODUCTION, 1949-59

[1956=100]

	Weights	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Total industrial production.....	100.00	27.17	34.35	45.62	56.06	70.15	80.18	80.69	100	109.36	143.78	181.60
Industry.....	84.79	21.84	29.00	41.22	53.13	65.18	75.96	78.81	100	111.00	149.81	192.41
Fuels and power:												
Electric power.....	2.18	25.96	27.42	34.65	43.76	55.41	66.30	73.80	100	116.56	165.91	250.12
Coal.....	12.26	29.25	38.71	47.87	59.98	62.85	75.46	88.37	100	117.29	179.85	234.51
Petroleum.....	.92	10.40	17.20	26.23	37.49	53.48	67.84	83.06	100	125.37	194.67	318.14
Industrial materials:												
Ferrous metals.....	5.96	3.73	12.24	21.28	34.48	46.24	54.93	69.07	100	133.28	189.44	264.06
Chemical processing.....	2.88	9.38	16.27	28.94	38.14	47.53	63.11	75.96	100	119.33	166.33	234.58
Building materials.....	9.82	10.34	22.06	38.95	44.75	60.64	71.95	70.44	100	107.30	145.47	191.93
Timber.....	5.83	25.09	29.75	35.20	53.04	83.32	105.88	100.11	100	134.14	168.98	199.63
Machinery: Metal processing.....	19.96	14.83	21.76	35.28	43.80	51.14	60.88	62.64	100	105.53	163.72	204.21
Light industry:												
Paper.....	1.21	14.82	19.29	33.03	50.98	58.56	71.07	78.79	100	125.19	166.87	233.10
Textiles.....	21.10	24.60	34.37	45.33	61.36	74.88	85.27	77.85	100	94.00	116.92	148.69
Food processing.....	17.88	35.17	36.75	52.39	64.48	78.98	85.62	93.17	100	116.17	127.32	152.96
Handicrafts.....	15.21	56.87	64.16	70.16	72.25	97.87	103.72	91.22	100	100.21	110.18	121.34

1. INDUSTRY

The index of production for industry was constructed from Chinese data on the physical output of 33 commodities produced by 11 branches of industry. These data were weighted in two stages. In the first stage the output series were grouped by branch of industry and weighted by their respective prices to calculate indexes for each branch separately.

In the second stage an index for industry as a whole was obtained by combining the indexes for the individual branches. The weights employed for the aggregation of the branch indexes were estimates of the values added in 1956 which were computed from the wage bill paid to workers employed in industry.

2. HANDICRAFTS

The index of handicraft production was constructed from Chinese data on the physical output of eight commodities. For the years 1949-57 these data were weighted by their respective prices. The years 1958 and 1959, however, presented a special problem because the output data for coal and pig iron include the output produced by mass campaigns during the Leap Forward and are not comparable to the output data for the earlier years. For these years the index was constructed in two steps. First, an index was constructed based on the six commodities for which output data comparable to that for the earlier years are available; and second, this index was adjusted to allow for the difference between its rate of growth and that shown by the full index of handicraft production described above.

3. TOTAL INDUSTRIAL PRODUCTION

In the third stage of aggregation the index of total industrial production was obtained by combining the indexes for industry and handicrafts. Independent estimates of the values added in industry and handicrafts could not be used as weights because the data on the earnings of handicraft workers necessary to calculate the weights were not available and could not be estimated. The estimates used in this paper were based on an adjustment of official data for the net value of total industrial production in 1955.

B. For the Years 1960-70

The index for the years 1960-70 is presented in the form of a range rather than as a single-valued series because the deterioration in the coverage and accuracy of the physical output data has made it impossible to determine accurately the level of industrial production. The lower end of the range was calculated in two stages. First, those series for which physical output could be estimated were weighted by their respective prices, and then the resulting sample index was adjusted for the difference between its rate of growth and that shown by the index of total industrial production in the period 1952-57. Finally, the upper end of the range was calculated by linking the sample series to the index of total industrial production in 1959. The details of these calculations are shown in table A-2.

TABLE A-2.—DERIVATION OF THE INDEX OF INDUSTRIAL PRODUCTION, 1960-70

Year	Sample output data ¹ (1959=100)	Total industrial production (1956=100)	
		Adjusted ²	Linked ³
1959.....	100.00	181.60	181.60
1960.....	98.44	176.42	178.76
1961.....	66.00	116.75	119.86
1962.....	67.77	118.30	123.07
1963.....	75.35	129.82	136.84
1964.....	85.47	145.33	155.22
1965.....	96.67	162.22	175.56
1966.....	108.83	180.24	197.64
1967.....	89.47	146.23	162.48
1968.....	97.95	158.00	177.88
1969.....	117.08	186.39	212.63
1970.....	138.49	217.58	251.50

¹ Derived from the estimates of physical output presented in table B-1.

² Calculated from the formula:

$$I_i = \frac{1+\alpha}{1+\beta} \times \frac{I'_i}{I'_{i-1}} \times I_{i-1}$$

where I represents the index of total industrial production, I' represents the index computed from the sample output data, and α and β represent the average annual rates of growth during the years 1953-57 of the index of total industrial production and of the sample index, respectively. The value of the index of total industrial production in 1959 is from table A-1, and the values of α and β are 0.1430 and 0.1581, respectively. (For a more complete description of this formula, see Norman M. Kaplan, and Richard H. Moorsteen, *Indexes of Soviet Industrial Output*, Santa Monica, 1960, pp. 61-68.)

³ Calculated by linking the sample index to the index of total industrial production in 1959.

Because several of the commodities included in the sample index have grown very rapidly, linking it to the index of total industrial production for the earlier years has probably introduced an upward bias into the upper end of the range. On the other hand, the repeated deflation of the sample index may have introduced a downward bias into the lower end of the range. It seems likely, however, that the true value lies within the range presented.

II. THE SECTORAL INDEXES

A. For the Years 1952 and 1957

Indexes for broad functional sectors of total industrial production during 1952 and 1957 are presented in table A-3. The method by which production was allocated to functional sectors is described below:

TABLE A-3.—DERIVATION OF SECTORAL INDEXES FOR TOTAL INDUSTRIAL PRODUCTION 1952 AND 1957

[1956=100]

	Weights ¹	1952	1957
Total industrial production (100).....	100.00	56.15	109.49
Fuels and power.....	11.57	56.67	118.60
Industrial materials.....	24.77	44.52	120.40
Machinery.....	16.23	45.40	105.61
Light industry.....	47.43	65.78	102.89
Industry (84.79).....	100.00	53.26	111.15
Fuels and power.....	13.21	56.33	117.67
Industrial materials.....	27.23	43.45	121.43
Machinery.....	17.17	43.80	105.53
Light industry.....	42.40	62.44	104.80
Handicrafts (15.21).....	100.00	72.25	100.21
Fuels and power.....	2.46	66.74	146.33
Industrial materials.....	11.03	59.29	106.28
Machinery.....	11.03	59.29	106.28
Light industry.....	75.47	76.22	96.93

¹ Weights may not add to 100, because of rounding.

1. INDUSTRY AND HANDICRAFTS

Industrial and handicraft production were separately allocated to functional sectors. For industry the weighted averages of the branch indexes presented in table A-1 are used as sectoral indexes on the assumption that within each sector the branches of industry not specifically included in the original index grew at the same rate as those that were. Although the calculations are based on an assumption they appear to be reasonable because an index of total industrial production derived from the sectoral indexes and a set of adjusted weights—which is described below—differs from the original index by only 0.13 and 0.15 index points in 1952 and 1957 respectively.

For handicrafts the sectoral indexes had to be estimated indirectly because physical output data were not available for a large enough number of commodities to estimate the distribution of production, even for broad functional sectors. The index for light industry—which is by far the largest sector of handicrafts—was derived from the data on the gross value of consumer goods produced by handicrafts that are presented in table B-3 (appendix B) on the assumption that the value added by the light industrial sector constituted the same proportion of all handicraft production as the gross value of consumer goods in the gross value of all handicraft production. The index for the fuels and power sector was derived directly from the handicraft production of coal and the indexes for the industrial materials and machinery sectors were estimated by dividing the residual share of handicraft production evenly between them.

Although the handicraft indexes are not as accurate as those for industry they appear to be reasonable. The index for the fuels sector is derived directly from physical output data and the index for the light industrial sector corresponds fairly closely to an index derived from the physical output of the five light industrial commodities for which data are available. There is no corresponding check for industrial materials or machinery, but handicraft production is such a small proportion of these sectors that even a fairly large error would not have an appreciable effect on the index for the corresponding sector of total industrial production.

2. TOTAL INDUSTRIAL PRODUCTION

Sectoral indexes for total industrial production were derived from the indexes for industry and handicrafts using the weights presented in table A-4. For industry the original weights are the sum of the branch weights presented in table A-1. Because the original weights for the industrial materials and light industrial sectors do not include the entire production of their respective sectors they had to be adjusted. The adjustment factor, which is derived from the data presented in table B-4, is the ratio of the gross value produced by the entire sector to the gross value produced by the specifically included branches.

TABLE A-4.—DERIVATION OF WEIGHTS FOR THE SECTORAL INDEXES

	Industry					Handicrafts	Total industrial production	
	Original weights	Adjustment factor	Adjusted weights					
Fuels and power.....	15.36	1.000	15.36	13.21	11.20	2.46	.37	11.57
Industrial materials.....	24.49	1.293	31.66	27.23	23.09	11.03	1.68	24.77
Machinery.....	19.96	1.000	19.96	17.17	14.55	11.03	1.68	16.23
Light industry.....	40.19	1.227	49.30	42.40	35.95	75.47	11.48	47.43
Aggregate.....	100.00		116.28	100.00	84.79	100.00	15.21	100.00

Estimating sectoral weights for handicrafts was more difficult. First, the weight for light industry was derived from the relative share of consumer goods in the gross value of handicraft output in 1956; next, the weight for fuels and power was estimated from the weight assigned to the coal industry in table A-1 on the assumption that the value added per ton of coal was the same in handicrafts as in the modern part of the industry. And finally, in the absence of data on which to base independent estimates, the residual share of the weight was divided evenly between industrial materials and machinery.

B. For the Years 1965 and 1970

The derivation of sectoral indexes for total industrial production during 1965 and 1970 is presented in table A-5. For the fuels and power sector, because the coverage of the physical output data is the same as that for the 1950's, the sectoral index was calculated directly from the physical output series for electric power, coal, and crude oil in table B-1 using an adjustment of the weights in table A-1 which makes an allowance for the handicraft production of coal.

TABLE A-5.—DERIVATION OF SECTORAL INDEXES FOR TOTAL INDUSTRIAL PRODUCTION, 1965 AND 1970

	[1956=100]				
	Weights	Sample indexes		Final indexes	
		1965	1970	1965	1970
Fuels and power.....	11. 57	235. 05	358. 13	223. 65-242. 04	321. 35-371. 45
Industrial materials.....	24. 77	228. 60	331. 98	217. 51-235. 40	297. 89-344. 33
Machinery.....	16. 23	193. 12	288. 64	183. 75-198. 86	259. 00-299. 38
Light industry.....	47. 43	114. 21	148. 27	108. 67-117. 61	133. 04-153. 79
Total industrial production.....	100. 00	170. 49	242. 48	162. 22-175. 56	217. 58-251. 50

For the industrial materials sector coverage has been greatly reduced but a sample index that was calculated by applying price weights to the physical output series for crude steel, chemical fertilizer, cement, and timber is used because it corresponds reasonably well to the sectoral index for 1952 and 1957 presented in table A-3 above. The same procedure was used for the light industrial sector even though a sample index calculated from the series for paper, cotton cloth, and sugar did not grow as fast as the sectoral index in table A-3. During the 1950's there was a rapid shift from production in the home or on the farm to factory production, and adjusting the sample index on the basis of the difference in the rates of growth shown during the First Five-Year Plan period would assume implicitly that this shift had continued at the same rate during the 1960's and would probably introduce an upward bias into the index. For this reason the unadjusted sample index was used for the years 1965 and 1970.

Estimating an index for the machinery sector presented the greatest problem because it is represented by a single physical output series for the years since 1957. Machine tools are essential for China's industrial development but they represent only a small proportion of the value of machinery production. To make estimates for 1965 and 1970 I regressed the more complete machinery index for the years 1952-57 against the production of machine tools and crude steel. The regression was as follows:

$$I = 20.51 + 0.169 MT + 0.584 ST$$

where I stands for the machinery index, MT for an index of machine tools and ST for an index of crude steel production.

Finally, the sample sectoral indexes were weighted to form a sample index for total industrial production. This sample index was then forced to equal the upper and lower ends of the range in the final index for total industrial production in order to introduce a range into each of the sectoral indexes.

III. THE REGIONAL INDEXES

A. For the Years 1952 and 1957

Regional indexes for total industrial production during 1952 and 1957 are presented in table A-6. Because the index for industry as a whole, even for the earlier years, is based on the production of only 33 commodities the regional distribution of the value of these commodities is not a reliable indicator of the regional distribution of industrial activity. For this reason the regional indexes were based on official data for the gross value of industrial production—even though it is known to be a defective measure.⁵ This was done for two reasons:

⁵ For a discussion of the defects in the official data for the gross value of industrial production, see Robert Michael Field, "Labor Productivity in Industry," *Economic Trends in Communist China*, Eckstein, Galenson and Liu, eds., Chicago, 1968, pp. 638-644.

First, the coverage of the official data is complete whereas the coverage of the physical output data is not; and second, the aggregate value-added index is available to serve as a control.

TABLE A-6.—DERIVATION OF REGIONAL INDEXES FOR TOTAL INDUSTRIAL PRODUCTION 1952 AND 1957
[1956=100]

	Weights	1952	1957
Total industrial production (100).....	100.00	56.06	109.36
Coastal.....	64.57	58.83	108.52
Inland.....	35.43	50.95	110.89
Industry (84.79).....	100.00	53.13	111.00
Coastal.....	67.90	57.20	109.53
Inland.....	32.10	44.53	114.12
Handicrafts (15.21).....	100.00	72.25	100.21
Coastal.....	46.00	72.25	100.21
Inland.....	54.00	72.25	100.21

The specific procedures used to calculate the regional indexes are as follows: First, indexes for the gross value of industrial and handicraft production were derived from the data presented in table B-5. Next, deflators for these gross value indexes were derived by dividing the value-added index presented in table A-1 by the gross value index derived above. The deflators for industry and handicrafts were derived separately, but within each category the deflator for the coastal and the inland areas was the same. And then, on the assumption that the upward bias in the gross value data was the same in both the coastal and inland areas, regional indexes of value added were derived by deflating the gross value indexes described above.

Finally, regional indexes of total industrial production were derived from the indexes for industry and handicrafts. The weights for the coastal and inland areas were derived from the weights for industry and handicrafts presented in table A-1 on the assumption that the relative shares of the coastal and inland areas were the same as the shares in the gross value of output in 1956.

B. For the Years 1965 and 1970

The derivation of regional indexes for total industrial production during 1965 and 1970 is presented in table A-7. First, sample regional indexes were calculated by applying price weights to the physical output series presented in table B-2. For the coastal area, machine tools and timber were excluded from the index because the regional distribution of their production was available for only a single year. For the inland area, two additional commodities were excluded. Neither crude oil nor chemical fertilizer was used in the index because their production in 1970 was 18 times and 37 times that of 1957, respectively. These rates of growth are much too high to be considered typical of industrial production in the inland area, and with the small size of the sample, would have introduced a severe upward bias into the index.

TABLE A-7.—DERIVATION OF REGIONAL INDEXES FOR TOTAL INDUSTRIAL PRODUCTION 1965 AND 1970
[1956=100]

	Weights	Sample indexes		Final indexes	
		1965	1970	1965	1970
Coastal.....	64.57	157.71	223.95	141.07-152.67	185.96-214.95
Inland.....	35.43	224.43	331.45	200.76-217.26	275.22-318.13
Total industrial production.....	100.00	181.35	262.03	162.22-175.56	217.58-251.50

Finally, the sample regional indexes were weighted to form a sample index for total industrial production. This sample index was then forced to equal the upper and lower ends of the range in the final index for total industrial production in order to introduce a range into the regional indexes. Unlike the weighted average of the sample indexes for the functional sectors, the index of total industrial production derived from the sample regional indexes was slightly above the upper end of the range in the final index. The inability to include the production of machine tools and timber, both of which grew relatively slowly, has probably introduced an upward bias into the indexes, but this bias has been corrected by the forcing process described above.

APPENDIX B
STATISTICAL TABLES

TABLE B-1.—ESTIMATED PRODUCTION OF SELECTED INDUSTRIAL COMMODITIES, 1949-70

Year	Electric power (million kw.-hrs.)	Coal (th. M.T.)	Crude oil (th. M.T.)	Crude steel (th. M.T.)	Chemical fertilizer ¹ (th. M.T.)	Cement ² (th. M.T.)	Timber (th. cu. M.)	Machine tools (units)	Paper (th. M.T.)	Cotton cloth (million linear M.)	Sugar (th. M.T.)
1949.....	4,308	32,430	121	158	27	661	5,760	1,582	228	1,889	199
1950.....	4,550	42,920	200	606	70	1,410	6,640	3,312	380	2,522	242
1951.....	5,750	53,090	305	896	137	2,490	7,640	5,853	492	3,058	300
1952.....	7,261	66,490	436	1,349	194	2,861	11,200	13,734	603	3,829	451
1953.....	9,195	69,680	622	1,774	263	3,877	17,530	20,502	667	4,685	638
1954.....	11,001	83,660	789	2,225	343	4,600	22,210	15,901	842	5,230	693
1955.....	12,278	98,300	966	2,853	426	4,503	20,930	13,708	839	4,361	717
1956.....	16,593	110,360	1,163	4,465	663	6,393	20,840	25,928	998	5,770	807
1957.....	19,340	130,732	1,458	5,350	803	6,860	27,870	28,297	1,221	5,050	864
1958.....	28,000	230,000	2,300	8,000	1,400	9,300	35,000	30,000	1,600	5,700	900
1959.....	42,000	300,000	3,700	10,000	1,900	11,000	41,000	33,000	1,700	7,500	1,100
1960.....	47,000	280,000	4,600	13,000	2,500	9,000	33,000	38,000	1,700	5,800	920
1961.....	31,000	170,000	4,500	8,000	1,400	6,000	27,000	30,000	1,000	4,000	700
1962.....	30,000	180,000	5,000	8,000	2,100	5,500	29,000	25,000	1,000	4,200	480
1963.....	33,000	190,000	5,500	9,000	2,900	7,300	32,000	35,000	1,100	4,500	540
1964.....	36,000	200,000	6,900	10,000	3,500	8,700	34,000	38,000	1,500	4,900	1,100
1965.....	42,000	220,000	8,000	11,000	4,500	11,000	36,000	44,000	1,700	5,400	1,500
1966.....	47,000	240,000	10,000	13,000	5,500	12,000	38,000	48,000	1,800	6,000	1,600
1967.....	41,000	190,000	10,000	10,000	4,000	10,000	30,000	40,000	1,700	4,800	1,700
1968.....	44,000	200,000	11,000	12,000	4,800	11,000	32,000	40,000	1,700	4,800	1,800
1969.....	50,000	250,000	14,000	15,000	5,800	12,000	35,000	45,000	1,800	6,500	1,600
1970.....	60,000	300,000	18,000	18,000	7,400	13,000	40,000	50,000	2,000	7,500	1,700

¹ Production is measured in standard units of fixed nutrient content. For nitrogen fertilizer, the standard is 20 percent nitrogen; for phosphorus fertilizer, 18.7 percent phosphoric acid; and for potassium fertilizer, 40 percent potassium oxide.

² Large-scale plants only.

TABLE B-2.—ESTIMATED PRODUCTION OF SELECTED INDUSTRIAL COMMODITIES, BY REGION, 1952, 1957, 1965, AND 1970

	Total	Coastal	Inland
Electric power (billion kilowatt hours):			
1952	7.3	4.8	2.5
1957	19.3	11.6	7.8
1965	42.0	22.7	19.3
1970	60.0	34.0	26.0
Coal (million metric tons):			
1952	66.5	22.9	43.6
1957	130.7	46.5	84.3
1965	220.0	78.0	142.0
1970	300.0	121.3	178.7
Crude oil (million metric tons):			
1952	.4	.3	.2
1957	1.5	.6	.9
1965	8.0	1.3	6.7
1970	18.0	2.4	15.6
Crude steel (million metric tons):			
1952	1.3	1.1	.3
1957	5.4	4.5	.9
1965	11.0	7.0	4.0
1970	18.0	10.0	8.0
Chemical fertilizer (million metric tons):¹			
1952	.2	.2	—
1957	.8	.7	.1
1965	4.5	2.2	2.2
1970	7.4	3.7	3.7
Cement (million metric tons):²			
1952	2.9	2.1	.7
1957	6.9	4.3	2.5
1965	11.0	4.5	6.5
1970	13.0	4.7	8.3
Timber (million cubic measure): 1958	35.0	6.3	28.7
Machine tools (thousand units): 1970	50.0	39.8	10.2
Machine-made paper (million metric tons):			
1952	.4	.2	.2
1957	.9	.4	.5
1965	1.5	.6	.9
1970	1.8	.7	1.1
Cotton cloth (billion linear measure):			
1952	3.8	3.1	.7
1957	5.0	3.5	1.5
1965	5.4	3.3	2.1
1970	7.5	4.6	2.9
Sugar (million metric tons):			
1952	.5	.2	.3
1957	.9	.3	.5
1965	1.5	.7	.8
1970	1.7	.8	.9

¹ Production is measured in standard units of fixed nutrient content. For nitrogen fertilizer, the standard is 20 percent nitrogen; for phosphorus fertilizer, 18.7 percent phosphoric acid; and for potassium fertilizer, 40 percent potassium oxide.

² Large-scale plants only.

TABLE B-3.—GROSS VALUE OF INDUSTRIAL AND HANDICRAFT OUTPUT, BY PRODUCER AND CONSUMER GOODS, 1952-57

	(Million 1952 yuan)					
	1952	1953	1954	1955	1956	1957
Total industrial production ¹	34,330	44,700	51,970	54,870	70,360	78,390
Producer goods ¹	12,220	16,680	19,990	22,890	32,040	37,940
Consumer goods ¹	22,110	28,020	31,980	31,980	38,320	40,450
Industry ²	27,020	35,580	41,510	44,750	58,660	65,020
Producer goods ²	10,730	14,670	17,580	20,580	29,170	34,330
Consumer goods ²	16,290	20,910	23,930	24,170	29,490	30,690
Handicrafts ³	7,310	9,120	10,460	10,120	11,700	13,370
Producer goods ³	1,490	2,010	2,410	2,310	2,870	3,610
Consumer goods ³	5,820	7,110	8,050	7,810	8,830	9,760

¹ State Statistical Bureau, Ten Great Years, Peking, 1960, pp. 16 and 87.

² Total industrial production less handicrafts.

³ State Statistical Bureau, "Kuo-min ching-chi t'ung-chi t'i-yao" ("Statistical Abstract of the National Economy"), appended to the pamphlet Kuan-yu 1956 nien-tu kuo-min ching-chi chi-hua chih-hsing chieh-kuo ti kung-pao (Communiqué on Results of Implementation of the 1956 Economic Plan), released Aug. 1, 1957, Peking, no publication date, pp. 28-29 except as noted.

⁴ Producer and consumer goods are derived as 52.8 percent and 47.2 percent of industrial production, respectively. See State Statistical Bureau, "Communiqué on Fulfillment and Overfulfillment of China's First Five-Year Plan" NCNA-English, April 13, 1959; in American Consulate General, Hong Kong, Current Background, No. 556, April 15, 1959, p. 4.

⁵ Handicraft production of producer and consumer goods are total production less production by industry alone, respectively.

TABLE B-4.—GROSS VALUE OF INDUSTRIAL OUTPUT, BY SECTOR AND BRANCH 1956

[Million 1952 yuan]

	Total	Producer goods	Consumer goods
Total ¹	58,661	29,166	29,495
Fuels and power ²	3,088	3,088	
Electric power ¹	928	928	
Coal ¹	1,510	1,510	
Petroleum ¹	650	650	
Industrial materials ²	14,167	14,167	
Steel ¹	4,113	4,113	
Chemicals ¹	3,652	3,652	
Building materials ¹	1,475	1,475	
Timber ¹	1,718	1,718	
Other materials ²	3,209	3,209	
Machinery.....	¹ 9,353	⁴ 8,698	⁴ 655
Light industry ²	32,053	3,213	28,840
Paper ¹	1,318	1,318	
Textiles.....	¹ 13,049	⁵ 1,895	⁵ 11,154
Food ¹	11,764		11,764
Other ⁶	5,922		5,922

¹ Robert Michael Field, "The Growth of Industrial Production and Productivity in Communist China: 1952-57" (doctoral thesis, Harvard University), 1966, p. 156. Unless noted below, the production of an individual branch is not divided between producer and consumer goods, but allocated to the category which predominates.

² The sectoral total is the sum of the gross value produced by the branches within the sector.

³ The difference between the value of all producer goods and that produced by the specifically listed branches.

⁴ Producer goods and consumer goods are derived as 93 percent and 7 percent of machinery production, respectively. See Chao I-wen, "Hsin chung-kuo ti kung-yeh" (The industry of New China), Peking, 1957, p. 43.

⁵ State Statistical Bureau, "Wo-kuo kang-t'ieh tien-li mei-t'an chi-hsieh fang-chih tsao-chih kung-yeh ti chin-hsi" (Chinese Iron and Steel, Electric Power, Coal, Machinery, Textile and Paper Industries—Past and Present), Peking, 1958, p. 164-165.

⁶ The difference between the value of all consumer goods and that produced by the specifically listed branches.

TABLE B-5.—GROSS VALUE OF INDUSTRIAL AND HANDICRAFT OUTPUT, BY REGION, 1952 AND 1956-57

[Million 1952 yuan]

	1952	1956	1957
Total industrial production:			
Total.....	¹ 34,326	¹ 70,361	² 78,390
Coastal.....	² 23,111	³ 45,213	² 49,713
Inland.....	² 11,215	² 25,148	² 28,667
Industry:			
Total.....	¹ 27,014	¹ 58,661	² 65,020
Coastal.....	⁴ 19,747	⁴ 39,831	⁴ 43,563
Inland.....	⁴ 7,267	⁴ 18,830	² 21,457
Handicrafts:			
Total.....	¹ 7,312	¹ 11,700	² 13,370
Coastal.....	⁵ 3,364	⁵ 5,382	⁵ 6,150
Inland.....	⁵ 3,948	⁵ 6,318	⁵ 7,220

¹ State Statistical Bureau, "Kuo-min ching-chi t'ung-chi t'i-yao" ("Statistical Abstract of the National Economy"), appended to the pamphlet Kuan-yu 1956 nien-tu kuo-min ching-chi chi-hua chih-hsing chieh-kuo ti kung-pao (Communique on Results of Implementation of the 1956 Economic Plan), released Aug. 1, 1957, Peking, no publication date, p. 23.

² State Statistical Bureau, Ten Great Years, Peking, 1960, pp. 16 and 87.

³ Derived as the sum of industry and handicrafts.

⁴ The coastal and inland areas are derived from the percentage distribution given in Yang Ch'ing-wen, "Two Problems of Industrial Location," Chi-hua ching-chi, No. 8, 1957, p. 13.

⁵ The coastal and inland areas are derived from the percentage distribution given in Ho Cho, "An Elementary Understanding of Chairman Mao's Theory on the Arrangement of Production," Kuang-ming jih-pao, July 18, 1960; translated in Joint Publications Research Service, No. 5481, Oct. 4, 1960, p. 11.

⁶ The coastal and inland areas are derived from the percentage distribution given in Fu Shih-hsia, "The Role of Handicraft Industry in China's National Economy," Ta-kung pao, July 19, 1959. The figures probably refer to 1954, but it was assumed that the distribution did not change during the first 5-year plan period.

THE ELECTRONICS INDUSTRY OF CHINA

By PHILIP D. REICHERS

I. SUMMARY AND CONCLUSIONS

Since the founding of the People's Republic of China in 1949, the Communist government has transformed a few small electronics plants into a mature and powerful industry, consisting of hundreds of plants which produce a broad spectrum of electronics products. Among Communist countries, China now ranks second only to the U.S.S.R. in the volume of electronics production. The industry has enjoyed a priority claim on China's resources because of the importance of its products to both military preparedness and industrial modernization. One-half to three-quarters of total production is produced by the military, with most of the remainder destined for industry. A small volume of radios and other consumer equipment reaches the general population. Despite the rapid gains of the industry China has had to import strategically important advanced electronic products from non-Communist countries in order to keep military and industrial programs moving.

Value of Output and Major Products

During 1971 the value of output of China's electronics industry totaled at least \$1 billion, roughly 1 percent of China's GNP. The industry, which is controlled by the Fourth Ministry of Machine Building, produces:

- Almost all types of standard components plus special-purpose vacuum tubes, transistors and integrated circuits, and printed circuit boards;
- Standard laboratory test instruments and computers, many completely transistorized;
- Specialized military transmitters and receivers;
- Microwave equipment, shortwave radio transmitters, automatic telephone switching apparatus, and black and white television transmitters;
- Radios, phonographs, and black and white television receivers; and
- An impressive assortment of radar, sonar, avionics, and missile and nuclear instrumentation for the military.

Facilities and Labor Force

At present the backbone of the electronics industry consists of about 200 major plants employing approximately 400,000 persons. In addition, there are 500 smaller plants and workshops employing less than 500 workers each—most employ less than 50—or a total of 50,000

workers. Shanghai, Peking, Nanking, Tientsin, Chengtu, and Canton are the six major centers of production. These cities account for about half of China's major electronics plants and nearly three-fourths of China's total electronics output. Concentrations of electronics facilities are also found in Shenyang, Liaoning Province; Changchun, Kirin Province; Suchou, Kiangsu Province; Hangchow, Chekiang Province; Fuchou, Fukien Province; and Wuhan, Hupeh Province. Many of the plants in these cities, however, employ fewer than 100 employees.

History Prior to 1949

In the area now occupied by the People's Republic of China, pre-World War II electronics production was confined to small plants producing a few items of simple communications equipment and replacement parts for imported electronics products. During World War II most of the plants sustained severe damage. Immediately after the war the U.S.S.R. removed the best equipment from those plants located in Manchuria. From 1945 through 1948 the Nationalist government attempted to rebuild and rehabilitate what remained of electronics production facilities but accomplished little because of the civil war. When the Communists took control in 1949, electronics production was at a standstill.

Era of Soviet Support

After their accession to power, the Chinese Communists immediately began to consolidate the small plants into more efficient enterprises, and to rehabilitate old equipment and add some new equipment. They also began to import electronic products from the U.S.S.R. These were not only put to operational use but also were employed as prototypes for domestic production. However, at the end of 1955 the output of the industry was still limited in quantity and assortment because of a lack of modern production machinery. The import from the U.S.S.R. and Eastern Europe in 1956-60 of equipment for several large electronics plants alleviated much of this problem. In addition to complete plants, large amounts of automatic and semiautomatic production machinery, also imported from the U.S.S.R. and Eastern Europe, were installed in plants that were otherwise equipped from domestic Chinese production. By 1960 some 60 major plants had been established, forming the nucleus of the present large scale electronics industry.

Era of Western Support

The withdrawal of Soviet aid in 1960 forced China to turn to the non-Communist countries for assistance. These countries, principally Japan, West Germany, the United Kingdom, France, and Switzerland, are currently the source of more than four-fifths of China's imports of electronic products and production equipment. In 1960-70 more than \$200 million of technologically advanced electronic products as well as millions of dollars of electronics production equipment was imported from the non-Communist world—see table 1. The imports consisted primarily of modern military and industrial electronics which China could have produced domestically only after a long devel-

opment period. These imports, as well as imports from the West, of special electronics materials and technological know-how enabled China to forego the lengthy and expensive process of prototype development and to expand its electronics production base from 60 major electronics plants in 1960 to 200 in 1971. Years were saved in establishing the production of advanced electronic products for industrial and military programs. Although the withdrawal of Soviet support was a sharp blow to short-run prospects for the electronics industry, the Chinese gained in the long run by being forced to develop their own resources and to draw on the technology of the non-Communist countries which were outstripping the U.S.S.R.

TABLE 1.—CHINA: IMPORTS OF ELECTRONIC EQUIPMENT FROM NON-COMMUNIST COUNTRIES¹

[Thousands of dollars]

Type of equipment	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970 ²	Total 1960-70
Professional and scientific instruments and apparatus.....	5,224	1,883	736	2,318	7,802	18,741	24,947	20,308	15,078	11,589	7,926	116,552
Telecommunications apparatus.....	2,247	978	1,238	933	2,127	4,705	6,035	3,501	967	1,480	1,524	25,735
Electric measuring and controlling instruments.....			915	2,136	6,614	14,146	14,312	9,073	5,116	4,267	4,340	60,919
Electron tubes, photo cells, and semiconductors.....		283	156	242	433	440	493	452	507	183	207	3,396
Total.....	7,471	3,144	3,045	5,629	16,976	38,032	45,787	33,334	21,668	17,519	13,997	206,602

¹ Source: Summary of exports and imports from Communist areas in Eastern Europe and Asia. Prepared by: International Trade Analysis Division, Bureau of International Commerce, and U.S. Department of Commerce.

² Data incomplete.

Effects of Cultural Revolution

The electronics industry, as a priority supplier of essential military products, suffered only minor dislocations during the Cultural Revolution (1966-69). Some production was lost because of Red Guard disruptions, but the major thrust of the modernization and capital construction program continued. A number of new electronics plants went into operation during the period, and production continued to increase for the period as a whole.

Outlook for the Fourth Five-Year Plan (1971-75)

The achievements of the electronics industry were widely heralded in the Chinese press in 1970, and it appeared that the industry would continue to receive high priority in the new Fourth Five-Year Plan (1971-75). However, the Chinese leadership recognizes the need for balance in the development of the economy, and rationalization of the priority for the development of electronics is now underway.¹ The new plan period is likely to be a period of consolidation of past gains with investment resources channeled primarily into strengthening the capability of existing facilities for producing more advanced electronics.

Production of solid state components and equipment will be significantly expanded, and, as a result, considerable quantities of transistorized consumer entertainment equipment and simple laboratory test instruments may be available for export. The capabilities of computers will be improved, and the production of microwave equipment and television broadcasting equipment will be increasingly emphasized. The assortment of military electronics will be continually enlarged and will include advanced types of avionics, such as airborne radars to give Chinese fighter planes an all-weather capability. Moreover, China is developing the capability to produce increasingly large amounts of military equipment incorporating transistors (and eventually integrated circuits). This equipment will have improved portability and durability compared with the tube-fitted equipment now standard in the Chinese military forces.

Despite the expected increases in output and advances in technological level, the electronics industry cannot be expected to satisfy all of China's needs. China will still have to import advanced electronic products from Japan, Western Europe, and possibly the United States. China will continue to lag behind Japan and Western Europe in the state of development of its electronic industry—perhaps 5 to 10 years in military electronics and computers and even more in the civilian branches of industry.

Organization of the Paper

China's electronics industry consists of six major product groups, each of which normally has its own separate production facilities and

¹*Jen-min Jih-pao*, May 25, 1971. The article states in part, "Should we take steel as the 'key link' or take electronics as the 'center'? These are two diametrically opposite policies. The role of the iron and steel industry in pushing forward industrial construction as a whole cannot be replaced by any other industry. Electronic technique is the eye and ear of science; adoption of electronic technique may raise the level of automation. The electronics industry plays an important role in the economic construction and the development of national defense. But it is not the basic sector of industry as a whole and cannot be the 'center' in pushing forward the development of industry as a whole".

specialized technology. These product groups are: electronic components, electronic instruments, computers, communications equipment, consumer entertainment equipment, and military electronics. Chapters II through VII cover each of these groups in turn. The appendix furnishes details on China's major electronics plants.

II. ELECTRONIC COMPONENTS

Development of Production Capability

The electronic manufacturing facilities of China in 1949 consisted only of several small plants producing a few types of electronic components—radio receiver tubes, resistors, and capacitors. During the 1950's an extensive program of capital construction was conducted in an effort to expand production capacity for components. The program was substantially aided by imports of machinery, materials, and technical assistance from the U.S.S.R. and Eastern Europe. By 1958 several major new plants equipped with automatic and semiautomatic production machinery had begun production. The most important of these was the Peking Electron Tube Plant with a reported annual capacity of 15 million receiving tubes and 2 million transmitting tubes. Other major plants erected during this period include the Harbin Electron Tube Plant, Shanghai Electron Tube Plant, Peking North China Radio Equipment and Materials Plant, Peking Radio Equipment and Materials Plant No. 2, and the Nanking Electron Tube Plant. In addition, a number of smaller plants were built and several existing facilities were enlarged and re-equipped.

By 1960, China had established a substantial plant capacity for the manufacture of electron tubes and passive components.² Following the Sino-Soviet split in 1960, China turned to the non-Communist countries for assistance and obtained access to modern solid state technology. Since 1960 the Chinese have tried to increase labor productivity and product assortment in existing facilities and, at the same time, develop a new large production capacity for semiconductor materials and components.

Production Facilities

By the end of 1971 China had at least 110 plants (including 70 major plants) engaged in series, batch, or experimental production of electronic components, about 40 percent more plants than in 1965. Facilities engaged in the production of semiconductor components accounted for nearly the entire increase. Vacuum tubes, capacitors, and resistors are produced in about 50 plants while semiconductor materials and components are manufactured in about 70 plants. These figures total more than 110 because both semiconductors and tubes are produced at a number of electronics plants such as the Peking Electron Tube Plant and the Shanghai Electron Tube Plant.

Major concentrations of component production facilities are in Peking, Shanghai, Nanking, Tientsin, and Chengtu. These five cities account for more than half of the known component manufacturers

² *Passive components* are resistors, capacitors and inductors in contradistinction to vacuum tubes and semiconductors which are considered active components in electronic circuits.

and for at least three-fourths of the total output of semiconductors, electron tubes, and passive components. Concentrations of component manufacturers are also found in Harbin, Heilungkiang Province; Tantung and Chinchou, Liaoning Province; Shihchiachuang, Hopeh Province; Sian, Shensi Province; and Canton. It is estimated that 150,000 workers are directly involved in the production of electronic components. This represents one-third of the total number of workers employed in the electronics industry. In terms of number of employees, the plants range from the Peking North China Radio Equipment and Materials Plant with at least 5,000 workers to the Harbin Hungyen Transistor Plant with about 50 workers.

Electron Tubes and Passive Components

Types of vacuum tubes currently in production include all standard receiving tubes; transmitter tubes such as pentodes and air-cooled triodes; high-voltage rectifiers; magnetrons; klystrons; travelling wave tubes (TWT); ultraviolet emitters; and digital counting tubes. In addition the Chinese manufacture miniaturized tubes which are used mainly in military communications equipment. Most Chinese tubes are either adaptations or copies of Soviet tubes. However, several of the tubes, especially magnetrons and klystrons, may be based on Western designs. Despite this fairly wide assortment of electron tube production, there is evidence that China is presently unable to manufacture adequate quantities of certain types of magnetrons and klystrons which are used in high-power applications. China probably relies on imports of such tubes to satisfy its growing requirements for high-power and high frequency transmitting tubes. It is estimated that China now has the capacity to manufacture 75 million ordinary vacuum tubes annually.

Passive Components

China's production of passive components includes tantalum, ceramic, mica, paper, electrolytic, and steel capacitors; carbon film and ceramic resistors; and inductors. Miniature resistors and capacitors, electric wire and cable, nickel-cadmium batteries, and printed circuits also are produced. Probably at least half of the components—including most of the tantalum capacitors, miniature resistors and capacitors, and printed circuits—are utilized in instruments and communications equipment operated by the military.

Semiconductors

By the end of 1971 the number of facilities reported to be engaged in series, batch, or experimental production of semiconductor materials and components had grown to 70, or more than double the number identified in 1965. Of these, about 15 facilities are equipped to produce silicon and germanium monocrystals for use in the manufacture of a relatively small assortment of diodes, transistors, integrated circuits (IC's), and other semiconductor components. Most of the new and modernized facilities are equipped to produce silicon monocrystals. The ability to produce high-purity monocrystalline silicon is required for self-sufficiency in the production of IC's. To a much lesser extent,

probably on a laboratory basis, the Chinese use selenium solar cells and a variety of thermoelectric, photoconductive, and other semiconductor components. It appears China presently has the latent capacity to produce up to a few million IC's and several hundred million transistors and diodes annually. This is less than 5 percent of Japan's output, and because of probable low yield, the production of usable semiconductor components would be even much less.

To support their production of solid state components, the Chinese have imported semiconductor manufacturing equipment from non-Communist countries for operational purposes and for use as prototypes. Several pictures of domestic semiconductor manufacturing equipment have appeared in Chinese publications. One picture shows a batch of crystal-pulling furnaces apparently being inspected at a plant associated with the Institute of Mechanical Engineering in Peking.³ These furnaces appear to be of standard design and are used to "grow" monocrystalline rods of germanium or silicon. Germanium wafers are used only in the manufacture of discrete transistors, diodes, and rectifiers, whereas silicon wafers are used for IC's as well. Another picture shows a variety of Chinese-made equipment for making thin film IC's.⁴ The photograph probably was taken in a laboratory of a Peking electronics plant. Identifiable equipment includes at least four different versions of vacuum coating systems. This level of effort in production, publicized by the Chinese to indicate a technological competence, is not representative of commercial scale production. The Chinese displayed several diffusion furnaces at the 1971 Spring Canton Trade Fair. These units, resembling models manufactured in Japan, are used in the manufacture of both discrete components and IC's. Based on the specifications claimed for some of the displayed equipment, the Chinese appear to be able to make examples of semiconductor production equipment comparable to that in use in the West about 5 years ago. However, it is neither certain nor likely that China can now make all necessary equipment for producing IC's and advanced types of transistors (epitaxial planar types). Further development of China's semiconductor industry therefore depends to a large degree upon China's continued access to non-Communist semiconductor manufacturing equipment and technology.

Contributions to Military-Industrial Modernization

The strong military orientation of China's semiconductor industry is reflected in the end users of solid state components. Transistors and diodes of Chinese manufacture are being used in missile systems, radars, nuclear instrumentation, military communications equipment, and computers (most of which appear to be produced for military uses). Most of the integrated circuits probably are being used in military electronic equipment such as missile guidance systems. Many of these applications are probably very new but will grow in volume with continued development of the electronics industry.

Some transistors, diodes, and other components that fail to meet the rigid reliability requirements prescribed for military applications probably are being used in considerable quantities for civilian equip-

³ *China Pictorial*, January 1971, p. 24.

⁴ *China Pictorial*, January 1971, pp. 26, 27.

ment such as transistorized radio receivers and general industrial control, monitoring, and testing equipment. Moreover, some solid state devices are produced specifically for industrial use. Chinese news media report, for example, that silicon controlled rectifiers (SCR's) and other semiconductor components are being used in numerous applications by the machine tool, electrical equipment, transport equipment, metallurgical, chemical, petroleum, and textile industries as well as in medical appliances. However, little specific information on such applications has been made available, and most of them probably are still in the prototype stage. Electronic equipment fitted with electron tubes is still the mainstay for nonmilitary applications.

III. ELECTRONIC INSTRUMENTS

Types in Production

During the late 1950's China was manufacturing simple laboratory and test instruments such as long wave, medium wave, and short wave signal generators; heterodyne oscillators up to 20 kilocycles (kc.); vacuum tube voltmeters with a range of from 50 cycles to 50 kilocycles and from 1 millivolt to 300 volts; impedance bridges suitable for use at 1,000 cycles; set-frequency and variable-frequency devices for measuring resistance and inductance; and cathode-ray oscillographs suitable for use at more than 150 kilocycles. In the period 1960-71 China transistorized many instruments, produced instruments with higher and broader frequency ranges, and introduced several new types of instruments. Instruments currently in production include ultrasonic thickness testers, phase meters, transistorized oscilloscopes and signal generators, transistor parameter testers, calorimeters, X-ray diffraction spectrometers, and medical apparatus.

Most of the instruments displayed at recent Canton Trade Fairs are not for sale and are shown for propaganda purposes only. Those displayed include model SQ-13 transistorized dual beam sampling oscilloscope with a bandwidth of d.c. to 8,000 megacycles (mc.); model XS-2 microwave frequency variable signal generator; model PZ-9 integrating digital voltmeter with a range of from 1 cycle to 100 kilocycles and from 20 millivolts to 1,000 volts, and model XFS-eight signal generator with a frequency range of 6 cycles to 100 kilocycles in eight bands.

Other instruments recently displayed by the Chinese or reported to be in production include a microwave spectrum analyzer, an electron microscope with a magnification of 400,000X, a scintilloscope used for nuclear research, a gravimeter used for oil exploration, and a laser interferometer used for calibration of length scales. Little or no information is available concerning Chinese production of special purpose instrumentation such as integrated circuit testers, analog-to-digital converters, or automated test equipment.

Production Facilities

The production of instruments is centered at approximately 50 major plants employing about 90,000 workers. Major concentrations of instrument production facilities are in Peking, Shanghai, Nanking,

and Tientsin. At these four cities are located more than half of the identified instrument manufacturers and probably about two-thirds of the total output of instruments. Major centers of instrument production are also found in Harbin, Heilungkiang Province; Suchou, Kiangsu Province; Tsingtao, Shantung Province; Sanmenhsia, Honan Province; Swatcw, Kwangtung Province; Wuhan, Hupeh Province; and Chilin, Kirin Province.

Technical Level of Production

Based upon specifications given by the Chinese, it is apparent that China can manufacture, in accordance with Western standards, simple instruments such as voltmeters and transistorized low frequency oscilloscopes, but lags, technologically, at least 5 years behind advanced Western nations in the production of instruments designed for specialized applications or for operation in the higher frequency ranges. For example, Chinese oscilloscopes are limited mainly to general-purpose, low frequency (less than 30 mc.) laboratory applications. Several high frequency instruments, including the model SQ-13 oscilloscope, were reported by observers as hand finished, probably one-of-a-kind, intended for display and experimental purposes. Many of these newer instruments have a distinct Western appearance; in fact the face plates of several instruments bear close resemblance to instruments in the United States, Western Europe, and Japan. It could not be determined, however, whether the instruments were copies.

Imports From Non-Communist Countries

China has imported technologically advanced instrumentation from non-Communist countries for operational use and, apparently, to copy. As listed in table 1, Chinese imports from non-Communist countries of professional and scientific instruments and apparatus, and industrial electric measuring and controlling instruments totaled \$177 million. If this figure is reduced by the value of imported computers (see chapter IV), the net value of imported instrumentation is approximately \$157 million, about three-fourths of China's total imports of electronic equipment from non-Communist countries during 1960-70. Considering the importance to industrial and military development of up-to-date instrumentation, and China's apparent inability to mass produce advanced instrumentation; it is evident that access to advanced Western instrumentation has been an important factor in China's industrial and military programs.

Uses of Instruments

At least half of the instruments in China, including imported instrumentation, probably are used in support of the military. For example, medium to high frequency oscilloscopes and signal generators are used in the production and maintenance of military avionics; transistor parameter testers are used to select transistors meeting military standards; and spectrum analyzers are used to calibrate microwave systems and radar sets. Many special-purpose instruments are also required in China's nuclear and missile programs. Instruments not used directly in a military capacity include simple test equipment

used in the production and maintenance of all kinds of electronic equipment; spectrometers and electron microscopes used in physical analysis; and X-ray machines used for medical analysis.

Outlook

During the Fourth Five-Year Plan (1971-75) China probably will make significant progress in the production of solid state instrumentation while at the same time achieving the capability to mass produce advanced instruments which presently are handmade. The need for advanced instrumentation such as integrated circuit testers, computer test equipment, and microwave test equipment will grow with the continued development of China's electronics industry. Production of such equipment probably will continue to be very limited, and China probably will continue to import large quantities of non-Communist instruments, with emphasis on state-of-the-art instrumentation. Even though the United States is the major producer of advanced instrumentation, U.S. instrument manufacturers probably will not make many sales to China. In addition to the political barrier there is the economic fact that instrumentation equal or almost equal to advanced U.S. equipment usually is available at lower cost from Japanese and West European manufacturers.

When China achieves an increased production of instruments, it can be expected to offer more of them for export. By 1975, China may have the capability to export, at very competitive prices, large quantities of simple transistorized test equipment such as high frequency (HF) oscilloscopes and signal generators.

IV. COMPUTERS

Development of Production Capability

Development of computers in China began in 1956 with the establishment of the Academy of Science's Institute of Computation Techniques at Peking. By 1959 additional computer research institutes had been established in Shanghai, Shenyang, Tsinan, and Chengtu; computer courses were being taught at most of the large Chinese universities, and computer research and development were underway at universities in Shanghai, Nanking, Shenyang, Shantung, and Peking. During this early period, however, China had little native capability for the development of computers, and the progress achieved resulted largely from substantial Soviet assistance in the form of technical information, advisers, and a supply of computers for use as prototypes. With this help the Chinese succeeded before 1960 in experimentally reproducing models of Soviet digital and analog computers.

Digital Computers

The loss of Soviet aid in 1960 did not bring Chinese computer development to a halt. Serial production of digital computer model DJS-1—a copy of the Soviet M-3—began about 1962. This small vacuum tube computer was capable of only 1,800 operations per second (ops.). An improved version, the DJS-2, was put into production about 1963. Modeled after the Soviet BESM-2, this computer was capable

of 10,000 ops. By 1964 the Chinese were producing a much improved version of the Soviet M-20. This computer, which represented a significant technical advance in China's capabilities, was capable of 50,000 ops. and incorporated some semiconductor components.

The Chinese claimed in 1964 that they were constructing their first large, completely transistorized, digital computer. This computer, with a capability of 60,000 ops., was first displayed to visitors in China in 1966 and probably is being serially produced as model DJS-21. The model DJS-7, a small transistorized digital computer, was exhibited at the 1968 Fall Canton Trade Fair and the 1969 Spring Canton Trade Fair. This computer has a capability of 2,700 ops., and, judging from its size, it appears that significant advances in the miniaturization of computers have been made. This computer also has a distinctly Western appearance. In the 1970 Spring Canton Trade Fair the Chinese exhibited the model DJS-6, a transistorized digital computer, which was reported to be capable of 100,000 ops. Since 1966 all new models of digital computers have been completely solid state, and with the completion of the DJS-6 model, the solid state computer had finally surpassed rather than merely duplicated the capabilities of vacuum tube models. In the development of digital computers, however, China is still at least 5 years behind the U.S.S.R. and 10 years behind the United States. A list of the digital computers produced in China and their characteristics is given in table 2.

TABLE 2.—CHINA: CHRONOLOGY OF DEVELOPMENT OF DIGITAL COMPUTERS

Initial year of serial manufacture and model and manufacturer	Arithmetic speeds (operations per second)	Storage	Input-output	Comments
1962: DJS-1, Peking Wire Communications Plant.....	1, 800	Ferrite core, 1,000 words; magnetic drum, 2,048 words.	Punched paper tape, numeric printer.....	Vacuum tube, production version of model 103. Advertised in 1964.
1963: DJS-2, Peking Wire Communications Plant.....	10, 000	Ferrite core, 2,048 to 4,096 words; 2 magnetic drums, 6,144 words each, magnetic tape.	.....do.....	Vacuum tube, production version of model 104. Advertised in 1964.
1964: Unknown, Peking Wire Communications Plant..	50, 000	Ferrite core, 4,096 to 16,384 words; 4 magnetic drums, 16,384 words each, magnetic tape.	Punched paper tape, printer.....	Vacuum tube, solid state diode.
1965: Unknown, Peking Radio Plant No. 3.....	10, 000	Ferrite core, 1,024 to 2,048 words.....	.....do.....	Vacuum tube, designed in early 1960's.
Do.....	6, 000	Ferrite core.....	Unknown.....	Solid state.
1966: DJS-21, Peking Wire Communications Plant....	60, 000	Ferrite core, 4,096 words; 2 magnetic drums, 16,384 words each, magnetic tape.	Magnetic tape, teletypewriter, paper tape, printer.	Solid state. Exhibited at Peking in the spring of 1966 and at the 1969 fall Canton Trade Fair.
1968: DJS-7, Peking Wire Communications Plant....	2, 700	Ferrite core, 4,096 words; 2 magnetic drums, 12,000 words each.	Punched paper tape, electric typewriter.....	Solid state. Exhibited at 1968 fall Canton Trade Fair and 1969 spring Canton Trade Fair.
1970: DJS-6, Peking Wire Communications Plant....	100, 000	Ferrite core, 16,000 to 32,000 words; magnetic drums.	Punched paper tape, numeric printer, 1,200 lines per minute; electric typewriter.	Solid state. Exhibited at 1970 spring Canton Trade Fair.

Analog Computers

The work on analog computers was even more extensive than that on digital computers, and by 1958 China had constructed at least 30 analog machines. While most of the analog computer developments that have been publicized appear to have been aimed at satisfying the needs of the developing institute or the needs of a single industry, certain models are being manufactured for more general use.

The small vacuum tube FM-8 analog computer which has been mass produced since 1964 was originally constructed in 1958. This computer underwent five major modifications before it was placed in serial production, but it still has a range of error of up to 5 percent. Other vacuum tube models in use in China are the DMJ-16B analog computer, which was in production by 1960, and the M-24, which was in production by 1965. These computers are comparable to those available in the United States in the middle 1950's. In 1966 the SJ-1 and DMJ-3 analog computers were displayed. These were the first analog machines that had a distinctly Western appearance. Also, the DMJ-3 was partly transistorized. Not until 1968, at the Spring Canton Trade Fair, however, did the Chinese exhibit a completely transistorized analog computer—the DMJ-2. China's development of transistorized analog computers appears to have lagged behind that of transistorized digital computers. The major Chinese analog models with their characteristics are listed in table 3.

TABLE 3.—CHINA: CHRONOLOGY OF DEVELOPMENT OF ANALOG COMPUTERS

Initial Year of Serial Manufacture	Model	Manufacturer	Specifications	Comments
<i>Analog computers:</i>				
1960.....	DMJ-16B	Peking Radio Plant No. 1.	Capable of solving differential equations up to the 6th order.	Vacuum tube, network analyser, in production by 1960. Displayed in Paris in 1965.
1964.....	FM-8	Tientsin Electronics Instrument Plant.	30 operational amplifiers capable of solving differential equations up to the 9th order. Accuracy 1.0%-5.0%.	Vacuum tube, in serial production since 1964.
1964.....	M-9	.....do.....	Capable of solving differential equations up to the 9th order.	Vacuum tube. Production began 1964.
1965.....	M-24	.....do.....	Capable of solving differential equations up to the 24th order.	Vacuum tube. Production began 1965. Major use reported to be flight simulation and part of surface-to-air missile system.
1966.....	DMJ-3	Peking Radio Plant No. 1.	98 operational amplifiers; including 20 integrating amplifiers; two units may be connected to permit solution of differential equations up to the 40th order. Accuracy 1.5%	Vacuum tube and solid state Reported cost of 200,000 yuan each.
1966.....	SJ-1	Shanghai Electric Relay Plant.	24 integrating amplifiers. Accuracy 0.1%.	Vacuum tube. Model that most closely resembles Western type of analog computers.
1968.....	DMJ-2	Peking Radio Plant No. 1.	30 operational amplifiers. Solves differential equations up to the 8th order.	Solid state. First exhibited at 1968 Spring Canton Trade Fair.

Special Purpose Computers

Special purpose computers have been developed for process control and language translation. Process control computers reportedly were first produced in the late 1950's and include both digital and analog

types. In 1959 China completed a special digital computer for machine translation of Russian, but it is doubtful whether much progress has been made in machine translation.

Peripheral Equipment and Software

The peripheral equipment and memory systems of Chinese computers also have been improved. According to Chinese claims, capacity of core storage has increased from 1,000 words to the DJS-1 to 16,000-32,000 words in the DJS-6. The speed of numeric printers has increased from 15 lines per minute with the DJS-21 to 1,200 lines per minute with the DJS-6. It appears, however, that these electro-mechanical printers and magnetic drums are of poor quality. The magnetic tape units that have been displayed in China appear to be based on earlier Soviet designs, but a Chinese unit exhibited in 1966 at the China Industrial Fair in Kyushu, Japan, appeared similar to some produced by U.S. companies. All Chinese digital computers use paper tape or magnetic tape for data input. To date there are no reports of the use of punched cards for data input, or magnetic disks for auxiliary memory.

Nearly all Chinese computer programs (software) evidently have been written in machine language—that is, numeric language. Output probably is written in numbers, English letters, or Chinese characters. Chinese software to be used with imported computers probably is written in English. At present the use of machine language probably is adequate for Chinese needs, but as China's inventory of computers increases, the need for higher level languages will increase. Despite their experience with imported software, the Chinese will encounter difficulties in developing high-level computer languages. They almost certainly will emphasize development of Fortran or Algol compilers to make use of the huge worldwide inventory of programs written in these languages.

Output of Computers

No information is available concerning China's output of digital and analog computers, perhaps because of the extensive use of these machines for military purposes. However, considering the size of the production facilities and level of production technology, China may have produced as many as 300 digital computers as well as several hundred analog computers between 1960 and 1971. This level of digital computer production is about equal to that of the Communist countries of Eastern Europe during the same period. Probably half of China's total domestic digital computer inventory by the end of 1971 consisted of the small vacuum tube models DJS-1 and DJS-2. Production of vacuum tube digital computers, however, very likely has been discontinued, leaving in current production only the transistorized models DJS-6, DJS-7, and DJS-21. Since the DMJ-2 transistorized analog computer was not displayed until 1968, China may still have some vacuum tube analog computers in production.

China's computer production presently appears to be concentrated at five major plants; however, several smaller plants have been reported by the Chinese as producers of computers and these facilities

eventually could become major producers. Digital computers are produced at two plants in Peking, while analog computers are produced at single plants in Tientsin, Peking, and Shanghai. The Peking Wire Communications Equipment Plant, which employs 5,000 employees, produces the DJS computers among other products. The Peking Radio Plant No. 3, which probably has a workforce of at least 1,000, is presently manufacturing a small transistorized digital computer and perhaps other models. The Tientsin Electronics Instrument Plant, with at least 1,000 employees, produces three models of analog computers. The Peking Radio Plant No. 1 also produces at least three models, while the Shanghai Electric Relay Plant, with at least 1,000 employees, produces the SJ-1 analog computer.

Chinese Imports of Computers

Available information indicates that China has imported at least 50 digital, analog, and special-purpose computers valued at approximately \$20 million from Japan, France, West Germany, and the United Kingdom. Specific models that have been identified include four British machines and a few Japanese Fujitsu models. The British models consist of one Arch series process control computer manufactured by Elliott-Automation, two 1900 series digital computers manufactured by International Computers Ltd., and one Marconi-Elliott 803 series digital computer.⁵ In addition, China has imported from these countries large quantities of peripheral equipment and has received technical and operational guidance from the manufacturers. All Chinese imports of computers from these four countries occurred during and after 1964. Most of the imported computers were obtained in 1966 and 1967. The drop in imports in 1968-70 probably reflected the near cessation of purchases during 1967-68 when the Cultural Revolution was at its height.

Uses of Computers

It is believed that at least half of China's computer inventory (including imported computers) are used in military applications. Imported and domestic computers are being used in China's nuclear and missile programs for many applications such as weapons design, vibrational studies, and trajectory analysis. The Chinese have stated⁶ that they have used their DMJ-3 analog model in solving problems relating to atomic weapons, guided missiles, and aircraft location (probably air traffic control). They also have said that the DMJ-16B analog computer has been used for electrical network analysis and that the DJS-7 digital computer is suitable for process control. They have used unspecified models for processing census data and very likely are using both imported and domestically produced models in accounting operations, for inventory control, and in economic planning.

Outlook

During the Fourth Five-Year Plan (1971-75) China no doubt will increase its production of computers in an effort to satisfy rising re-

⁵ *Computer Survey*, September/October 1971, p. 339.

⁶ Hong Kong, *Ta Kung Pao*, May 1, 1969, p. 1 and May 6, 1969, p. 2.

quirements generated by an expanding economy and by the continued priority on the development, production, and deployment of advanced weapons systems. Output of the transistorized digital computers now in production will be stepped up, and new digital models (still second generation transistorized types,⁷ however) capable of 500,000 ops, probably will be developed within 5 years. Output of analog computers also almost certainly will be raised, and the transition from vacuum tube to solid state design should be completed in all analog production models.

Despite the expected advances, Chinese production of computers during the next few years will not match, either quantitatively or qualitatively, the domestic requirements for these machines. Moreover, in view of the fast tempo of computer development in the West, China's technological lag in computers may increase even further. Therefore, the Chinese will continue to import advanced computers from Japan and Western Europe for operational purposes and for use as prototypes. With the relaxation of U.S. trade controls China may make inquiries for U.S. machines. However, if the United States allows the export of only small capacity machines, U.S. computer manufacturers probably will not find a large market in China. U.S. manufacturers of peripheral equipment and process control computers probably will experience less difficulty in achieving a market in China.

V. COMMUNICATIONS EQUIPMENT

History of Development

Up to 1955 the Chinese Communists produced communications equipment identical to that produced under the Nationalist government. In production were simple telephone equipment such as magneto telephones and manual switchboards, and radio equipment assembled from imported and domestic components. In late 1955 Chinese news media reported that a Chinese-language teleprinter had been produced in Peking.⁸ This report was one of the first indications that China actually was introducing into production new and somewhat more complex communications equipment. The teleprinter, a Chinese adaptation of an East German model, reportedly went into serial production on a limited scale in late 1956. During 1957 China manufactured a prototype of a 120 kilowatt (kw) high frequency transmitter by copying Soviet equipment, and by 1959 was manufacturing 3-channel, 6-channel, and 12-channel carrier equipment.

Although the Soviet withdrawal in 1960 handicapped the industry, China continued to develop more advanced communications equipment. Access to modern equipment in non-Communist countries enabled China to gain familiarity with technologically advanced communications apparatus. By 1965 China had manufactured 14-channel telemetry equipment. In 1969 China was developing a transistorized VHF transmitter and had completed the first unit of automatic switching equipment for long distance telephone communications.

⁷ Vacuum tube computers are considered first generation, transistorized computers second generation, and integrated circuit computers third generation.

⁸ Peking, *Jen-min Yu-tien*, Sept. 7, 1955, p. 5.

Equipment in Production

In addition to vacuum tube and transistorized portable radios (described in chapter VI) communications gear presently in production includes shortwave transmitters, microwave equipment, black and white television transmitters, automatic crossbar switchboards, telegraphic facsimile equipment, electronic teleprinters; and specialized military transmitters and receivers. Little information is available, however, about Chinese microwave equipment, and no information is available concerning Chinese production, if any, of coaxial cable and high-capacity multiplexing apparatus.

Production Facilities

Communications equipment is produced in about 60 major facilities with a total workforce of at least 100,000 employees. Major concentrations of facilities are in Peking, Shanghai, Nanking, and Tientsin. In these four cities are located about two-thirds of the major communications manufacturers and probably up to three-fourths of total production. Communications equipment is also manufactured in Harbin, Heilungkiang Province; Chengtu, Szechwan Province; Changchun, Kirin Province; Tantung, Liaoning Province; Hangchow, Chekiang Province; Fuchou, Fukien Province; and Canton. The plants in these cities, however, tend to be smaller than those located in the four major cities.

Level of Technology

China appears to lag technologically at least 10 years behind the United States in the production of communications equipment for civilian use, but lags less than 5 years in the production of certain military communications equipment. China's civil communications products can be considered obsolete. For example, not until 1969 did China build automatic switching equipment for long distance telephone communications. This type of equipment has been in use in the United States for more than 25 years.⁹ China still appears to have difficulties producing monochrome television equipment at a time when most advanced nations are converting to color broadcasting. And while the use of microwave equipment for civilian communications is well established in the industrialized countries, it is only in the embryonic stage in China. This lack of development of civilian communications could be due partly to the emphasis on military communications and to the need to produce wired loudspeakers to transmit Communist propaganda to the population.

The difference between the level of technology embodied in civilian communications equipment and that in military apparatus is apparent in a recently captured Chinese 2-watt manpack transceiver.¹⁰ This completely transistorized high-frequency military radio was manufactured in 1970 almost entirely from indigenous components, including germanium and silicon transistors mounted on easily replaceable printed circuit boards. Table 4 below provides a comparison of the Chinese transceiver with the AN/PRC-25, the current U.S. company

⁹ *Business Week*, Aug. 21, 1971, p. 89.

¹⁰ Unpublished information provided by U.S. Army Foreign Science and Technology Center, Charlottesville, Va.

level manpack radio, and with the AN/PRC-74B, the current U.S. long-range patrol manpack radio. It can be seen that in terms of weight and battery life, the Chinese set compares favorably with U.S. equipment. While the radio generally is inferior to the U.S. transceivers, it is obvious that China is mass producing high quality, technologically advanced military communications equipment.

TABLE 4.—COMPARISON OF CHINESE MILITARY TRANSCEIVER WITH UNITED STATES MILITARY TRANSCEIVERS

	Chinese 2-watt set	United States AN/PRC-25	United States AN/PRC-74B
Frequency coverage	1.7 to 6 mc.	30 to 75.9 mc.	2-17,999 mc.
Channels	430 voice plus 430 continuous wave (CW) (estimated)	920	5,334
Tuning	Continuous	Detent.	Digital/1 kc. per step,
Modulation	AM voice or CW	FM	AM-USB or CW.
Battery life	100 hr. (estimated)	24 hr. to 70 hr.	11 hr. to 40 hr.
Range	10 to 16 kilometers (km) (estimated)	8 km (nominal)	24 km. (nominal).
Weight	15 lbs.	22 lbs.	29.5 lbs.

Imports From Non-Communist Countries

In the period 1960-70 China imported from non-Communist countries telecommunications equipment valued at about \$26 million, about 12 percent of the total value of electronics imported from that area. Included in these imports were modern television transmitters, high power radio transmitters, microwave apparatus, and marine communications equipment. China probably also received high capacity multiplexing apparatus, coaxial cable, and advanced telephone switching equipment. It is apparent from the specifications in the Chinese press that generally the capability of imported equipment greatly exceeds that of domestic. It is likely, therefore, that imported products are valued as prototypes for production and to satisfy strategic needs such as those in military communications.

Outlook

The importance to the Communists of a well-developed communications system for the control of the population and operation of the economy is obvious. The large military forces also place huge demands on communications manufacturers for specialized military equipment. In addition, as the news media recently have emphasized, a program for the dispersal of industry away from the coast of China has been established. This program would require the integration of the communications system and its expansion into previously underdeveloped areas. Thus during the Fourth Five-Year Plan China will have to significantly increase the output and raise the technical level of communications equipment to satisfy the demands of a growing economy and a maturing military establishment. China probably will emphasize increasing the production of microwave and television broadcasting equipment and initiating the production of high capacity multiplexing equipment. The use of wired loudspeakers, however, will still remain the major means for transmitting propaganda to the people.

Despite the improvements expected in the design and production of communications equipment, China still will not be able to produce highly advanced telecommunications apparatus in large quantities.

Therefore, the importation of highly sophisticated equipment from the West is expected to continue. U.S. manufacturers may be asked to supply some of this equipment, but they will face stiff competition from Western Europe and Japan.

VI. CONSUMER ENTERTAINMENT EQUIPMENT

Production

China manufactures on a batch or assembly line basis at least 15 models of transistorized radios, several models of vacuum tube radios, transistorized and vacuum tube phonographs, audio tape recorders, and tube-type monochrome television receivers. Several of the transistorized radios contain eight transistors and can tune in AM, FM, and shortwave bands. Television receivers are manufactured with screens up to 20 inches in diameter, but the majority of Chinese televisions have smaller size screens.

The value of production of consumer entertainment equipment is less than 5 percent of China's total output of electronics. Most of this equipment is produced in small quantities by large manufacturing facilities which specialize in communications equipment, or in small plants and workshops. For example, the Nanking Radio Equipment Plant, a major communications producer, manufactured in 1967 only 60,000 vacuum tube radios and 40,000 transistorized radios.¹¹ And in 1970 China reported that the "May 7" workshop of the Hsinlan Meters and Instrument Factory produced in approximately 1 year 170 4-transistor radio sets.¹² In 1960 only nine of the major communications manufacturers were producing television sets and the number has not significantly increased. At present, probably no more than 50,000 television sets are produced annually.

Consumer Welfare

The average Chinese consumer as yet gains little benefit from the production of consumer entertainment electronics. The quantity available for domestic consumption, after allowing for exports, is tiny in relation to China's huge population. Workers in urban areas who are toward the top of the income range are gradually acquiring transistorized radios. Television sets are not produced for private ownership but for use by a labor union, commune, or other public group.

Outlook

During the next several years China's population will continue to make only small gains in the form of consumer electronic products. With continued emphasis on military preparedness and the strengthening of heavy industry, few increases in production of consumer entertainment equipment are expected. However, if China should decide to increase production of these items, it could become a significant exporter of low-priced transistorized consumer entertainment products.

¹¹ Tokyo, *Chugoku Ni Okeru Kogyogijutsu No Genjo Bunseki* (Analysis of the Present Situation of Communist China Technology), June 1967, p. 111.

¹² NCNA-English Lanchow, Dec. 27, 1970. As reported in SCMP No. 4812, Jan. 5, 1971, p. 76.

For example, if China decides to produce pocket radios for wide domestic sale, the larger scale of production would permit exports at very attractive prices.

VII. MILITARY ELECTRONICS

Production

When the Communists came to power in 1949 they acquired from the Nationalists small amounts of U.S.-manufactured military electronic equipment including early warning radars, naval electronics, and simple avionic equipment. Throughout the 1950's, however, China made only slight progress in copying and manufacturing this equipment. China relied mainly on a large volume of imports of military electronics from the Soviet Union. With the Soviet withdrawal in 1960, the Chinese were forced to develop the capability to manufacture large quantities of military electronic equipment to satisfy the requirements of the armed services and the emerging nuclear and missile programs.

China publishes almost no information concerning production of specialized military electronic equipment. However, public reports about China's military forces,¹³ satellite launchings, and nuclear and missile tests¹⁴ and photographs of Chinese ships and submarines make it apparent that China manufactures early warning, ground control intercept, missile control, and naval radars; sonar; avionic equipment; missile guidance equipment; laser rangefinders; and nuclear instrumentation. China probably also manufactures electronic countermeasure equipment, airborne radars, and infrared homing devices for missiles. Most of China's military electronic equipment is copied from Soviet apparatus,¹⁵ but the latest equipment probably is of indigenous design or copied from Western equipment. Much of the newest equipment probably is transistorized¹⁶ and some, such as prototype airborne computers, incorporate integrated circuits.

The production of military electronic equipment is believed to account for at least one-quarter of total electronics production in value terms. Although several plants probably specialize in specific military items, such as radars, it is likely that a sizable amount of military electronics is produced as part of the output of multiproduct plants. For example, it is presumed that precision instrument plants produce components for missile guidance systems.

Level of Technology

Although only a little information is available, it appears that China lags technologically up to 10 years behind the United States in the production of military electronics. Impressive progress has been made in nuclear and missile programs, but these programs only

¹³ *Military Review*, April 1971 gives China's armed forces as 2.3 million men in the army, 200,000 men and 2,800 airplanes in the air force; and 140,000 men, 562 surface vessels, and 30 submarines in the navy.

¹⁴ By the end of 1971, China had carried out 12 nuclear explosions, several medium and intermediate range ballistic missile tests, and 2 satellite launchings.

¹⁵ For a study on Soviet radars (many of which the Chinese are believed to have copied) see *Aviation Week and Space Technology*, Oct. 25, 1971.

¹⁶ According to *Electronics Weekly*, Dec. 8, 1971, the Chinese recently displayed a completely solid state X-band marine radar. While the unit is not a military radar it is a good indicator that several military radars have been transistorized.

duplicate U.S. successes achieved years ago. At present China probably cannot manufacture phased array radars, highly accurate inertial guidance systems, or avionic equipment for all-weather fighters.

Military Aid

China has exported an unknown, but significant, amount of military electronic equipment to North Korea, North Vietnam, Cuba, Albania, and Pakistan; it may also be supplying such equipment to several nations in Africa including Tanzania and Egypt. Exported equipment has ranged from replacement parts for avionic equipment on Chinese-built jet fighters bought by Pakistan to radar systems in North Korea. The export of such equipment, however, is not an indication that China has excess capacity for the production of military electronics. China provides such aid for political, not economic reasons.

Outlook

During the Fourth Five-Year Plan China is expected to increase its production of military electronics to satisfy the demands of its conventional armed forces, nuclear and missile programs, and military aid projects. Small quantities of equipment incorporating integrated circuits should be operational by 1975, and airborne radar, if not in production now, should be in production within 4 years. Despite the gains expected, China is not likely to master by 1975 the production of advanced military electronic equipment such as full integrated navigation and weapons delivery systems for aircraft or computer controlled radar air defense systems, and therefore will continue to lag significantly behind the United States (and the Soviet Union) in military electronic technology.

APPENDIX

MAJOR FACILITIES IN CHINA'S ELECTRONICS INDUSTRY¹⁷

PLANT AND INFORMATION

NORTHEAST CHINA

Heilungkiang Province

Harbin, Lungchiang Instruments Plant: 1965¹⁸—This plant advertises Model EWY electronic automatic potentiometer, model EQY electronic automatic balanced bridge, model EGY electronic differential meter, model EEZ-110 fine-scale calorimeter, model EET-100 regulating fine-scale thermostat, model ELZ-100 proportional calorimeter.

Harbin Radio Factory: 1960—Produces TV receivers and transmitters.

Kirin Province

Changchun Electric Equipment and Communications Equipment Supplies Plant: 1958—Produces telephone and other communications equipment.

Changchun Transistor Plant: 1969—500 employees.

Liaoning Province

Liaoning Broadcasting Equipment Plant: 1965—This plant has started the mass production of closed circuit television sets for industrial application.

¹⁷ Data for this paper were compiled from hundreds of pieces of information including SCMP editions, FBIS reports, Chinese newspapers, Chinese electronic equipment catalogs, and data sheets, United States, Japanese, and European technical journals, U.S. Department of Commerce trade statistics, and unpublished information. This plant information is reported just as it appeared in the Chinese press. The press reports only civilian production. However, these plants undoubtedly produce military products as well. Moreover, a large number of unreported plants undoubtedly specialize in military production.

¹⁸ Date of information.

Shenyang City Thermodynamic Meter Plant: May 1970—Plant is subordinate to the Shenyang City Radio Instrument and Meter Industry Co. It produces oxygen meters and valves, electronic potentiometers, model EFZ-110 temperature indicating millivoltmeters, pressure gages, thermocouples, temperature gages, and thickness gages.

Darien Talien Radio Plant No. 1: 1964—Plant produced SMB-2 and SMB-2125 pulse oscilloscopes.

EAST CHINA

Shanghai Municipality

Shanghai Radio Plant No. 3: 1965—Production of transistorized radio receivers during the first quarter of 1965 was 43-percent higher than during the last quarter of 1964. The model 27A transistorized shortwave radio is now in production. Plant also produced meter to determine the stability of condensers; measurement limits are 5 picofarads to .14 microfarad. Also produces Meito brand model 28B eight-transistor portable radio receiver.

Shanghai Radio Plant No. 7: 1966—This plant produced the following products: the 3AD6 and 3AD7 germanium PNP type low-frequency, high-power triodes. These A-C PNP germanium alloy triodes are used for low-speed switches, current amplifiers, and direct current voltage transformers. Also produced the 3AG5 germanium PNP drifting type, high-frequency, low-power triode.

Shanghai No. 17 Radio Factory: 1970—Production quotas are at least double those of 1969. This plant is one of the five plants in Shanghai assigned the main production task for semiconductor parts in the city.

Shanghai Radio Plant No. 29: 1970—This is one of the five plants in Shanghai assigned the main production task for semiconductor parts in the city.

Shanghai Electron Tube Plant: 1965—Plant produced in limited numbers the new SZ-1 numerical indicating tube. This tube is a cold cathode discharge tube. It is mainly used in numerical measuring instruments and computing instruments. In 1964 plant produced model EQ 1-0.5/5 rectifying dual pole tube.

Shanghai Wire Communications Plant: 1957—Produces telephone equipment.

Shanghai Radio Instruments Plant: 1966—Produced new products: JS-7 model transistor parameter tester, model JZC-1 noise factor tester, JC-8 model transistor medium frequency power gain tester.

Shanghai Telecommunications Equipment Plant: 1966—In cooperation with the Shanghai City Research Institute of Radio Technology, this plant trial produced the model FDH microphone amplifier. It is used for measuring work in acoustics, electroacoustics, and ultrasonics. It can also be used as a high sensitivity voltmeter. In 1964 plant produced the SX-2 type hand microphone. Plant produces tubes for instruments used by the air force and navy.

Shanghai Postal and Telecommunications Equipment Plant: 1964—Products include model ZM 312 IV terminal and model ZR 312 IV amplifier. These are parts of the series 312 IV 12-channel telephone line; model ZB316 equipment for a 12- to 16-channel telephone line; and model BD055 teleprinter.

Shanghai Huatung Electric Switch Plant: 1965—In conjunction with Shanghai Electrical Equipment Institute produced model SFW-62-1 noncontact remote control telecommunication equipment which can be used for telemetering 14 channels.

Shanghai, Hsinchien Electronic Instruments Plant: 1966—Products of this plant are the model SBR-1 two-wire oscillograph, the model SBE-7 two-trace oscillograph, 0-30 megacycle transistorized multipurpose oscillograph, external diagram building block structured oscillograph, a 500 megacycle sampler insert (complete unit), time base insert (complete unit), Y-axis insert (complete unit), SBT-5 synchronous oscilloscope, PJD-7 electronic counter type frequency meter, and GT-2 vacuum tube oscilloscope.

Shanghai, Yamei Electrical Equipment Plant: 1966—Advertises the following new products: XFL-11 centimeter wave power signal generator with a wave length of 9 to 16 centimeters, XFL-8 centimeter wave signal generator with a frequency measurement range of 2 000 to 3,800 mc.; GLX-6 small dynamometer that can measure frequencies within 20 mc. to 3,000 mc. and average operating power of 0.05 to 10.5 mw., PXZ-11A medium precision resonance frequency meter which can measure frequencies of 2,500 to 3,750 Mc. in a 10-centimeter wave band. Also produces DYC-5 VHF vacuum tube voltmeter and a complete set of microwave apparatus with a 10-millimeter wave band.

Shanghai Marine Meter Plant: 1970—Built in 1956, this plant produces radars for ships.

Shanghai Sound Recording Equipment and Materials Plant: 1966—Plant produces model L301 "Chungsheng brand" transistorized magnetic tape recorder and model L601 magnetic tape recorder.

Shanghai Rectifier Plant: 1966—Products are: Series GZI high voltage electrostatic silicon rectifier equipment, series RTK high speed circuit breakers. The GZ-3 Q-3000/300 type electrolytic silicon rectifier equipment, and models GZC-T-8/72 and GZT-T-16/60 battery chargers. Plant also manufactures 3CT controllable silicon rectifier element, a P-N-P-N four-layer triode manufactured using the alloy-diffusion process. In effect it is a type of power switching transistor suitable for use with following equipment: Electric motor speed regulators, power generator exciters, a.c./d.c. current variation, frequently conversion, pulsation, automatic control devices, light modulation, adjustable and stabilized power sources, and others.

Shanghai Electric Relay Plant: 1966—Produces SJ-1 vacuum tube analog computer.

Kiangsu Province

Nanking Telecommunications Instrument Plant: 1966—Successfully trial produced a new product—PJD-6 model electron count type frequency scale. The instrument consists of an electron counter, a crystal oscillator, and a frequency converter. These three have integral parts so that they can be used separately. Plant also produced E-900 model electronic counter type tachometer.

Nanking Wire Communications Equipment Plant: 1966—A product of this plant is the MK-10 Soviet model carbon particle type transmitter, supplied for use by telephone companies. China nationally produces 66 models of special types and similar types of transmitters.

Nanking Radio Equipment Plant: 1967—Produces 60,000 Hsiungmao brand tube radios and 40,000 Hsiung mao transistor radios per year; 1966, this plant trial-produced the "Chungshan brand" pocket-type three-transistor radio receiver. Have designed and built the model B-302, Panda brand, single wave band, portable transistor radio. In 1965 produced Hsiungkou brand B-802 eight-transistor, three-band radio receiver. In 1960 produced Panda brand TV receivers. The Hsiungmao brand radios are sold in 30 countries.

Nanking, Huatung Election Tube Plant: 1967—Produces pictures tubes (100-200) per month, spotlights, digital indicator tubes, and fluorescent lamps. In 1965, plant produced products for oscilloscopes. Before the Cultural Revolution, the plant employed over 700 engineering technicians.

Nanking, Electron Tube Plant: 1970—Reached annual output goal in 8 months and fulfilled 1970 plan for output value 6 months ahead of schedule.

Suchou Testing Instruments Plant: 1965—New product: Model ZS-600 electromagnetic vibration test stand for testing electronic instruments, apparatus, components, and electric equipment not exceeding 5 kilograms in weight for their vibration resisting characteristics. Vibration speeds range between 20 and 600 per second.

Fukien Province

Fuchou Radio Plant: 1965—This plant has successfully test-produced a helium mass spectra leak-detecting instrument; this instrument is used to detect small cracks in vacuum chambers. When first manufactured, the electron tubes were imported. This is a factory which was established in 1958 and produced common radios.

NORTH CHINA

Shansi Province

Taiyuan, Shanhsi Telecommunications Equipment Plant: 1958—Produces three-channel carrier-wave equipment, teletype equipment, and automatic cross-bar switch boards.

Peking Municipality

Peking North China Radio Equipment and Materials Plant: 1968—Established in 1957 and has a work force of 5,000. In 1958 supplied selenium rectifiers. Products include paper capacitors, electrolytic capacitors, carbon film resistors, ceramic resistors, speakers, selenium rectifiers, and magnetic ceramics.

Peking Electron Tube Plant: 1968—Employs 4,000 workers, produces diodes, transistors, and electron tubes. Plant was constructed in 1956 to foreign design and furnished entirely with foreign equipment. In 1958 test manufactured a germanium transistor of 2.5-megacycle frequency range and was capable of manufacturing a germanium transistor whose bandwidth is 600 megacycles. In

1958 also test manufactured a microwave band TWT, and in 1959 was capable of manufacturing a thyratron and a 250-kilowatt HF oscillating tube.

Peking Post and Telecommunications Equipment and Materials Plant: 1970—Supplied products to the Peking Electric Wire Plant.

Peking General Glass Factory: 1970—Recently this factory designed and produced a Chinese style large scale machine for growing large diameter silicon single crystals needed for making large area SCR's.

Peking Radio Equipment and Materials Plant No. 1: 1967—Produces carbon film rheostats, selenium rectifiers, metallized paper condensers. Plant was built with East German aid in 1957.

Peking Radio Equipment and Materials Plant No. 2: 1968—Plant was established in 1957 and has a labor force of 2,000. Much of the equipment in use by 1965 had been imported from East Germany. Present production includes selenium rectifiers, carbon film resistors, paper capacitors, steel roll capacitors, and variable resistors.

Peking Radio Plant No. 1: 1960—When Russians terminated shipments of analog computers to China plant was to produce small analog computers. Workers soon produced DMJ-16 B analog and put it into serial production. In 1964 they began work on medium analog DMJ-3 capable of solving equations of 20th order. Serial production began 1966. DMJ-3 has widespread use in chemical industry, scientific work for national defense and is indispensable for problems in production of H bombs, aerospace, navigation, water power, and electrical power studies. At the end of 1965 plant had also manufactured an analog computer capable of solving equations of 24th order.

Peking Radio Plant No. 2: 1969—Plant advertised for sale model XFS-9 audio signal generator (frequency range 20 to 20,000 cycles) WYB-1000 transistorized AC voltage regulator, FDC-2 microphone amplifier, and SJ-1 transistorized sound level meter (sound level measuring range: 46 to 125 decibels, frequency measuring range: 50 to 80 000 cycles).

Peking Radio Plant No. 3: 1966—Produced a small-sized transistorized general-purpose digital computer. All the parts and components used in this computer are of Chinese manufacture.

Peking Wire Communications Equipment Plant: 1970—People's Liberation Army personnel are stationed at this plant. Manufacturers DJS-6, DJS-7, and DJS-21 transistorized digital computers, 1967 labor force of 4,000. Produces automatic switchboards (Soviet model 47), and relays. Plant operation began in 1957 with Soviet aid.

Peking Broadcasting Equipment and Materials Plant: 1969—Produces model SGB-5 industrial closed circuit television. In 1957 test manufactured 120-kilowatt HF transmitter by copying U.S.S.R.-made equipment. Test manufactured back pack TV equipment in 1963. Manufactured "Mu-tan" brand radio receiver, developing transistorized VHF multichannel transmitting equipment.

Peking, Yuehtang Semiconductor Equipment Factory: 1971—Plant has been supplying some 20 provinces, municipalities, and autonomous regions with its major product—diffusion furnace with automatic temperature control which was first trial-manufactured in 1965. End of 1969 plant produced furnace for making epitaxial silicon materials. In the beginning of 1970 manufactured transistorized diffusion furnace using SCR.

Peking Scientific Instrument Plant: 1970.—Plant produces model 58 photoelastic instrument, model 410 pocket-size photoelastic instrument, model WFD-J3 self-recording double-beam infrared spectrophotometer, models DGS-11 and DGS-63 photoelectric range finders, and model 422 glass duplex refractometer.

Peking Niuchieh Instruments Plant: 1969.—Products: CZ-1 transistorized vibration and horizon measurement instrument, Z25-2 seismographs, JH-1 microfarad meter, Z1D low frequency power amplifiers, SHQ-8 acceleration meter, PFJ-1 frequency analyzer, Z28-1 accelerator, SZQ-1 special speed inducing machine.

Peking Gas Analysis Instrument Plant: 1970.—Products include salt measuring instruments, 5101 thermomagnetic oxygen analyzer, SP-2302 gaseous phase chromatographical instruments, TM-1120 hydrogen analysers, ZHT-1301 mass spectrometers, GDB-10 mercury diffusion pumps, and high vacuum valves.

Tientsin Municipality

Tientsin Electronics Instruments Plant: 1970.—Plant trial produced a transistorized audio frequency spectrum analyzer. Produces FM-8 vacuum tube ninth order analog computer, 1966. Produced XFD-8 ultra low frequency signal generator 1965. Plant developed a 24th order analog computer.

Tientsin Electronic Instruments Plant No. 2: 1965—This plant advertises model CDOGX 65 duplicator. The machine is capable of making a print as wide as 110 centimeters and as fast as 230 meters per hour.

Tientsin Radio Plant: 1966—Produces the ZF-2 model noise generator and XFC-4 UHF signal generator, 1960, produced parts for TV receivers.

Tientsin Broadcasting Equipment and Materials Plant: 1969—This plant was damaged by fire on January 17, 1969. Probably three buildings were destroyed and a parts warehouse and an insulation materials warehouse were possibly damaged.

Tientsin Electric Meter Plant: 1970—Plant produces AC voltage meters, DC voltage meters, three-phase watt meters, milliammeters.

Tientsin Optical Precision Instruments Plant: 1965—This plant advertises model WDS-1 all-purpose monochromator, model WS-4 instrument for testing the sharpness of cutting tool edges, model WX-3 spectroscope, model WPF-2 AC electric arc generator, and model WPS-3 capacitor spark generator.

CENTRAL-SOUTH CHINA

Hupch Province

Wuhan Electronic Instruments Plant: 1966—Announced the production of the model GTC-1 ultrasonic fault detector.

Kwangtung Province

Canton Broadcasting Equipment Factory: 1960—Produces TV receivers.

Canton Wire Communications Equipment Plant: 1960—Operation began in 1956. Produces telephone equipment.

Swatow Ultrasonic Electronic Instruments Plant: 1970—Plant produces ultrasonic instrument models CTS-1, CTS-2, CTS-3, and CTS-4.

Canton Adding Machine Plant: 1966—Recently produced China's first electric adding machine. This machine has 10 digits and can carry out addition, subtraction, multiplication, division and the extraction of square roots.

SOUTHWEST CHINA

Szechwan Province

Chengtu Instruments Plant: 1965—This plant advertises mass spectra leak tester, thermo-ionic vacuum meter, ionization vacuum meter, thermo vacuum meter, and acidity meter.

NORTHWEST CHINA

Shensi Province

Sian Instruments Plant: 1970—Construction of this plant was started in December 1957 and put into operation in 1960. Entire plant covers 80,000 square meters of floor space. Equipped with 2,700 pieces of machinery, plant primarily produces temperature, pressure, regulating, electrical, and electronic instruments. By 1965 plant employed 3,200 workers.

CHINA: AGRICULTURAL DEVELOPMENT, 1949-71

By ALVA LEWIS ERISMAN

I. CONCLUSIONS

Agricultural development policy in the People's Republic of China (PRC) may be divided into two distinct periods, distinguished by contrasting investment policies. In the first period, 1949-61, Peking tried to build up the capacity and output of the agricultural sector through the restoration and rationalization of China's traditional agricultural system—the intensive application of labor on an inelastic supply of cultivated land. Primary reliance was placed on the increased controls permitted by collectivization and on investment from within agriculture itself, such as massive use of rural manpower on projects for irrigation, drainage, and improvement of the soil. The small amount of investment from central resources went mainly to large-scale water conservation projects on the North China Plain.

For the first few years, these measures were sufficient to provide China's growing population with a reasonable minimum of food and clothing although production was not large enough to provide sizable surpluses. The results fell increasingly behind the expectations of the Chinese leadership. A major disappointment was the almost complete lack of results from the large-scale projects on the North China Plain.

In 1958, the regime, instead of increasing the priority of agriculture for central investment resources, chose to increase the tempo of local investment and to demand enormous increases in agricultural production forthwith. Huge supercollectives—the so-called communes—were set up to implement this frenzied Leap Forward policy. The result of this ill-advised approach to agricultural development—combined with three consecutive years of bad weather in 1959-61—was a drop in output of one quarter and severe nationwide shortages of food.

In the second period, 1962-71, Peking was forced to shift to an "agriculture first" investment policy. Large and increasing amounts of chemical fertilizer, pesticides, equipment for irrigation and drainage projects, and farm machinery began to flow into the agricultural sector. Decisions on day-to-day agricultural matters were left to small production teams. The rural population was permitted to engage in sideline farming, handicrafts, and trade in return for putting in a reasonable effort on the collective acreage. Finally, the locus of the main investment effort was shifted away from north to south China in a successful effort to raise yields on land that already had comparatively high yields. As a result of the turnabout in policy, total food production was rapidly restored to the pre-Leap Forward level and thereafter increased at a rate somewhat higher than the population growth rate. But valuable time had been lost.

Prospects through 1975 are for continued increases in agricultural production in line with population growth. At the same time,

the agricultural sector is not likely to provide large new quantities of industrial raw materials and export goods. Peking's policy toward agriculture remains "agriculture first" in comparison to the low-priority policy of the first decade; it is not "agriculture first" when compared to the continued emphasis placed on military-industry expansion.

Organization of the Paper

Section II of this paper provides background information in China's agricultural resources. Section III deals with the problems of agricultural development in the first decade, and section IV with the problems in the second decade. Section V describes in detail the inputs made available to agriculture in the second decade. Section VI examines the impact of the new strategy on output and the prospects for agriculture during the Fourth Five-Year Plan (1971-75). Two appendixes give detailed information on agricultural zones in China and a brief description of sources used in the preparation of this paper.

II. BACKGROUND

A Leading Agricultural Nation

The PRC is one of the world's foremost agricultural nations. Because of wide variations in climate, topography, and soils practically every farm crop and type of livestock can be produced. China produces more rice, millet, sweet potatoes, sesame, and rapeseed than any other nation and ranks second or third in the production of soybeans, tobacco, wheat, and cotton. China also ranks high in animal husbandry although livestock are valued more for draft power and fertilizer than as a source of food. More hogs are grown in China than in any other country in the world. In summary, the PRC vies with the Soviet Union for second place behind the United States in the value of agricultural commodities produced.

Topography, Soils, and Climate

Despite China's overall eminence as an agricultural nation, natural conditions are not particularly favorable for agriculture. Unsuitable topography, soils, and climate have restricted the cultivation of crops to only 11 percent (107 million hectares) of the mainland mass.¹ Most of the land that is not already in use is in marginal agricultural areas where aridity, altitude, short growing season, and other physical factors inhibit farming. More than 80 percent of the population and a similar percentage of the cultivated land are concentrated in the eastern one-third of the country. Of the land that is farmed, less than one-third is classified as fertile and slightly more than one-half is level. Thus, only a fraction of China's farmland is naturally endowed with the combination of smooth topography, fertile soil, and favorable climate necessary for high crop yields.

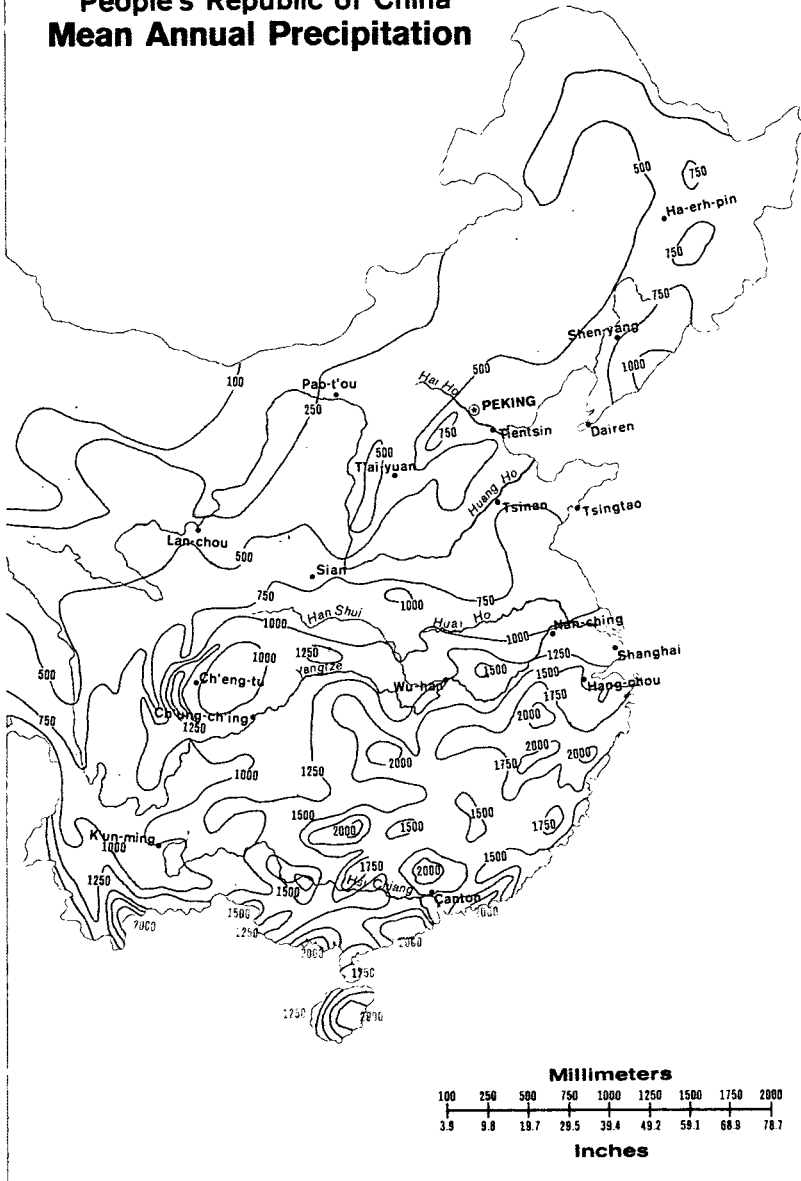
¹ By comparison, almost 157 million hectares, or about 20 percent of the land area of the continental United States is under cultivation. In China, however, the intensive use of land through multiple cropping permits the sown area to exceed the basic cultivated area by more than 40 percent. In contrast, about one-third of the cultivated land in the United States normally lies fallow. In all, the total area sown to crops in China exceeds that of the United States by about one-third.

Most of the western two-thirds of China is ruled out for agricultural purposes by extremely rugged mountain terrain and extensive desert areas. Even in the agricultural eastern third, because of fluctuations in atmospheric pressure, and in the pattern of dry northerly and moist southerly air currents, rainfall varies widely and unpredictably from region to region and from year to year (see fig. 1). Depending on the season of the year, irrigation is useful in all regions even when precipitation is normal and is mandatory for preventing crop failure in periods of drought. At the same time, about one-fourth of China's farmland is subject to flooding and waterlogging, and losses from too much water are almost as great as losses from too little water. Floods and drought have occurred more often and have caused greater loss of crops, property, and lives in China than in any other part of the world.

Natural divisions of climate and topography separate China's eastern agricultural area into two broad segments—north and south China—with the break occurring at roughly the Huai River. The river (*a*) marks an abrupt transition between the leached, acidic, non-calcareous soils of the south and the generally calcareous, alkaline soils of the north; (*b*) constitutes the northern limit for the harvesting of two crops in 1 year from the same plot of ground; (*c*) separates the high precipitation regime of the south from the low, highly seasonal, and uncertain precipitation regime of the north; and (*d*) separates an agriculture based on paddy rice in the south from that based on the cultivation of dry land crops, especially coarse grains and wheat, in the north.² In addition to the major crops, a large variety of other crops is grown in each of the two broad areas. Furthermore, some wheat and coarse grains are grown as secondary crops in every province south of the Huai River and a small amount of rice is grown in every province to the north.

² Paddy land refers to fields enclosed by dikes that are capable of holding standing water (flooded) and are almost always used for the cultivation of rice. Dry fields are not diked, are unable to hold standing water, and may or may not be irrigated.

Figure 1
People's Republic of China
Mean Annual Precipitation



Because of higher rainfall, warmer temperatures, longer growing season, and more extensive multiple cropping, a paddy field in south China probably produces at least two or three times as much grain in a year as a dry field of similar size in the north. However, paddy

fields are scattered and badly fragmented by terracing and diking. In most local areas in the south, the percentage of tilled land does not exceed 30 percent of the land area and is commonly 20 percent or less. In contrast, 60 percent or more of the area of the broad plains in some areas of the north is under cultivation. But, crop yields here are low and unstable because of the frequent incidence of drought, flooding, and waterlogging. Appendix A gives further detail on the agricultural zones and regions of China.

Traditional Agricultural Practices

China's agriculture historically has been characterized by ultra-intensive inputs of labor on a limited and inelastic supply of cultivated land.³ The lavish expenditure of labor, multiple cropping, and exacting crop rotations have enabled the Chinese to extract a comparatively high yield per unit of cultivated land; of course, productivity per unit of farm labor has been quite low despite the back-breaking toil of the individual peasant. Before 1949, the social traditions and financial motivations of the countryside—together with the lack of sizable surpluses above subsistence—precluded any large-scale introduction of machinery and the newer scientific methods into agriculture. Furthermore, the ravages of warfare and unchecked natural calamities made the agricultural sector an unfavorable environment for technological development. The Chinese peasant over the ages had developed the art of agriculture—*within this set of important constraints*—to such a state that improvements were subject to increasingly severe diminishing returns.

III. EARLY STRATEGY, 1949–61

When the Communists gained control over the whole of China in October 1949, the regime sought first to rehabilitate the war-ravaged economy and then to implement its broad plans for economic development. Foremost among these plans was the rapid development of industry, especially heavy and military industry. Only a minor share of capital investment was to be spared for agriculture. As a corollary, agriculture would have to rely extensively on its existing technology. The elimination of the landlord class and the collectivization of the countryside were expected to insure Peking's firm political and economic control over the agricultural sector.

The discussion in this section of the paper deals with the main agricultural policies of the first decade of Communist rule—increasing collectivization, limited investment, and retention of the old technology—and with the results of these policies.

A. An Increasing Degree of Collectivization

The "socialist transformation" (collectivization) of agriculture was expected to have very practical material results. Of primary importance, systematic central control would presumably enable the Government to keep rural consumption to austere levels and to appropriate most of any increases in production for the threefold purpose of

³ In China there is less than 0.13 hectare of cultivated land per person, compared with about 0.06 hectare in Japan, 0.25 hectare in India, and about 0.77 and 0.92 hectare in the United States and the Soviet Union respectively.

feeding the cities, supplying industry with raw materials, and providing exports to pay for China's imports of machinery. In addition, control over the agricultural sector and over inputs into the sector would enable the regime to enforce its policies on the scope and pace of technological change in agriculture.

LAND REFORM

In preparation for its ultimate objective of tight control over agriculture, the new Communist regime moved swiftly to shatter the traditional rural organizational structure through a sweeping "land reform" program. This program eliminated the landlord class—which was the focal point of opposition to party policies in the rural areas—redistributed 46 million hectares of land to 300 million poor peasants, and dislocated time-honored patterns of income distribution in the countryside.

Before the new patterns of ownership could harden, Peking moved to press the peasants into new organizational forms—first the mutual aid teams, then the lower level agricultural producer cooperatives (APC's), then the higher level APC's, and finally the commune. Originally, the transformation was to have taken 15 years, through 1967. As table 1 shows, however, the pace was much faster, even taking into account the way in which official claims outstripped actual organizational accomplishments.

TABLE 1.—CHINA: THE DEVELOPMENT OF SOCIALIZED AGRICULTURE¹

Year	Mutual aid teams	Agricultural producer cooperatives		Communes	Percentage of peasant households in socialized agriculture
		Lower stage	Higher stage		
1950.....	2,700,000	19	1	0	² 10.7
1951.....	4,760,000	300	NA	0	19.2
1952.....	8,030,000	3,640	10	0	40.0
1953.....	7,450,000	15,000	15	0	39.5
1954.....	9,930,000	114,000	201	0	60.3
1955.....	7,150,000	633,000	529	0	64.9
1956.....	NA	³ 268,000	311,935	0	² 96.3
1957.....	NA	³ 72,000	700,000	0	NA
1958.....	NA	NA	740,000	⁴ 26,578	99.1
1964.....	0	0	0	⁴ 74,000	⁴ 99.0

¹ Henry J. Lethbridge, "The Peasant and the Communes," the Green Pagoda Press Ltd., Hong Kong, 1963, is the source of all data except where noted differently.

² State Statistical Bureau, "Ten Great Years," Foreign Language Press, Peking, 1960, pp. 35 and 43.

³ SCMP, No. 1573, July 19, 1957, p. 23.

⁴ Liu Kuo, "74,000 Communes in China," SCMP, No. 3307, Sept. 25, 1964, p. 14.

MUTUAL AID TEAMS

The mutual aid teams originally were little more than the pooling of labor, animals, and implements by several households during the busy season. Later, the teams were reorganized to include a larger number of households, which were organized for the whole year; draft animals and implements were held in common; simple plans for production were adopted; and an elementary division of labor was provided for.

AGRICULTURAL PRODUCER COOPERATIVES (APC'S)

Mutual aid teams were next consolidated into APC's of the lower stage. These new organizations often were coextensive with villages.

Although the peasant retained the title to his land, the APC exerted a more centralized control over the management of the land and the planning of production. Returns to individual members were based upon their contributions of both land and labor to the cooperative.

During the next stage of the transition, the ACP's of the lower stage were grouped together into APC's of the higher stage (collective farms). The new unit might be made up of a large village or several small villages. At this point, the peasant lost title to his holdings and was rewarded solely on the basis of his contribution of labor to the cooperative.

COMMUNES

The final stage of the Communist transformation of agriculture took place during the Leap Forward. This was the replacement of APC's by huge new "people's communes," with an average of 25,000 people each. The commune was designed to be a self-sustaining entity economically, politically, and even militarily. It absorbed all the property of the APC's plus most of the property the individual peasant had been permitted to retain, such as private plots, farm tools, livestock, and fruit trees. The commune established local industrial plants, managed the distribution of consumer goods and farm supplies, ran its own financial and educational systems, sponsored militia units, and arranged for the distribution of income. Communal messhalls replaced individual kitchens. Communal dormitories and "happy homes" for the elderly, which were supposed to supplant old-style living arrangements, remained almost entirely in the blueprint stage because of lack of building materials.

B. A Limited Amount of Investment

1. STATE INVESTMENT

Because the potential for modern investment in China's agriculture had been barely scratched, Peking expected that a small amount of state investment in agriculture would yield large returns. In 1950-57 about 8 percent of total state investment for economic construction was allocated to agriculture, of which more than half was allocated for water conservation projects alone.⁴ Of the investment in water conservation at least two-thirds was allocated to harness the water resources of the Yellow, Hai, and Huai Rivers. This was the only comprehensive capital-intensive developmental scheme in agriculture during the early years of Communist rule.

The three rivers and their tributaries dominate the North China Plain, which covers less than 4 percent of the mainland landmass but accounts for more than 20 percent of China's farmland. The region is the major producer of coarse grains and wheat. In addition, more than one-third of China's total acreage of industrial crops and soybeans is scattered throughout the plain. Crop yields, however, are low and unstable due to almost chronic drought, flooding, and waterlogging throughout the area. If successful, the water control schemes would stabilize and increase crop yields substantially on more than one-fifth of China's farmland.

⁴ State Statistical Bureau, *Ten Great Years*, Foreign Language Press, Peking, 1960, p. 57.

Control of the Yellow, Huai, and Hai Rivers had defied solution for centuries. The three rivers are exceptional with respect to extremes in the rates of flow and the enormous volume of silt. Furthermore, the discharge capacity in the flat lower reaches is less than in the mountainous upper reaches. Following a cloudburst—a common occurrence in the region—the man-made dikes in the lower reaches often gave way, causing devastating floods for miles around. The rivers frequently passed from flood stage to a trickle in a matter of hours. The construction of large reservoirs to collect and store water during periods of heavy precipitation for use during the dry season was precluded by the vast quantities of silt carried in suspension in the river water.

The Communists planned similar control measures for each river. The discharge capacity in the lower reaches was to be increased by (a) renovating and strengthening the dikes, (b) dredging the river beds of silt, (c) constructing flood detention and overflow basins, and (d) digging supplemental outlets to the sea. In the upper reaches, a number of large dams were to be constructed to regulate flow, store water for irrigation, and generate power.

Although state river control schemes would not be completed for a number of years, significant returns were expected to begin to accrue much sooner. For example, the Yungting River, a major tributary of the Hai River, was to be brought under control by the fall of 1953.⁵ The scheme to control the Huai River was to be completed "by 1955 or earlier."⁶

2. LOCAL INVESTMENT

The greater part of investment during this period was local investment, that is, the expansion of productive capacity through the input of peasant labor and local materials. This investment took several forms:

Improvement and expansion of livestock numbers, with resulting increases in draft power, manure, and meat supplies;

Improvement in the quality of land through leveling, consolidating of strips, and more intensive manuring;

Extension of the land area through the clearing and terracing of marginal land; and

Carrying out of countless simple water conservation projects.

Taken as a whole, this local investment appreciably increased the capacity of the agricultural sector and fitted neatly into the regime's strategy of minimizing the flow of central investment resources to agriculture.

C. A Slow Pace in Technological Change

The People's Republic of China in this first decade lacked the resources to modernize agriculture. Priority went to military-industrial expansion, and for the most part agriculture had to rely on its old traditional technology, which featured:

Use of land in fragmentary fashion; that is, in small plots and strips because of the inherited pattern of ownership and the existence of gravesites which took up roughly 5 percent of the

⁵ Fu Tso-yi, minister of water conservancy and electric power, "Achievements of Water Conservancy Work in New China," *CB*, No. 219, Nov. 14, 1952, p. 29.

⁶ Kao Shih-shan, "Third Stage of the Huai River Project," *People's China*, Feb. 1, 1953, p. 13.

land, sometimes in the middle of fields; pressure to use the most minute scraps of land;

Simple irrigation project; in the north, emphasis on shallow wells; in the south, the digging of small canals, the establishment of small ponds and reservoirs, and the erection of water wheels;

Heavy use of organic (animal and human) fertilizer and compost;

Selection by peasants, on a local basis, of seeds from the hardiest plants; and

Intensive use of family labor to meet peak labor needs at times of sowing, transplanting, weeding, fighting insect incursions and plant disease, and harvesting.

The continuation of these traditional modes of agricultural production and investment had considerable potential for raising output in the first decade because the Communists could bring order and stability to a countryside ravaged by war, flood, famine, and disease. At the same time the new rulers did not completely rule out central investment in agriculture or central programs to advance the state of agricultural technology. As described above, the most ambitious of these efforts was the state program to harness the water resources of the North China Plain.

D. Performance

1. RECONSTRUCTION AND RECOVERY, 1949-52

The first projects undertaken in agriculture were of an emergency nature designed to alleviate conditions arising from over a decade of continuous warfare. Breaches in dikes were repaired, irrigation ditches were cleaned out, and land was put back into cultivation. Most river control projects were simple ones of a regulatory nature. In the fall of 1950 Chairman Mao issued a directive that the Huai River should be harnessed; the construction of permanent control projects was begun during the winter of the same year.⁷ The land reform reached a crescendo in 1950 without, however, causing any appreciable damage to production. Steps to merge individual peasant households into mutual aid teams began soon thereafter. According to official statistics, grain output rose from 108 million tons⁸ in 1949 to 154 million tons in 1952 (see table 2). Although this gain must be partially discounted because statistical coverage was expanding in this period, the agricultural sector clearly had been restored to operation, and the short-run problem of feeding China's people had been greatly eased.

⁷ Fu Tso-yi, "Achievements of Water Conservancy Work in New China," *op. cit.*, p. 28.

⁸ Tonnages refer to metric tons throughout this paper.

TABLE 2.—CHINA: OUTPUT OF GRAIN, 1949-71^{1,2}

[Million metric tons]

Year	Estimated output	Chinese sources
1949		108
1950		125
1951		135
1952		154
1953		157
1954		160
1955		175
1956		182
1957		185
1958	200	250
1959	165	270
1960	160	150
1961	160	162
1962	175-180	174
1963	175-180	183
1964	180-185	200
1965	190-195	200
1966	195-200	(³)
1967	210-215	230
1968	195-200	(³)
1969	200-205	(³)
1970	215-220	240
1971	4 215-220	246

¹ "Grain", as defined by the Chinese, consists of any staple foodstuff (primary source of calories) and normally includes: (1) rice, wheat, and other small grains; (2) coarse grains such as corn, millet, and kaoliang (Chinese sorghum); (3) tubers (white and sweet potatoes, yams, and cassava) at a ratio of 4 units of tubers to one of grain; and (4) lentils, such as field peas and various types of beans. Rice, small grains, and coarse grains are reported on an unmilld basis. The definition of "grain" varies from period to period and province to province. For example, chestnuts are considered a grain in some areas of Southwest China whereas in Central China a portion of the sweet potato crop is reported as an industrial crop. At various times, soybeans have been reported by Hopeh and the provinces of Northeast China as a grain crop and by the provinces of Central China as partly a grain and partly an industrial crop.

² The grain series adopted for use in this paper is the official Chinese series for 1949-57 and estimates by the author for 1958-71, as presented in this table. Grain statistics reported by the State Statistical Bureau for 1949-57 are believed to be internally consistent and reasonably accurate. In contrast, the official figures for 1958-59 are obvious Leap Forward exaggerations and for 1960-71 are disjointed announcements from various Chinese sources rather than formal claims made through the statistical apparatus. Whereas these latter figures for 1960-71 are not outside the realm of plausibility, they are generally higher than might be expected given the weather conditions, agricultural inputs, and agricultural policies prevailing in these years.

³ Not available.

⁴ Preliminary.

Despite the impressive rate of increase, the period ended on an ominous note. By mid-1952 three large reservoirs had been completed, a fourth was nearing completion, and seven new flood detention basins were in operation to regulate the Huai River.⁹ These projects were unable to cope with the unusually heavy rainfall in the summer of 1952. The Huai River dikes were breached at a number of places, producing severe flooding in the North China Plain.¹⁰

In the fall and winter of 1952-53, new collectivization policies were introduced, apparently to accelerate local investment. First, mutual aid teams were made to operate on permanent year-round basis, permitting the rural labor force to be employed more fully.¹¹ Secondly, in 1953 the formation of lower level APC's were begun, a step that originally was to be delayed until the Second Five-Year Plan (1958-62).

2. FIRST FIVE-YEAR PLAN 1953-57

In the First Five-Year Plan (1953-57), agricultural output was expected to increase by 23 percent, or at an average rate of 4.2 per-

⁹ *Agriculture in China*, Brilliant Publishing Co., Shanghai, China, 1953, pp. 213-216, and Fu Tso-yl, "Successes in China's Water Conservation Work," *People's China*, Oct. 1, 1952, p. 20.

¹⁰ Fu Tso-yl, "Report to the 163d Meeting of the Government Administrative Council," *NCNA*, Dec. 28, 1952.

¹¹ Kenneth R. Walker, *Planning in Chinese Agriculture, Socialization and the Private Sector*, Aldine Publishing Co., Chicago, Ill., 1965, p. 6.

cent per year. The plan soon ran into trouble. Despite normal weather in 1953, the targets for most industrial crops and livestock products were not met. Output fell even further behind the assigned targets the following year, primarily because of severe flooding in the North China Plain. In April 1954, it had been claimed that the dikes along the Huai River could contain the highest rate of flow ever recorded.¹² A number of major flood control projects had simultaneously been completed in the Hai River Basin. But heavy rainfall in June 1954 breached the dikes of both rivers, producing one of the most destructive floods on record.¹³

The poor harvest of 1954 was followed by a speeding up of collectivization. In February 1954, Liao Lu-yen, Minister of Agriculture, noted (a) that agricultural output and procurement were not progressing as planned, and (b) that there was a growing "contradiction" between agricultural and industrial growth which was due to the inadequacy of existing institutions of agriculture to promote the required progress.¹⁴

Beginning in mid-1955 the formation of lower level APC's was accelerated. In all, the number of cooperatives was increased from 114,000 at yearend 1954 to 633,000 at yearend 1955.

Following the excellent harvest of 1955, the peasants were hurriedly assembled into higher level APC's. Programs to intensify local investment in agriculture were simultaneously stepped up. Included among these measures were the mobilization of labor to construct simple irrigation projects and an intensification of land use through increased multiple cropping. As shown in table 3, the multiple cropping index reportedly increased from 137.2 in 1955 to 142.3 in 1956, resulting in record acreages of grain crops, soybeans, cotton, and all other industrial crops with the exception of sugar.¹⁵

¹² Fu Tso-yi, "Report to the 163d Meeting of the Government Administrative Council," *op. cit.*

¹³ *Ibid.*, "July 26, 1955, Speech to the National People's Congress" *CB*, No. 352, Sept. 1, 1955, p. 21.

¹⁴ Walker, *op. cit.*, pp. 7-8.

¹⁵ These records still stand. Since 1956 both the cultivated area and the multiple cropping index have declined. The former declined from 111,800,000 hectares in 1956 and 1957 to 106,700,000 hectares in 1962, and has remained at about that level since that time. The MCI declined to 140.6 percent in 1957, but subsequently was increased to 145 percent during the Leap Forward of 1958. The MCI again contracted after 1958 as proven crop rotation was restored. Beginning in 1962 when chemical fertilizers and improved farm tools and machinery became available the MCI once again began to increase. The current multiple cropping index is unknown, although it is probably less than the 145 percent claimed for 1958. It was reported officially that in 1971 "the cultivated area [106,000,000 hectares] multiplied by the multiple cropping index is 133,000,000 hectares." (Chi Wei, "Local Industries," *China Reconstructs*, November 1971, p. 5). Although unclear, the statement could mean that two or more crops are planted for harvesting on 27,000,000 hectares (133,000,000 minus 106,000,000 hectares) of China's cultivated land. If so, then the area of triple cropping, the area of green manure crops, and the acreage of other unspecified crops (perennial tropical crops and orchards, for example) would have to be included to make the index consistent with previous indexes. The deduction of green manure and other unspecified crops alone, for example, would reduce the 1957 cropping index from 140.6 to 129.7 percent as compared with an index of 124.6 in 1971.

TABLE 3.—CHINA: CULTIVATED AREA, CROPPING INDEX, AND SOWN AREA FOR VARIOUS CROPS¹

	1952	1953	1954	1955	1956	1957	1958
Cultivated area (thousand hectares).....	107,924	108,534	109,360	110,162	111,830	111,836	107,792
Cropping index (sown area as a percent of cultivated area).....	130.9	132.7	135.3	137.2	142.3	140.6	145.0
Sown area (thousand hectares).....	141,263	144,043	147,933	151,089	159,190	157,253	156,276
Grain crops.....	112,305	114,280	116,347	118,403	124,298	120,891	121,305
Rice.....	28,383	28,323	28,723	29,175	33,314	32,243	32,746
Wheat.....	24,871	25,637	26,969	26,740	27,273	27,543	26,625
Miscellaneous grains ²	50,363	51,304	50,873	52,433	52,720	50,610	45,654
Tuber crops.....	8,688	90,016	9,782	10,055	10,991	10,495	16,280
Soybeans.....	11,680	12,363	12,654	11,442	12,047	11,333	9,791
Industrial crops.....	12,488	11,661	11,128	12,475	14,963	12,879	NA
Cotton.....	5,576	5,180	5,462	5,773	6,256	5,776	5,723
Tobacco.....	427	394	406	456	579	542	NA
Fiber crops.....	186	117	121	174	178	176	NA
Oilseed crops.....	4,724	4,531	4,847	5,753	5,698	5,793	5,849
Sugar crops.....	217	241	292	319	370	426	686
Other (unspecified).....	1,358	1,198	0	0	1,882	166	NA
Green manure crops.....	2,297				3,195	3,420	4,200
Other crops (unspecified).....	2,493	5,739	7,804	8,769	4,687	8,730	NA

¹ Data for cultivated area, cropping index, total sown area, and area sown to grain crops and cotton are taken from State Statistical Bureau's Ten Great Years. The remaining data are taken from other official publications.

² Includes coarse grains—corn, kaoliang, and millet—barley, rye, oats, buckwheat and lentils.

The efforts to accelerate agricultural development failed. Yields of both grain and cotton declined from the 1955 level.¹⁶ The output of grain in 1956 was only slightly greater and as shown in table 4, the output of cotton was less than in 1955 in spite of substantial increases in acreage. The decline is attributable to two factors: (a) mismanagement and "commandism" associated with the rapid formation of higher level APCs, and (b) severe natural calamities. Torrential rainfall and typhoonal activity in the summer of 1956 caused both the Huai and the Hai Rivers to flood.¹⁷ In all, the flooding was probably even more destructive than the 1954 floods.¹⁸

¹⁶ Stato Statistical Bureau, *op. cit.*, p. 121.

¹⁷ Fu Tso-yi, "Speech to the Third Session of the First National People's Congress," *NCNA*, June 22, 1956, and T. J. Lindsay, "Water Conservancy Schemes in China," *Far Eastern Economic Review*, Jan. 17, 1957, pp. 71-72.

¹⁸ Department of Water Conservancy of Anhwei Province, "What Anhwei has Accomplished in Harnessing the Huai River in the Past Seven Years and Proposed Plan for 1958-62," *ECMM*, No. 130, June 2, 1958, p. 30, and "Work Report on Progress in Hopeh Province," *JPRS* No. DC-401, Dec. 28, 1958, p. 7.

TABLE 4.—CHINA: ACREAGE, YIELD, AND PRODUCTION OF COTTON

Year ¹	Acreage (million hectares)	Yield (kilograms per hectare)	Production (million metric tons)
1949	2.8	165	0.44
1950	3.8	180	.69
1951	5.5	187	1.03
1952	5.6	232	1.30
1953	5.2	225	1.17
1954	5.5	195	1.06
1955	5.8	262	1.52
1956	6.3	232	1.44
1957	5.8	285	1.64
1958	5.7	306	1.75
1959	5.6	285	1.60
1960	5.0	255	1.28
1961	3.7	244	.90
1962	3.4	271	.92
1963	4.1	251	1.03
1964	4.5	311	1.40
1965	4.5	333	² 1.50
1966	4.5	355	1.60
1967	4.5	400	³ 1.80
1968	4.4	386	1.70
1969	4.4	⁴ 360	⁴ 1.58
1970	4.4	377	⁵ 1.66
1971 ⁶	4.2	381	1.60

¹ Yield and production data for the period 1949–57, and acreage data for the period 1949–58 as reported by the State Statistical Bureau, *op. cit.*, pp. 119, 121, and 129.

² Estimated. The claim was made at the Fifth Cotton Conference (held in March 1966) that 1965 was a record year. This claim is not believed valid because of generally poor growing conditions in 1965 and because the end-of-year economic report did not repeat this claim or claim an increase in cotton production.

³ The 1967 harvest was claimed to have been a record.

⁴ An official press statement in early 1970 reported that about 3,330,000 hectares of land is required to produce about 1,200,000 tons of cotton. This implies a yield of 360 kilograms per hectare. 1969 production—admittedly less than 1968—was obtained by multiplying the 1969 acreage by an average yield of 360 kilograms per hectare.

⁵ Provincial data suggest that 1970 production was about 5 percent greater than in 1969.

⁶ Preliminary.

By 1957—the last year of the First Five-Year Plan—time was running against the regime. During the plan period, the annual rate of increase in the output of grain averaged 4 percent and cotton 5.2 percent.¹⁹ These increases, while large enough to enable the regime to provide the basic necessities for a large and rapidly growing population, were not sufficient to make available the large surpluses that had been expected.

Effects on the whole economy

The laggard performance of agriculture affected the whole economy. As shown in table 5, except for 1956, capital investment increased at a decreasing rate throughout the First Five-Year Plan instead of at an increasing rate as would be expected from an economy in the take-off. Fluctuations in investment were highly correlated with gyrations in the size of the harvest. Both 1953 and 1956, when the rate of increase in investment was the greatest, were preceded by the unusually good harvests of 1952 and 1955; on the other hand, 1955 and 1957, when the rate of increase in investment was lowest or negative, were preceded by the poor harvests of 1954 and 1956.²⁰

¹⁹ State Statistical Bureau, *op. cit.*, p. 119.

²⁰ Wang Kuang-wei, "For Rapid Progress of Chinese Agriculture," *People's China*, Dec. 16, 1957, p. 10.

TABLE 5.—CHINA: ANNUAL PERCENTAGE CHANGES IN TOTAL INVESTMENT IN CAPITAL CONSTRUCTION AND IN CAPITAL INVESTMENT IN INDUSTRY, 1953-57

	Year				
	1953	1954	1955	1956	1957
Investment in capital construction.....	+83.5	+13.4	+3.5	+59.1	-6.6
Investment in industry.....	+68.0	+9.9	+4.7	+25.2	+4.2

Source: State Statistical Bureau, op. cit., p. 57.

While the regime was certain that agricultural output had to be dramatically increased and diversified during the Second Five-Year Plan (1958-62), it was uncertain how these increases could be achieved. Nationwide production targets had been defined by the National Program for Agriculture Development 1956-67,²¹ but obviously these goals could not be met with current production practices and policies.

State investment looked unpromising as a major source of short-term gains. For example, the state had been heavily committed to control the water resources of the North China Plain. Now much of that work had to be abandoned, primarily because of added costs.²² The regime was left with only one option, short of increasing the basic investment for agricultural development. That option was to increase the size and work pace of the rural labor force and force further reductions in the share of production that was permitted to be retained in the countryside.²³

3. THE GREAT LEAP FORWARD, 1958

The Second Five-Year Plan (1958-62), which followed the Soviet-style script of the first plan, was suddenly swept aside in 1958 by the Great Leap Forward. The economy was to "walk on two legs"—one, the small modern military-industrial sector, the other, the vast unmechanized rural area. The leap rested on the questionable belief that a doubling of an already stern work pace would bring industrialization several decades closer. The extra output expected from the leap was to provide a rapidly expanding industry with necessary raw materials

²¹ This program—the first detailed nationwide plan—was adopted in January 1956, and was reintroduced and approved by the Second Session of the Second National People's Congress of the Chinese People's Republic on April 10, 1960, following the collapse of the Great Leap Forward. Although modified slightly in September 1957, and again in May 1958, the basic provisions have remained almost identical to those in the original draft. The most important targets are those for the per hectare output of grain. Output is expected to reach an average of 6,000 kilograms per hectare in the rice-growing region (south China), 3,750 kilograms in that portion of the North China Plain north of Hwai River and south of the Yellow River, and 3,000 kilograms in all other areas. Compared with the base year of 1955—the most favorable year in agriculture up to that time—this represented an increase to indexes of 200, 241, and 268, respectively. Considering that these targets are for the annual yield per unit of *cultivated* land rather than the average yield per unit of *sown* area and that yields are in terms of *rough* rather than *milled* grain, the targets are attainable, especially in those areas where multiple cropping is possible. Their achievement, however, will require considerable investment of capital; something not provided for in the original draft. Significantly, as of February 1972 only two provinces have reportedly fulfilled the target—Kwangtung and Chekiang. In Kwangtung, almost the entire cultivated area produces at least two crops each year, and in Chekiang, multiple cropping is extensive and the yields per unit of *sown* area are historically the highest in China. According to the current timetable, an additional 3 to 6 years will be required for most areas to fulfill the plan.

²² The series of floods in the North China Plain dramatized that the original schemes for river control were inadequate. Revised plans for harnessing the Hwai and Hai Rivers were completed by mid-1957, but could not be implemented because of the high cost and because the investment would not begin to pay off for a number of years. In all, about 18 billion yuan of state investment would be required to continue with the schemes for the Hwai and Hai Rivers and to complete the first phase of the plan to control the Yellow River. This sum was equivalent to over four times the total state investment in agriculture and over seven times the state investment in water conservation during the First Five-Year Plan. Unable to continue with the three schemes simultaneously, the regime chose to proceed with the construction of the Sanmen Gorge Project to control the Yellow River. With the introduction of the Great Leap Forward, water conservation work was continued in the Hwai and Hai River Basins. Millions of peasants were set to work to construct small uncoordinated projects in an unsuccessful attempt to replace the large multiple-purpose projects originally planned.

²³ Alexander Eckstein, "The Strategy of Economic Development in Communist China," *American Economic Review*, LI, No. 2 (May 1961), pp. 508-517.

and to supply additional goods for export; it was not to go for increased consumption. The communes were set up in time to insure that most of the bumper harvest of 1958 was distributed in conformity with new rates of distribution favorable to the state.²⁴

The leap was marked by incredible claims about the primitive capital that was being created and by even more incredible claims for what this capital was producing. About 9 billion man days of labor were expended during the winter of 1957-58 on water conservation projects alone, it was said.²⁵ Some areas planned to apply up to 15,000 tons of compost on each hectare of farmland and to deep plow to a depth of 10 feet.²⁶ The production of grain was claimed to have increased from 185 million metric tons in 1957 to an "estimated" 350 million to 400 million tons in 1958.²⁷ The Communists asserted that the "new revolution in farming methods" was so successful that 500 million tons or more of grain would be produced in 1959 by concentrating all the available labor on the best one-third of the cultivated land, the remaining two-thirds of which would be allowed to revert into pasture or forest.²⁸

4. THE DISASTER YEARS, 1959-61

The bubble burst with dramatic swiftness. Many urgent tasks—the harvesting of crops in some areas for example—had been neglected because too much rural labor had been assigned to other jobs, such as: the construction of small water conservation projects and the operation of "back yard" blast furnaces.²⁹ The *People's Daily* of June 12, 1959 carried an editorial complaining that the system of "plant less, yield more, and reap more," while basically sound, could not be realized in the greater part of China within the next 10 years because in spite of all the efforts of the Great Leap Forward, we "still cannot attain high yields on a universal scale." Furthermore, ultra-labor intensive methods—deep plowing, the application of massive quantities of organic fertilizer, and the construction of millions of small water conservation projects—could not produce universally high yields alone; capital investment also would be required. Therefore, until this investment was forthcoming, the peasants would have to plant more and reap more just as they had been accustomed to doing for centuries. And, "in order to plant more and reap more, we must make use of all available land, no matter how small and fragmentary it may be."³⁰

Mismanagement and the sapping of peasant incentive—both associated with the establishment of communes—together with unfavorable weather caused agricultural output to plummet in 1959-61.

²⁴ Around 80 to 85 percent of the net income of collectives was distributed to the members. Under communal organization the percentage declined to 65 percent in normal years, and the percentage was even smaller if the harvest was better than average. See Yueh Wei, "Capital Accumulation in the Agricultural Producer Cooperatives," *ECMM*, No. 132, June 16, 1958, p. 33, and *Hsinhua News* (Hong Kong), November 19, 1960.

²⁵ Shu Chung, "Problems of Population and Employment in China," *SCMP*, No. 1798, June 24, 1958, p. 2.

²⁶ Yang Min, "Revolution in Farming Methods," *Peking Review*, October 28, 1958, p. 8.

²⁷ Wang Hsing-shu, "The Myth of Diminishing Returns," *Peking Review*, Oct. 28, 1958, pp. 10-12.

²⁸ *Ibid.*

²⁹ *NCNA*, February 4, 1959.

³⁰ This reversal in policy was the logical outcome of a reappraisal of the grossly inflated Leap Forward claims. In late August 1959, Premier Chou En-lai stated that calculations made of last year's agricultural output were a bit high and that the production of grain in 1958 was 250 million tons instead of the 350 million to 400 million tons claimed and that the 1959 plan for the production of grain had been reduced by 47.5 percent. Chou En-lai, "Report on the Amendment of the Major Targets in the 1959 Plan and on the Campaign for Still Further Developing an Increase in Production and Economy," *NCNA*, August 26, 1959.

Annual output of grain, in what the Chinese themselves were later to describe as the 3 years of natural calamities, fell by one-fifth as compared to the good 1958 harvest, and per capita output by one-fourth.³¹ The situation was exacerbated by an even sharper decline in the availability of subsidiary (protective) foods, such as vegetables, fruit, and livestock products. The output of these foods—customarily produced by peasants on private plots—had apparently all but ceased with the confiscation of the plots under the commune system.³²

By 1961 the regime was forced to invoke strong measures to stabilize agriculture. A major share of the acreage normally sown with industrial crops or soybeans was shifted to grains. The planning and management of the factors of production were returned from the commune first, to the production brigade, and then to the production team (roughly equivalent to a village or the lower-level APC). The private plot was reestablished.³³ Short term contracts—normally for 6 months—were concluded for the import from abroad of large quantities of grain.³⁴ In addition to these changes, the regime later made a fundamental change in economic policy, namely, to shift sufficient resources into agriculture on a priority basis to insure a strong expansion of output over the next decade. This "agriculture first" policy was confirmed by the Tenth Plenum of the CCP in September 1962.

TABLE 6.—CHINA: IMPORTS AND EXPORTS OF MAJOR AGRICULTURAL COMMODITIES¹

[Thousand metric tons]

Period	Imports				Exports		
	Wheat	Rice	Cotton	Sugar	Rice	Sugar	Soybeans
1934-38 average.....	1,748	704	77	352	17	(?)	2,036
1955-57 average.....	(1)(2)	118	69	89	595	3	964
1960.....	3 60	28	80	203	1,174	16	996
1961.....	6,200	62	58	1,534	444	127	335
1962.....	5,300	5	67	938	577	284	342
1963.....	5,700	97	143	511	640	217	332
1964.....	6,800	76	155	408	791	362	498
1965.....	5,700	112	168	419	552	390	577
1966.....	5,800	51	107	620	1,215	552	550
1967.....	4,200	24	88	556	1,149	389	565
1968.....	4,400	(?)	66	431	886	244	571
1969.....	4,000	(?)	83	445	710	145	487
1970.....	4,700	(?)	(?)	(?)	(?)	(?)	(?)
1971.....	3,200	(?)	(?)	(?)	(?)	(?)	(?)
1972.....	3,200	(?)	(?)	(?)	(?)	(?)	(?)

¹ Food and Agricultural Organization of the United Nations, Trade Yearbooks, various issues 1957-1962, and Annual Supplementary Economic Statistics to FAO Trade Yearbooks, 1965-71 is the source of all data except where noted differently.

² Negligible.

³ Wheat imports for the period 1960-72 were constructed from data in various trade journals.

⁴ Not available.

⁵ (Preliminary) Includes only contracts negotiated through February 1972.

³¹ Chairman Mao reportedly told Viscount Montgomery in 1961 that 150 million tons of grain were produced in 1960. This would imply a decline of 25 percent from the 1958 harvest, generally estimated to be about 200 million tons by most observers in the west. Official datum for the 1958 harvest—250 million tons—although undoubtedly exaggerated would imply a decline of 40 percent.

³² By the winter of 1960-61, both under and malnutrition became common throughout China. The former is related to an insufficient supply of calories, most of which were provided by grains. Malnutrition refers to an inadequacy of vitamins, minerals, and protein. In China the bulk of these nutrients are derived from the products produced on private plots. Signs of malnutrition—oedema for example—are more readily apparent than are indicators of under nutrition.

³³ Although the percentage varies from region to region, private plots were not to occupy more than 5 percent of the cultivated land. This is about one-half of the maximum allowed in 1967. But, the output from even this small area is completely out of proportion to its size. Up to six crops of high yielding, quality foods can be produced in 1 year on a private plot. In comparison, only limited areas of the farmland in the socialist sector produce three crops of lower yielding grains in a year and majority of the area in the socialist sector produces—on the average—less than two crops a year. Although reestablished in 1961, it was 1962 before the private plot began to make a significant contribution to the supply of food.

³⁴ Although the first contracts were negotiated in 1960, it was 1961 before large quantities of grain began to arrive at Chinese ports, see table 6.

E. Impact of the Early Strategy

The agricultural development of the first decade depended heavily on an intensification of traditional production possibilities. In the absence of large investments of capital, these early rural development schemes were either once and for all types of improvements or were subject to increasing severe diminishing returns.³⁵ Nonetheless, these measures did increase agricultural output substantially. For example, the output of grain reportedly increased from 154 million tons in 1952 to 185 million tons in 1957. Of the overall increase of about 31 million tons, about 38 and 62 percent are attributable to increases in the acreage and in the yield of grain crops respectively.³⁶ Subsequent events have indicated that neither source of increase could be sustained at the rates of 1953-57.

In 1957, the sown area for all crops—grains, soybeans, industrial crops, green manure crops, and other miscellaneous crops—was about 16 million hectares larger than in 1952. Of this increase, about 3.9 and 12.1 million hectares are ascribed to increases in the cultivated area and multiple cropping respectively.³⁷ Both have declined since 1957, primarily because of changes in land utilization. Water conservation projects, urban expansion, the appropriation of land for industry, transportation, and military uses have decreased the amount of agricultural land available. Much of the increase in multiple cropping was impractical because the delicate balance between traditional factors of production and high levels of output were altered without initiating the use of nonfarm produced inputs, frequently resulting in a decline in output.³⁸

Because of the overriding necessity to produce an adequate supply of grain, little of the increase in the sown area could be spared for industrial crops or soybeans. Between 1952 and 1957 the acreage of industrial crops increased by 391,000 hectares. During the same period the acreage of soybeans declined by 347,000 hectares, resulting in an overall increase in the acreage of soybeans and industrial crops of only 44,000 hectares. Among the industrial crops the acreage of cotton increased by 200,000 hectares; and, the acreage of all other industrial crops increased by about 191,000 hectares.

The simple agrotechniques popularized by the regime could not increase crop yield indefinitely or provide the basis for sustained growth. Many were one time improvements or had a practical ceiling on their use. For example, an increase in multiple cropping or the

³⁵ Anthony M. Tang, "Input Output Relations in the Agriculture of Communist China, 1952-65," in W. A. Douglas Jackson, ed., *Agrarian Policies and Problems in Communist and non-Communist Countries*, University of Washington Press, Seattle, Washington, 1971, p. 293.

³⁶ As shown in Table 3, the acreage of grain crops increased by about 8.6 million hectares between 1953 and 1957. The average yield was 1,372.5 kilograms per hectare in 1952. Thus, the increase in acreage would account for about 11.7 million tons. Higher yields would account for the remaining 19.3 million tons. The average yield of grain in 1957 was 1,530 kilograms per hectare.

³⁷ It is unclear how much of this actually consisted of newly reclaimed land. Of the 3.9 million hectare increase, more than 2 million hectares were officially confirmed as unregistered land that had been in cultivation before agricultural cooperativization. Of the 3.9 million hectares, 2.3 million hectares were reclaimed in Heilungkiang, Kansu, and Kweichow Provinces, and Sinkiang and Inner Mongolian Autonomous Regions—all which were marginal for the reclamation of land. During the period 1951-57, 1.3 million hectares were reportedly reclaimed in Heilungkiang Province alone, yet official reports have stated the cultivated area in that province in 1957 was less than the area farmed in 1954. See Shigeru Ishikawa, "Changes in the Structure of Agricultural Production in Mainland China," in W. A. Douglas Jackson, *Agrarian Policies and Problems in Communist and Non-Communist Countries*, University of Washington Press, Seattle, Washington, 1971, p. 347, and Chinese National Academy of Sciences, *Economic Geography of Northeast China (Liaoning, Kirin, Heilungkiang) JPRS*, No. 15388, September 12, 1962, p. 398.

³⁸ Ishikawa, *op. cit.*, pp. 346-347.

substitution of a higher for a lower yielding crop were once and for all types of improvements and were without foundation for sustained growth. Similarly the maximum quantity of organic fertilizers and compost that can be utilized is fixed, albeit at high levels. The decomposition of an over abundance of organic matter in the soil fixes so much oxygen that plant growth may be stunted.

In general, returns from small, locally constructed irrigation projects were below expectations. The basic problem was the source of water for small ponds, streams, and reservoirs varied directly with local rainfall, and the capacity of the projects to store water was limited. Thus, small facilities were least able to supply water in dry periods when the need for irrigation was greatest. Likewise, shallow wells were inadequate because of the danger that indiscriminate pumping during periods of drought would lower the water table, rendering the wells inoperative. As shown in tables 7 and 8, small projects accounted for almost all of the claimed increase in the irrigated area, which reportedly was enlarged from 16 million hectares in 1949 to 71.3 million hectares in 1959. In all, some 29 million projects were claimed to have been completed during the decade, but each new project—on the average—could irrigate less than two hectares.

TABLE 7.—CHINA: NUMBER OF NEW IRRIGATION PROJECTS, INCREASE IN AREA IRRIGATED, AND AVERAGE AREA IRRIGATED PER PROJECT, SELECTED PERIODS, 1949-59

	Number of projects ¹ (million projects)	Increase in irrigated area ² (million hectares)	Average area per project (hectares)
1949-52.....	2	5.3	2.65
1953-57.....	14	13.4	.96
1958-59.....	13	36.6	2.82
Total 1949-59.....	* 29	55.3	1.91

¹ Data derived from the following sources: (a) State Statistical Bureau, op cit., p. 68, (b) NCNA, 8 April 1953. (c) SWBC, No. 323, 26 June 1958, p. 13. (d) NCNA Nov. 1, 1959. (e) Peoples China, Sept. 16, 1953, p. 14.

² State Statistical Bureau, op. cit., p. 130, and NCNA, Oct. 28, 1959.

³ Claim include 55 large reservoirs, 4,000 large irrigation canal systems, about 19,000,000 small and medium sized projects other than wells, and 10,000,000 wells.

TABLE 8.—CHINA: IRRIGATED AREA, SELECTED YEARS 1949-63
(Million hectares)

Year	Irrigated area (claim)
1949.....	16.0
1952.....	21.3
1957.....	* 34.7
1958.....	* 66.7
1959.....	71.3
1963.....	* 33.5

¹ Of the 34,700,000 hectares claimed to be under irrigation, irrigation was inadequate on 10,000,000 hectares (28.8 percent) and 1,700,000 hectares (4.8 percent) could not be used because of poor engineering. (Ho Chi-Feng, Vice Minister of Water Conservancy, "Summary Report on the 1957 National Farmland Irrigation Conference," SCMM, No. 111, Dec. 16, 1957, p. 24).

² Of the 66,700,000 hectares, 33,300,000 hectares reportedly could benefit fully, 20,000,000 hectares could receive partial benefit, while projects were uncompleted on 13,300,000 hectares. (Chou En-lai, op. cit.)

³ Reported that only 33,500,000 hectares could be irrigated 3 or more times a year. The remainder of the farmland was without irrigation. (NCNA, Nov. 30, 1963).

Based on the "designed capacity" of new projects, Peking claimed that the irrigated area more than doubled during the 8 years 1950-57 and doubled again during the Leap Forward. But many projects did not perform up to capacity and many more—especially those undertaken during the Leap—failed to perform at all. The area under irrigation in 1963 was officially reported to be 33.5 million hectares;

this total is about the same as the 1957 figure and less than half the 1959 total. Thus, despite claims of superhuman efforts there was little progress between 1957 and 1964 when a new stabilization policy was introduced. As shown in table 9, most provinces report substantially smaller acreages under irrigation now than in 1958, indicating the deficiencies encountered with small irrigation projects were not restricted to any one geographic area or type of project.

In summary, the long-run weakness of the agricultural development policy of the first decade was masked by short-run gains in production which stemmed from the return to law and order and the more intensive use of land and labor. It began to become apparent in 1957-58, and it became very clear in 1959-61, that the productive base of agriculture was too weak. Peking had made no sizable provision for either domestic development of new technology or the production and effective use of large inputs from the industrial sector.

TABLE 9.—CHINA: OFFICIAL NATIONAL AND PROVINCIAL CLAIMS OF AREA UNDER IRRIGATION, 1949, 1957, 1958, AND MOST RECENT YEAR FOR WHICH DATUM IS AVAILABLE

[Thousand hectares]

Province	1949	1957	1958	Most recent year	
				Area	Year
Heilungkiang.....	127	323	501	776	1960
Kirin.....	85	280	1,230	600	1960
Liaoning.....	75	460	1,560	1,425	1963
Hopeh.....	267	1,739	6,840	2,600	1970
Honan.....	128	2,811	8,890	2,400	1970
Shansi.....	245	754	1,504	852	1968
Shantung.....	246	1,992	6,067	3,000	1971
Inner Mongolia Autonomous Region.....	285	800	1,620	855	1964
Shensi.....	235	649	2,067	933	1970
Kansu.....	402	1,060	1,867	1,239	1960
Tsinghia.....	49	125	308	166	1961
Sinkiang.....	1,075	1,709	2,411	2,763	1965
Ningsia.....			260	267	1965
Kiangsu.....	1,800	2,863	3,930	2,927	1959
Chekiang.....	1,500	1,593	1,981	1,680	1971
Anhwei.....	1,334	2,283	4,067	2,900	1971
Hunan.....	1,923	2,659	2,833	2,600	1971
Hupeh.....	533	1,928	2,661	2,667	1970
Kiangsi.....	880	1,719	2,650	1,467	1970
Kwangtung.....	1,646	2,602	3,372	2,400	1969
Kwangsi.....	472	1,333	1,571	NA	-----
Fukien.....	659	988	1,233	1,080	1965
Szechwan.....	737	2,561	3,860	NA	1972
Yunnan.....	267	772	1,611	1,000	1970
Kweichow.....	190	612	1,680	NA	-----
Sum.....	15,300	34,642	66,576	NA	-----
Discrepancy.....	700	46	94	NA	-----
China, total.....	16,000	34,668	66,670	33.5	1963

IV. NEW STRATEGY, 1962-71

A. Agriculture First, 1962-63

In 1962, the return of normal weather and the retreat from the most crippling features of the commune system brought a recovery in food supplies. Vegetables and livestock products from the reactivated private plots became available in large quantities. Output also increased in the socialist sector, but less dramatically. Estimated output of grain rose from the trough of 160 to 165 million tons in 1959-61 to 175 to 180 million tons in 1962. This level still fell short of 1957 out put

by 5 to 10 million tons, and there were almost 70 million more mouths to feed. About 4.7 million tons of grain—one-third more than in 1961—had to be imported to augment domestic grain supplies. Furthermore, a substantial share of the harvest had been attained by growing grains on acreage normally reserved for industrial crops and soybeans. Other sobering factors were the sharp declines in hogs and draft animals—a legacy of the Leap—and a decline in cultivated land from 111.8 million hectares in 1957 to 106.7 million hectares in 1962.

The Tenth Plenum of the CCP in September 1962 marked a break with past development policy. A new agriculture first policy provided for the allocation of a larger share of state investment to agriculture, the restructuring of the industrial sector to produce more inputs for agriculture, and a stepping up of imports of chemical fertilizers. Grain imports were put on a planned rather than emergency basis and were to continue at a rate of from 4 to almost 7 million tons each year through 1970, dropping to 3.2 million tons in 1971.

In 1963, the regime sought to restore the production of cotton by again expanding the acreage of cotton in the North China Plain. In light of the recent food crisis the peasants were understandably hesitant to grow cotton in place of food. To placate peasants the regime guaranteed a fixed grain ration to those production teams that specialized in growing cotton. Since this grain was to be procured from peasants within the same region, the shifting of grain within rural areas of the North China Plain would have precluded the procurement of sufficient grain to fulfill the needs of urban areas in the north. This deficit was to be made up from imports.

These plans went awry. In the late summer of 1963 one of the most severe floods in recent history devastated the North China Plain, negating the increase in cotton acreage and making it impossible for the regime to fulfill its promise to supply grain to cotton-growing teams. Still another major disappointment was the failure of the Sanmen Gorge Reservoir to perform as planned. This was the only major river control scheme carried on by the state after the Leap Forward. Completed with great fanfare in 1961, the project was expected to control the Yellow River just before it enters the North China Plain. By 1963 the reservoir was so silted up that it could not perform its assigned multiple functions.

B. Stabilization Policy, 1964

The reversals of 1963 were followed by more policy changes. Beginning in 1964, production teams in the North China Plain were to grow enough grain for their own consumption, but all land not so required was to be sown with industrial crops.³⁹ This was accompanied by an increase in the acreage of cotton and other industrial crops in the traditionally surplus grain producing areas of the Yangtze Valley. This substitution, albeit on a minor share of the cultivated land, undoubtedly increased the output of industrial crops, but the quantity of surplus grain produced may have declined.

³⁹ This policy—if followed to the letter—would indicate the regime planned to transfer grain from the farms of the North China Plain to northern urban areas only if the harvest was above average. If the harvest were average, the rural areas would produce just enough grain for their own use; and, if below average, the peasant would be dependent upon grain produced elsewhere for at least a part of his ration. Thus, grain imports were required in order to free land for the growing of industrial crops in the North China Plain. The quantity of imports required in any given year would fluctuate according to the harvest of grain in the North China Plain rather than according to the size of China's grain harvest in *total*.

The most important change in 1964 was the adoption of a stabilization policy establishing new guidelines for state investment in agriculture.⁴⁰ Beginning in 1964 all of China's farmland was classified as either "ordinary" or "high yielding." Most state investment was allocated to develop irrigation and drainage facilities on the latter so that a crop could be harvested should either a drought or a flood occur.⁴¹ Similarly, the rapidly increasing flow of industrially produced inputs were concentrated on high-yield fields.⁴²

This stabilization shifted the focus of investment from the North China Plain to the south. The greatest progress in developing high-yield farmland has been made in the rice growing regions of the south. Here water supplies are more abundant and mechanical pumps to drain and to irrigate fields can be installed quickly and comparatively cheaply. Included among the areas selected for the installation of large mechanical pumping facilities—provided largely or entirely by the state—are the Tung-ting Lake area of Hunan Province, the Yangtze Delta, and the Liuchou Peninsula, and the Canton (Pearl) and Swatow Deltas of Kwangtung Province. State investment in the North China Plain was suspended indefinitely.⁴³

C. The Cultural Revolution, 1966-69

The onset of the Cultural Revolution (1966-69) was accompanied by additional modifications of investment policy. The ideological question of whether the basic responsibility for capital investment in agriculture should rest with the state or with the "masses" was one of the reasons for the split of the leadership into opposing factions. The group advocating state responsibility had carried the day from the collapse of the Leap Forward until the introduction of the Cultural Revolution and was responsible for the "agriculture first" policy and then the "stabilization" policy which centralized increasing responsibility in the state. The same group had conceded the necessity for the private plots under the conditions then present in the countryside.

Now it was the turn of the supporters of a more radical economic policy to have their innings. Emphasis was accordingly placed on local self-reliance as opposed to reliance on the state for resources. The Tachai production brigade in Shansi Province was given tremendous publicity as a do-it-yourself outfit whose members were reclaiming many hectares of unpromising land without state support and were increasing yields each and every year.⁴⁴

In spite of the resurgence of radical doctrine and in spite of the constant calls to "learn from Tachai," Peking did not repeat the mistakes of the Leap Forward during the cultural revolution:

The production brigade and the production team continued to make the day-to-day agricultural decisions.

⁴⁰ The original objective of this policy was to stabilize rather than increase the yield on the most productive farmland. This policy will be referred to as the stabilization policy although this policy was later expanded to include both the increase and the stabilization of crop yields.

⁴¹ Yang-po, "Construction of High Yield Fields," *JPRS*, No. 25,060, June 12, 1964, pp. 5-10, and P.H.M. Jones, "Creeping Modernization," *Far Eastern Economic Review*, November 12, 1964, pp. 350-351.

⁴² For convenience these fields will be referred to as high-yield fields although the term most commonly used in the Chinese press is fields capable of producing high yields despite drought or flood.

⁴³ In 1966 over one-half of the state investment for water conservation was once again allocated to the North China Plain, apparently to assist in the renovation and enlargement of the drainage facilities destroyed by the devastating floods of 1963.

⁴⁴ The Tachai model has a pragmatic relevance for poor low-yield areas that do not qualify for state investment under the stabilization policy.

The private plot was left undisturbed in practice notwithstanding the propaganda blasts against material incentives.

Inputs of fertilizers and equipment from industry continued to flow in large volume, although planned increases were not fully realized because of disturbances in the industrial sector.

New irrigation projects were reasonably well planned and benefited from complementary inputs from both state and local resources.

Local chemical fertilizer plants began turning out substantial quantities of useful, though low-grade, fertilizers.

D. Policy in 1970-1971

With the winding down of the Cultural Revolution, strategy has essentially reverted back to the "agriculture first" and "stabilization" policies of 1962-1965. Increases in the flow of modern inputs supplied by the State reached record levels in 1970-1971 and are likely to continue to rise during the remainder of the Fourth Five-Year Plan (1971-1975). Likewise the output of semi-modern inputs—low quality chemical fertilizers, small water pumps, simple farm tools, etc.—produced locally and with local investment have increased rapidly and account for an increasingly larger share of the on-farm-produced inputs supplied agriculture.

Policy toward agricultural organization was gradually liberalized in 1970-1971. A more permissive attitude was taken toward sideline occupations, and radicals were told not to interfere with income differentials in the countryside which were perfectly proper "at this stage in the nation's development." Indeed, since Peking has been allocating most of the modern inputs to the rich communes and brigades, it is itself begetting increased income differentials.

V. INPUTS UNDER THE NEW STRATEGY

A. Water Conservation and High Yield Fields

High-yield farmland must be provided with both effective irrigation and drainage. Ordinary farmland may have one or the other but rarely both. The water conservation projects on high-yield farmland must be capable of the timely transfer of the very large volume of water necessary to produce high yields. In contrast, the simple irrigation projects emphasized in the past were usually without adequate drainage and were designed to ration a small volume of water over a large area. Facilities of this type are useful as a means to prolong plant life in time of drought but are of small value for modern agricultural practices.

While the total area under irrigation in the PRC has not increased appreciably since the Leap Forward, rapid progress has been made since 1964 in enlarging the portion under controlled irrigation. By January 1966, one-quarter (about 6.25 million hectares) of China's paddy fields had reportedly been developed into high-yield fields. As shown in table 10, the area of high-yield fields is estimated to have increased from about 6.5 million hectares in 1957 to 7.6 million hectares in 1963, an increase of only 1.1 million hectares. By 1971, however, the area is estimated to have grown to about 13 million

hectares—12 percent of China's farmland—an increase of about 70 percent since the adoption of the stabilization policy and double the area in 1957.

TABLE 10.—CHINA: TOTAL AREA, INCREASE IN THE AREA OF STABLE, HIGH-YIELD FARMLAND, AND ANNUAL INCREASE IN THE OUTPUT OF GRAIN ASSOCIATED WITH THESE FIELDS, SELECTED YEARS, 1957-71

Year	Area of stable, high-yield farmland (million hectares)		Increase in the annual output of grain over 1957 (million tons)		
	Total	Increase over 1957	From stabilization of yield ¹	From increase in normal yield ²	Total increase
1957	26.5				
1963	7.6	1.1	0.22	1.38	1.60
1966	10.0	3.5	.70	4.38	5.08
1970	11.0	4.5	.90	5.62	6.52
1971	13.0	6.5	1.30	8.12	9.42

¹ During the period 1953-57, 53,667,000 hectares of farmland were subjected to drought, flooding or waterlogging resulting in the loss of 52,500,000 tons of grain. The average loss was 978 kilograms of grain per hectare for the 5-year period or 195.6 kilograms per year (rounded to 200 kilograms).

² Believed to have been about the same as the area in 1956. In all 53,000 hectares of were equipped with mechanical irrigation pumps in 1957. This total added to 1956 area of 6,474,000 hectares of stable, high yield farmland would suggest an area of 6,527,000 hectares of these fields in 1957.

³ The provision of irrigation and drainage alone reportedly increases the yield of dry land crops in northern areas by from 450 to 675 kilograms per hectare, and may cause the yield of some paddy rice fields in south China to increase by as much as 2,250 kilograms per hectare. The average for all fields may be about 1,250 kilograms per hectare.

The increase in the area of high-yield fields requires increased availability of pumping equipment. As shown in table 11, the inventory of mechanical pumps on China's farms is estimated to have grown from about 700,000 horsepower in 1957 to about 8 million horsepower in 1966. The inventory has continued to increase rapidly in recent years. For example, the capacity of electric pumps supplied agriculture during 1970 was reportedly equivalent to one-sixth of the total increase attained during the period 1949-69. And the total supplied in 1971 probably surpassed the 1970 figure.

TABLE 11.—CHINA: INVENTORY OF MECHANICAL PUMPS AND AREA IRRIGATED WITH MECHANICAL PUMPS, 1949 ANNUALLY 1956-66

Total	Electric pumps (million horsepower)	Non-electric pumps (million horsepower)	Total pumps	Area irrigated ¹ (thousand hectares)
1949	(?)	(?)	0.12	23
1956	(?)	(?)	.39	73
1957	0.09	0.61	.70	126
1958	.33	1.77	2.10	399
1959	.56	2.84	3.40	646
1960	1.07	4.33	5.40	1,026
1961	1.47	3.53	5.00	950
1962	2.13	3.67	5.80	1,102
1963	2.36	3.54	5.90	1,133
1964	2.73	3.37	6.10	1,186
1965	2.97	4.33	7.30	1,387
1966	3.47	4.53	8.00	1,520

¹ Calculated according to the ratio of 0.19 hectare of land irrigated per horsepower of pumping equipment. According to official data, the ratio was 0.19 for the years 1949, 1956, 1963 and 1964, and 0.18 in 1957. About one-fifth of China's pumping equipment is used for irrigation, the remaining four-fifths is used for drainage.

² Not available.

The increase in the area of high-yield fields has been accompanied by a decrease in the average area irrigated per horsepower of pumping equipment. This average will continue to decline as the pumping of water is extended to higher fields and to deeper deposits of under-

ground water. For example, in Hopeh Province, the new deep wells require a pump of about 10 horsepower, 4 times the horsepower required for the old shallow wells.⁴⁵ Similarly, increasingly large pumps must be installed to control surface water from ponds, canals, and reservoirs. In Kiangsu Province the area irrigated per horsepower of pumping equipment declined from 3.3 hectares in 1957 to 2.25 hectares in 1962 and to 1.56 hectares in 1963.⁴⁶

Since the beginning of the Cultural Revolution the regime has relied more heavily on the production team to develop high-yield fields. The peasants have been called upon to construct water conservation projects equipped with simple mechanical pumps, most of which are produced locally. Initially, the requirement for small pumps undoubtedly exceeded the capacity of local workshops. Although the increase in the area under irrigation, the area irrigated by electric motors, and the number of deep wells dug in 1967 were reportedly the highest since 1961, little or no increase was claimed in the area of high-yield fields. But, as the pace that locally produced pumps were made available quickened, so did claims of increases in the area of high-yield farmland. For example, over 2 million hectares⁴⁷ of high-yield farmland were reportedly developed in China during the 1971 water conservation year,⁴⁸ far more than had been developed in any other year.⁴⁹

The potential to develop high-yield farmland is far from exhausted despite the impressive expansion since 1964. High-yield fields could be developed on perhaps 36 million hectares, that is, on about one-third of China's farmland or nearly three times the current high-yield acreage. A minimum of 8.6 million horsepower of pumping equipment would be required merely to provide the remaining 23 million hectares of potentially high-yield land with mechanical irrigation.⁵⁰

The policy of relying on the production team to develop high-yield fields has been at least partially successful because first, many fields could be irrigated and drained efficiently with the addition of a small pump, and secondly, the greater availability of petroleum products made it possible to establish simple pumping stations in areas far removed from electric powerlines. Most of this increase is predicted on the availability of locally produced pumps, which vary widely in quality and serviceability.

B. Research

The lack of adequate scientific capabilities is a serious impediment to China's progress in modernizing agriculture. China almost certainly cannot match the 1.2 research workers per 100,000 persons engaged in

⁴⁵ The large drainage canals that have been dug across the North China Plain since 1963 are useless for irrigation because they do not have the capability to store excess water for use at a later time as needed. However, the installation of large numbers of pumps has now made it possible to sink large numbers of wells in some parts of the plain. The potential to expand irrigation is limited by the natural rate of recharge of the underground deposits of water.

⁴⁶ Among the provinces Kiangsu has by far the largest inventory of mechanical water pumps.

⁴⁷ *NCNA*, December 1971.

⁴⁸ Both plans for construction in water conservation and the accomplishments of these programs are based on a "water conservation" or "irrigation" year, which runs from October 1 through the end of the following September.

⁴⁹ About 587 thousand hectares of this increase reportedly occurred in Shantung Province alone. Hunan, Hopeh, and Kwangsi Provinces each claimed an increase of about 200 thousand hectares in 1971. Thus, almost 1.2 million hectares, or about 60 percent of total increase for China, was in these four provinces alone.

⁵⁰ According to official sources about 46.5 million hectares, or 43 percent of China's farmland, could be equipped with mechanical irrigation pumps, but that much of this area could not produce stable high yields even if this equipment was installed. See "Some Problems Concerning Agricultural Mechanization," *SCMM*, No. 352, February 18, 1963, p. 16.

agriculture in India. Comparable figures are 7.9 and 60 in Taiwan and Japan, respectively.

The experience of other developing countries suggests that scarce scientific resources in the agricultural sector must be concentrated to fulfill limited objectives; that a highly qualified, interdisciplinary staff of scientists is required; that research objectives must be well defined; and that the directors and staff must be given freedom and the necessary time to achieve their objectives.

A non-doctrinaire approach to agricultural science more or less prevailed in China until the Cultural Revolution. As early as March 1965, articles began to appear in the Chinese press discrediting the scientific practices and research techniques of the type that had produced the "green revolution" in other countries.⁵¹ The press charged that Chinese agricultural experts had spent more than 10 years of research developing new varieties but were ivory tower servants who had failed to produce anything useful. The remedies proposed were to make the peasant masses responsible for agricultural experimentation and to disperse the agricultural scientists throughout the countryside to learn from the peasants at the grassroots level. In 1969, for instance, most of the 300 scientists and technicians working in technical agricultural stations in Kwangtung Province were sent to work with the peasants.

The continuity of long-term agricultural research has been seriously disrupted. For example, in October 1968 Peking reported:

Scientists and technicians of the Academy of Agricultural Sciences have readjusted their plan of scientific research and have abandoned a number of research subjects * * *. The monopoly of research work by a few bourgeois technical authorities has ended * * * complex procedures in the breeding of new varieties of crops have been abandoned, and the time spent on testing has been shortened.⁵²

C. Extension Service

The successful spread of new technologies requires an expanded and higher quality extension service. One of the major goals of the Chinese stabilization program has been a general improvement in the management of socialist farming enterprises. Extension services, which rely primarily on local experimental and demonstration plots, have probably been effective in popularizing some agrotechniques in China. The dispatch of scientific personnel from research centers to work on local plots may upgrade the quality of this work in some areas.

D. Varieties of Seed

The new high-yield varieties (HYV) of seed have not been introduced in quantity in China.⁵³ At the same time, the Chinese have not completely ignored the importation of new strains of seed. For example, Albanian strains of wheat as well as rice seeds from other Asiatic countries have been tested in China. Although the results of these tests are unknown, the paucity of official information concerning this work suggests that the results have not been encouraging.

⁵¹ "Agricultural Science Workers Go to Rural Areas To Set Up Basic Points of Scientific Experiment and Cultivate Demonstration Plots," *SCMM*, No. 469, May 17, 1965, pp. 36-42, and Peking *Jen-min Jih-pao*, editorial, May 8, 1966.

⁵² *NCNA*, Oct. 6, 1968.

⁵³ Superior varieties of seed developed for use in temperate regions such as the United States are possibly better suited to Chinese conditions than are the more popular strains of HYV or "miracle" varieties currently being cultivated in a number of developing Asiatic countries. The "miracle" varieties are mostly for use in tropical and semitropical environments and hence are probably not suitable for use in the higher latitudes within which most of China's major agricultural regions are situated.

At present, plant breeding and improvement programs in China are likely to produce short-term improvements rather than breakthroughs similar to HYV. In December 1969 the New China News Agency reported that complex breeding procedures had been replaced by simple methods of single crossing and seed selection, mostly by peasant experts. The number of new varieties of grain developed in recent years reportedly number into the hundreds; however, the failure of a few greatly superior varieties to emerge suggests that no miracle varieties have been developed. Although the growing of new varieties was popularized during the Cultural Revolution, press reports and other sources indicate that seed selection remains the dominant form of seed improvement. The selection of seed from the hardiest and most desirable plants for sowing during the next cropping season has insured that the varieties grown are suited to local conditions and has minimized seed degeneration.

The Chinese have also exchanged traditional varieties between regions. This practice is believed to have been especially successful in the transfer of varieties of rice. Traditionally *hsien* (*indica* or long grain) varieties of rice were grown in the southern and *keng* (*japonica* or short grain) varieties of rice were cultivated in northern (Yangtze Valley) rice growing regions.⁵⁴ Long grain varieties grew well on relatively infertile soils, were tall, rather coarse of stem, and could tolerate the deep water frequently associated with inadequately drained paddy land. The major disadvantages of this sub-specie is its proneness to lodging even at low levels of fertilization and its inability to tolerate high winds and typhoons. Short grain varieties responded well to heavy fertilization and—because of their comparatively short stalks—could withstand high winds. But, these latter varieties could not tolerate deep standing water and were photosensitive.⁵⁵ To maintain the high level of soil fertility demanded by short grain varieties, a rotation of a single crop of rice followed by a winter green manure crop had to be practiced.

The introduction of the stabilization program had opened new opportunities. The growth in the area served by mechanical pumps and the great increase in chemical fertilizers have made possible the cultivation of short grain varieties of rice in southern paddy areas and an intensification of rice cultivation in the northern paddy areas. Kwangtung Province in particular has developed the capability to control water depth on a major share of the paddy fields, thereby creating conditions favorable for the growth of short grain varieties.⁵⁶ The requirement for much heavier fertilization was met by chemical fertilizers which were just becoming available in large quantities at this time. In the northern paddy areas, chemical fertilizers were substituted for winter green manure crops. This in turn

⁵⁴ Shen Hsueh-nien, "Paddy Rice Cultivation in Communist China," *JPRS*, No. 13,946, May 28, 1962.

⁵⁵ Photosensitivity refers to the length of day and hours of sunlight required by a plant to flower. Photoperiod insensitive means the plant will flower in a given number of days after planting regardless of the length of day. Because of their photosensitivity, *japonica* varieties are believed suited for cultivation during the spring and early summer in south China. Thus, *japonica* varieties may be grown as the first or early crop of rice, but the second or late crop of rice is probably a traditional, *indica* variety.

⁵⁶ Short grain varieties were first grown on small areas of paddy in Kwangtung Province as early as 1954. By 1964, conditions were suited for the growing of these varieties on a larger acreage.

made possible the growing of two crops of rice⁵⁷ in 1 year or the growing of one crop of rice followed by a winter crop instead of one crop of rice followed by a crop of green manure. Shortages of labor during peak seasons—also a limiting factor in the double cropping of rice in this region—was alleviated by the provision of improved farm equipment.

E. Rural Electrification

Since 1962, significant progress has been made in rural electrification in Communist China. As shown in table 12, electric power consumption in rural areas has increased from 1.5 billion kilowatt-hours (kwh) in 1962, or 5 percent of total production, to nearly 4 billion kwh in 1969, or 8 percent of total production. Further large percentage gains were achieved in 1970 and 1971. Use in irrigation and drainage probably accounts for about 75 percent of the total electricity used in the countryside.

TABLE 12.—China: *Estimated use of electric power in agriculture*¹

[Electric power consumption (billion kilowatt-hours)]	
Year:	Year—continued
1962-----	1967-----
1963-----	1968-----
1964-----	1969-----
1965-----	1970-----
1966-----	1971-----
1.5	3.2
2.1	3.4
2.5	3.9
2.7	4.6
3.1	5.5

¹ Data for 1962-65 are either official Chinese Communist figures or are based on Chinese claims for increases over a given period. Figures for 1966-69 are based on estimates of increases by province in 1966-69 over 1965.

Rural electrification is likely to continue to expand, but perhaps not as rapidly as during 1962-71. During this period, emphasis was placed on constructing hundreds of small electric power installations and on electrifying the most convenient and least costly areas. While the small plant construction program remains important, continued rapid electrification of China's rural areas would require a resumption of work on the large-scale multipurpose water conservation projects which were begun in the 1950's and on which little work was done during the 1960's. Peking is not yet prepared to accept the high costs and the long construction time required to complete these projects.

F. Agricultural Tools and Machinery

Since 1962, China's agricultural areas have benefited from a mounting supply of such diverse agricultural tools and machinery as irrigation and drainage pumps, diesel and gasoline engines, agricultural processing machinery, and a wide variety of handtools. Diesel engines, for example, rarely mentioned as a source of power for machinery in rural areas during the 1950's, began to be mentioned with increasing frequency after 1965 when China became basically self-sufficient in petroleum. The sources of this agricultural equipment is both the modern machine building plants and the primitive,

⁵⁷ The growing of two crops of rice in 1 year does not mean that the productivity of the land will be double that of a single crop of rice. Because of more favorable growing conditions throughout its life cycle the yield of an intermediate crop of rice is usually significantly higher than the yield of either an early or a late rice crop. In addition, the double cropping of rice in central China normally requires that the two crops be interplanted (growing in the same field at the same time) for a varying period of time. For these reasons, under favorable conditions the combined yield of two crops of rice may be 30 to 50 percent greater than the yield of a single crop of rice.

small-scale industrial facilities in the countryside. Whereas in the first decade the regime rightly rejected the supply of machinery that simply displaced (abundant) labor, in the second decade a larger supply of machinery is needed to complement other factors of production. For example, chemical fertilizers may now make it possible to have two crops but only if sufficient machinery is available to insure timely planting and harvesting.

G. Tractors for Agricultural Use

China first began to manufacture conventional tractors⁵⁸ in 1958. In 1964 production lines—many of which were housed in small plants—were established to make garden type tractors. As shown in table 13, the production of both types of tractors has increased rapidly. The table illustrates clearly the interruptions to production caused by the Great Leap Forward in 1961–62 and by the Cultural Revolution in 1967–68.

TABLE 13.—CHINA: ESTIMATED PRODUCTION OF TRACTORS

Year	Thousand physical units			Thousand standard units ¹		
	Conventional	Garden	Total	Conventional	Garden	Total
1958.....	1.0	0	1.0	1.1	0	1.1
1959.....	4.9	0	4.9	9.4	0	9.4
1960.....	10.8	0	10.8	23.8	0	23.8
1961.....	6.7	0	6.7	16.2	0	16.2
1962.....	8.4	0	8.4	20.9	0	20.9
1963.....	10.0	0	10.0	24.6	0	24.6
1964.....	12.0	.6	12.6	29.2	.2	29.4
1965.....	13.7	3.6	17.3	32.3	.8	33.1
1966.....	17.6	9.0	26.6	43.1	2.1	45.2
1967.....	15.3	8.4	23.7	38.1	2.0	40.1
1968.....	16.4	10.7	27.1	40.4	2.5	42.9
1969.....	19.0	12.5	31.5	46.0	2.9	48.9
1970.....	24.0	18.0	42.0	58.6	4.1	62.7
1971.....	28.0	22.0	50.0	68.3	5.1	73.4

¹ Standard units measure each type of tractor in terms of horsepower rather than physical units and thus provide some adjustment for differences in size, weight, complexity, and cost. China follows the practice of other Communist countries and converts each tractor to standard units of 15 drawbar horsepower. The drawbar horsepower of Chinese tractors generally ranged from 50 to 70 percent of their brake horsepower (the more commonly used measurement of horsepower).

Measured in horsepower, the vast majority of China's inventory consists of conventional tractors. These tractors are primarily suited for "extensive" agricultural cultivation of the type conducted on the large state farms of northeast and northwest China and are less useful in the intensively farmed small-size croplands and flooded paddy fields of east, central, and south China. Beginning in 1964 an increasing number of garden tractors have been produced to correct this deficiency. Nevertheless, the output of garden tractors in standard units accounted for only 7 percent of total tractor output in 1971. Today China probably has roughly 75,000 garden tractors (roughly 20,000 standard units) in use. By contrast, in Japan, which has only 13 percent as much paddy land, farmers own several million garden tractors, or approximately one per hectare.

H. Pesticides and Fungicides

Production of pesticides and fungicides in the PRC in 1963 was 123,000 metric tons. By 1966 the output from newly constructed plants

⁵⁸ Conventional tractors include all tractors (wheeled or tracklaying) that are powered by engines of at least 20 horsepower (hp). Garden tractors include all smaller tractors, which the Chinese at various times have called "hand," "hand-propelled," "hand-guided," and "walking" tractors.

had increased the total to more than 250,000 tons. New capacity has been added since 1966, and production of pesticides and fungicides may now be on the order to 300,000 to 400,000 tons per year. Domestic production continues to be augmented by imports of pesticides and insecticides from non-Communist countries.

Throughout China's history, pests and plant diseases have been a major cause of crop losses. During 1962 the regime claimed that the total area under pesticide control was about 26 million hectares—roughly one-fourth of the cultivated area—and that the estimated additional harvest gained from such control was about 2 million tons of grain. Although the area under pesticide control has increased substantially since 1962, current emphasis on expanding output suggests that the Chinese still are some distance away from meeting all their requirements. In any case, increased availability and a greater variety of these chemicals would be a key element for successful large-scale introduction of HYV seeds into Chinese agriculture.

I. Chemical Fertilizers

China has been strikingly successful in increasing the availability of chemical fertilizer, particularly since 1962. As shown in table 14, the supply of nitrogen fertilizers increased by less than 50 percent between 1957 and 1962, but almost quintupled between 1962 and 1970. China has become the world's largest importer of nitrogen fertilizers and is exceeded only by the U.S.S.R. and the United States as a consumer.

TABLE 14.—CHINA: ESTIMATED SUPPLY OF NITROGEN FERTILIZER (NUTRIENT WEIGHT)

[Million metric tons of nitrogen]

Year	Total supply	Imports	Domestic production
1957	0.37	0.14	0.23
1958	.55	.20	.35
1959	.54	.27	.27
1960	.54	.33	.21
1961	.42	.20	.22
1962	.54	.24	.30
1963	.94	.54	.40
1964	.78	.32	.46
1965	1.19	.59	.60
1966	1.46	.72	.74
1967	1.65	1.13	.52
1968	1.84	1.20	.64
1969	2.20	1.40	.80
1970	2.50	1.48	1.02

Imported nitrogenous fertilizers are of higher quality and contain a higher percentage of plant nutrient per unit of weight than most domestic Chinese fertilizers. A large share of domestically produced chemical fertilizers consist of low quality, low nutrient fertilizers such as aqua ammonia and ammonium bicarbonate. These fertilizers are produced in small, locally operated plants. It is claimed the small plants are advantageous because—on the average—a small plant requires only 2.5 percent of the fixed investment of a large plant, but has 4.5 percent of the production capacity of the large plant, can be set up in only one-third the time, and can be built from local materials. By 1970 small plants were claimed to account for 43 percent of the domestic output of nitrogen fertilizers, but this is almost certainly in

terms of product rather than nutrient weight of output.⁵⁹ In terms of nutrient content, small plants probably produce about one-third of China's output of nitrogen. The fertilizers produced by the small plants are helpful to crops but are generally unsuited for modern agricultural practices. These products decompose rapidly when stored or exposed to the weather. Production and distribution of these products thus must be made to dovetail with the seasonal demands of farming.

No large modern fertilizer plants have been constructed since 1962. In the last 3 years, however, a number of small urea plants, each producing about 40,000 tons per year, have been put into operation. Urea fertilizer is the cheapest to produce and also contains the highest nutrient content—46 percent—of all nitrogen fertilizers.

To a large extent, chemical fertilizers are allocated to crops in the general vicinity of plants where they are produced or of ports where they are imported. The location of modern plant capacity is about equally divided between the rice growing regions of the south and the dry land farming regions of north China. The distribution of imported fertilizers is also believed to be divided about equally between the two regions. Thus, while most high-yield farmland is situated in the south, about one-half of the supply of high quality fertilizer is used in the north, often under conditions of uncertain and imperfect water control. The explanation may lie in the necessity to increase the yield of the large cotton acreage of the north and to spur the growth of corn which is highly responsive to fertilizer.

One weakness of China's chemical fertilizer program is the unsatisfactory mix of plant nutrients. For example, HYV seeds produce optimum yields with fertilizers in a ratio of 3.0:1.5:1.0 units of nitrogen, phosphorous, and potassium; the current ratio of plant nutrients in China is on the order of 7.0 units of nitrogen, 1.0 unit of phosphorous, and a negligible amount of potassium. Since crop yields are governed by the availability of the plant nutrient in least supply, the availability of phosphorous and potassium in China must be sharply augmented before optimum yields can be attained. The regime has begun to attack this problem of nutrient balance by increasing the amount of complex fertilizers it imports; domestic capacity for production of complex fertilizers has only recently come into being.⁶⁰

Despite spectacular progress in increasing supplies of chemical fertilizers, the PRC could profitably use large additional quantities. A recent Chinese estimate has placed China's needs for fertilizer at more than 50 million tons (product weight) each year compared with the 14 million tons (product weight) available in 1970.⁶¹ The gap between what is available and what can be profitably applied is indicated by the fact that on a nutrient basis, China applies only one-tenth the fertilizer per unit of cultivated land applied by West European countries and Japan. Because of the large acreage of multiple cropping in China, the spread is even wider per unit of sown area.

⁵⁹ In 1971 small plants reportedly produced 60 percent of the domestic output of all types of chemical fertilizers. (See "Fast Developing Chemical Fertilizer Industry," *Peking Review*, July 10, 1970, p. 39 and "New Leap in China's National Economy," *Peking Review*, Jan. 14, 1972, p. 8.)

⁶⁰ Complex fertilizers are fertilizers in which nitrogen, phosphorous, and potassium are combined together. Simple fertilizers, which constitute the bulk of Chinese availabilities, usually contain only one nutrient. Urea and ammonium sulphate, for example, contain nitrogen as the nutrient.

⁶¹ Chi Wei, *op. cit.*, p. 5.

VI. IMPACT OF NEW STRATEGY AND PROSPECTS

Successes Under the New Strategy

The response of agricultural production to the new strategy—including the substantial increase in investment in agriculture and the concentration on high-yield acreage—resulted in (a) the restoration of the 1957 level of grain production by 1964, and (b) the growth of grain production at a somewhat faster rate than population in 1965–71. In 1970, grain production reached a peak level of 215 to 220 million tons on the basis of fairly good weather and record inputs of chemical fertilizers, electric power, irrigation and drainage equipment, and other modern inputs discussed in section V. In 1971, weather, which had been average to excellent in the 9-year stretch 1962–70, turned sour. Extensive regions of China suffered from drought, waterlogging, and insect pests. Nonetheless, the continued rise in inputs into agriculture offset the unfavorable weather, and grain production maintained the peak of 215 to 220 million tons.⁶²

In summary: as a result of the changed strategy, a new trend line has been established in agriculture, distinctly higher and more steeply pitched than that prevailing under the low-investment policy of the first decade, yet lower than that which could be readily realized given even larger and better-balanced inputs. Output will exceed the trend value when weather is better than normal and fall below the trend value to the extent weather is unfavorable.

Under the new strategy, cotton production also was restored to the 1957 level but subsequently has remained at that level. The decrease in total acreage planted to cotton has been offset by increased supplies of chemical fertilizers and by a shift to more productive acreage in the Yangtze Valley. Cotton cloth remains tightly rationed, and Peking is emphasizing the expansion of man-made fibers to provide the additional cloth required by a steadily increasing population.

Shortcomings Under the New Strategy

The shortcomings of the new strategy were mainly in the form of unrealized opportunities. Seed varieties and the area of high-yield fields were not developed rapidly enough to take full advantage of augmented supplies of fertilizer. And fertilizer supplies were unbalanced for most effective results, nitrogenous fertilizers far outweighing phosphorus and potassium fertilizers. Furthermore, the development of a sound agricultural extension service, training facilities, and research base was gravely interrupted by political factors especially during the Cultural Revolution.

Prospects

“Miracle increases”—made possible only by a complete mix of modern inputs and scientific management practices—are not likely to be achieved in the PRC for the balance of the current 5-year plan (1971–75). Although China has substantially improved its agricultural sector

⁶² The official Chinese claims for grain production in 1970–71 run about 10 percent higher. In late 1970, Premier Chou En-lai told the late American author Edgar Snow that grain production in 1970 was more than 240 million tons. At yearend 1971, Peking announced that grain production for 1971 was 246 million tons, one of the two national aggregate production figures released by the regime for 1971.

since 1962 and has moved ahead of the traditional technology of the first decade, it lacks much of the institutional infrastructure and scientific competence necessary for a "green revolution". The gains of the next few years will be obtained from the gradual extension of high-yield acreage, the increase in supplies of both high-grade and low-grade fertilizers, and the steady improvement in seed varieties. These gains probably will be sufficient to maintain per capita food supplies but not sufficient to provide large extra quantities of raw materials for industry or export. A run of bad luck in weather or a retreat from the permissive policy toward private activity in the countryside would reduce these gains. Shortcomings in domestic agricultural technology will increasingly constrain the advance of the agricultural sector. By picking up the pieces and starting anew on a basic agricultural research program, Peking could substantially improve long-term prospects.

As for foreign trade, China has imported 4 million to almost 7 million tons of wheat each year starting with 1962, except for 1971 when only 3.2 million tons were purchased. At the same time, China has been exporting sizable quantities of rice—which has a higher unit price than wheat—and large amounts of processed foods with a high value-added. The wheat imports are convenient for the feeding of cities in the north and probably will continue at a restrained rate. Exports of processed foods should find ready markets in Japan, Europe, and, in the case of specialty products, the United States.

APPENDIX A

AGRICULTURAL ZONES AND REGIONS

In section II of the text, the eastern agricultural third of China was divided into the northern and southern areas, the dividing line being the Huai River. As shown in figure 2 and table 15, the area north of the Huai River can be further divided into two agricultural zones and the area south of the river into three zones. The zones—designated according to intensity of land utilization and productivity of the land—are the product of such natural features as temperature, length of the growing season, elevation, topography, and amount and seasonal distribution of precipitation. With the exception of zone I in the extreme south of China, each zone can be split into an "A" and a "B" region of roughly equal proportions. The agricultural characteristics of the two regions within each zone are similar. However, the "B" region is higher, cooler, and drier and hence multiple cropping is less common; a higher proportion of secondary crops are grown; and crops yields tend to be lower and less stable than in its "A" counterpart.

ZONE I

Because of warm to hot temperatures, generally adequate precipitation, and a year-around growing season, land utilization in zone I is the most intense in all of China. Two crops of rice are harvested each year from most paddy fields; a few in the extreme south—on Hainan Island—may produce three crops. Although triple cropping is possible by sowing a winter crop following the harvest of the second rice crop, this practice has not been popular. Among the important crops grown on dry (nonpaddy) fields are sweet potatoes, peanuts, and sugar cane. Because of inadequate fertilization, lack of water control, and the frequent occurrence of typhoons, the yield for each crop is lower than in many other rice-growing regions. Nonetheless, the annual productivity for each unit of land is high because almost every unit of land produces at least two crops each year.

ZONE II

Compared to zone I, cultivation is less intensive in zone II, but the yield for each crop is higher. The average yield per crop in Chekiang Province, for example, is the highest in China. The growing of a single crop of rice in the summer predominates although the double cropping of rice has increased in recent years.

Most of the rice that is double cropped is interplanted—the second or late crop is planted between the rows of the first or early crop before it is harvested—especially in the northern areas of the zone. Coarse grains and sweet potatoes are the most important dry land crops, and their acreage exceeds that for rice in region "B". Winter crops (fall-planted crops, harvested in the spring and early summer of the following year) are grown extensively. The most important winter crops are lentils—peas and beans—and rapeseed. Winter wheat is also grown although it is not nearly as important here as in zone III just to the north. Most fields not sown with a winter crop are used to grow green manure—a legume sown in fall and plowed under as an organic fertilizer in the spring—or are too low and wet to be sown to a crop of any kind.

Figure 2
People's Republic of China
Agricultural Zones and Regions

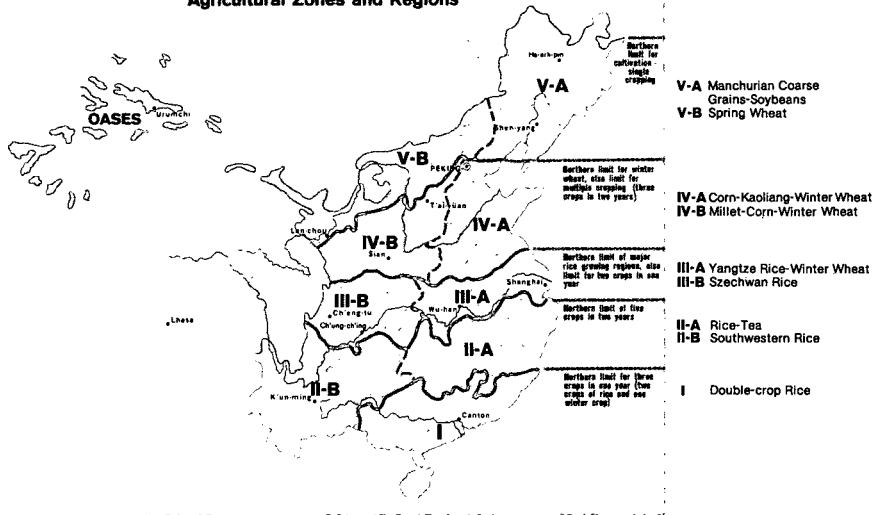


TABLE 15.—CHINA: CHARACTERISTICS OF MAJOR AGRICULTURE ZONES AND REGIONS

Zone	Region		Comments
	A	B	
I.....	<p>Double cropping rice area: Major crops: Early and late rice, sweet potatoes, peanuts, sugar cane. Minor crops: Winter crops—wheat and rape—fiber crops, and tropical crops.</p>		2 crops of rice grown on most paddy fields, approximate northern limit for the growing of 3 crops in 1 year.
II.....	<p>Rice-Tea region: Major crops: Double and single crop rice, sweet potatoes, winter legumes, and rapeseed. Minor crops: Winter wheat, sugar cane, cotton, peanuts, sesame, and coarse grains.</p>	<p>Southwestern rice area: Major crops: Single crop rice, corn and other coarse grains, winter wheat and legumes, rapeseed. Minor crops: Soybeans, peanuts, tobacco.</p>	Possible to grow 5 crops in 2 years in some areas; single crop rice predominates but the double cropping of rice is increasing, growing of winter legumes and rapeseed is also important, particularly in region II-A.
III.....	<p>Yangtze rice, wheat area: Major crops: Single crop rice, sweet potatoes, cotton, winter wheat, and legumes. Minor crops: Soybeans, peanuts, hemp, rapeseed, and sesame.</p>	<p>Szechwan rice area: Major crops: Single crop rice, corn, winter wheat and legumes, rapeseed, sweet potatoes, and cotton. Minor crops: Soybeans, peanuts, tobacco, and sugar cane.</p>	Northern limit of both major rice growing regions and also for the harvesting of 2 crops in 1 year.

TABLE 15.—CHINA: CHARACTERISTICS OF MAJOR AGRICULTURE ZONES AND REGIONS—Continued

Zone	Region		Comments
	A	B	
IV.....	Corn, kaoliang, winter wheat area: Major crops: Coarse grains, winter wheat, cotton, peanuts, soybeans, sweet potatoes. Minor crops: Tobacco, buckwheat, sesame, and fibers.	Millet, corn, winter wheat area: Major crops: Coarse grains, winter wheat, cotton. Minor crops: Soybeans, sweet and white potatoes, legumes, oilseeds, and buckwheat.	Northern limit for multiple cropping and also for the cultivation of winter wheat. Most common form of multiple cropping is the harvesting of 3 crops every 2 years.
V.....	Manchurian coarse grain and soybean area: Major crops: Coarse grains, soybeans, spring wheat. Minor crops: Cotton, tobacco, white potatoes, fiber crops, oilseeds, and sugar beets.	Spring wheat area: Major crops: Spring wheat, coarse grains. Minor crops: Oats, white potatoes, legumes, flax, barley, and sesame.	Northern limit for crop cultivation.
VI.....	Oases: Crops grown: Winter and spring wheat, rice, coarse grains, cotton, and oilseeds.		Limited to areas where irrigation water is available. Considerable increase in the size of the area under cultivation in recent years.

ZONE III

Zone III is important for the production of both wheat and rice. The northern boundary, the Huai River, represents the northern limit for major rice production. Likewise, the Yangtze River, the southern boundary, marks the southern limit for major wheat production. On account of frost in the middle of March and in the middle of November, the area is not favorable for the double cropping of rice. Rather, the most common rotation is a summer (fall-harvested) crop followed by a winter (spring-harvested) crop. The most important summer crops are rice, and, on dry fields, cotton, peanuts, coarse grains, and sweet potatoes. After wheat, the most important winter crops are barley, broadbeans, and rapeseed. Winter cropping, although important, is much less intensive in region "B", primarily because a large proportion of the most productive rice fields are terraced and are without dependable irrigation facilities. These fields must remain fallow over the winter in order to collect and retain enough precipitation to permit the transplanting of rice the following spring.

ZONE IV

Uncertain and uneven distribution of rainfall is a severe limitation on production on zone IV. However, this area is one of the most important in China because of the high proportion of cultivated land, especially in region "A". The growing season is too short to permit the harvesting of two crops in one year. Still it is possible to rotate crops in such a manner that three crops can be harvested in two years. In the spring, coarse grains—corn, millet or kaoliang, cotton, peanuts, etc.,—are sown. These crops are harvested early enough in fall to permit the sowing of winter wheat. Winter wheat is harvested during the early summer of the following year. Sweet potatoes or a coarse grain are sown following the completion of the harvest of winter wheat; these crops, however, mature too late to permit the sowing of winter wheat in the fall. This land is left fallow over the winter and is sown the following spring.

Winter wheat is the leading single crop in zone IV. Coarse grains—the combined acreage and output of which exceed that of wheat by a wide margin—are the more important source of staple food in rural areas. Although this is by far the most important wheat growing zone in China, natural conditions for its growth are hardly optimal. Normal precipitation during the growing season, September to early June, is barely sufficient to meet the minimum requirements of the crop.⁴³ Furthermore, the variability of rainfall, which exceeds 25 percent during the normally dry spring months, is so great as to make yields unstable.⁴⁴ Dependable

⁴³ Institute of Geography, Chinese Academy of Science, "Effect of Precipitation of the Yield of Winter Wheat in the Plains of North China," *JPRS* No. 30881, June 30, 1963, pp. 9-19.

⁴⁴ T. H. Shen, *Agricultural Resources of China* (Ithaca, New York: Cornell University Press, 1951), p. 17.

irrigation, largely restricted to peripheral areas, is essential for high and stable wheat yields. Climatic conditions are normally more favorable for spring sown crops, coarse grains, cotton, peanuts, soybeans, and tobacco, which must compete with winter wheat for available farmland during the spring months. The combination of higher yields and lower risk has encouraged the growing of more coarse grains and less winter wheat on non-irrigated land in recent years. In addition, the acreage of soybeans is believed to have declined to but a small fraction of the pre-Leap Forward area. Historically soybeans were widely grown and were a major staple throughout the zone, but because of low yields, the crop has been largely replaced by higher yielding grains.

ZONE V

Due to the shortness of the growing season—less than 200 days—practically no multiple cropping is to be found in zone V. The most important food crops are coarse grains although spring wheat is a significant crop in region B and also in the northern part of region A. Region A—Manchuria—is the major producer of soybeans for export. After having declined sharply in importance in recent years, soybeans may be making a comeback in zone V.

ZONE VI

Agriculture in zone VI (the area of China west of the 100th meridian) is extremely limited. The land consists of high barren plateaus, or mountains, or deserts that prohibit the cultivation of crops except under special conditions. The one exception occurs in Sinkiang where highly productive oases rim the great basins of the province and where considerable land has been reclaimed through irrigation.

APPENDIX B

COMMENTS ON PRINCIPAL SOURCES

The principal sources used in preparing this paper are official Chinese newspapers, journals, and books. The information available has been sufficient to permit a broadly accurate description of Chinese agricultural development, 1949–71. Of particular importance are the various series of translations of Communist Chinese printed matter, speeches, and radio broadcasts. The American consulate general in Hong Kong has issued three series of translations: (a) "Survey of the China Mainland Press (SCMP)"; (b) "Current Background (CB)", which presents key speeches and documents; and (c) "Extracts from China Mainland Magazines (ECMM)." The Joint Publications Research Service (JPRS) of the U.S. Government provides a copious supply of translations. "The Summary of World Broadcasts, Weekly Supplement (SWBC)" issued by the Monitoring Service of the British Broadcasting Corporation is a fruitful source of economic information. Releases of the New China News Agency (NCNA), Peking's official news agency, are another important source.

Scholarly books and journals on China's agricultural sector are cited in footnotes throughout the text. The best single item is the series of essays by Shigeru Ishikawa, Leslie T. C. Kuo, Anthony Tang, and others appearing in *Agrarian Policies and Problems in Communist and Non-Communist Countries*, edited by W. A. Douglas Jackson, and published by the University of Washington Press, Seattle, Wash., 1971. Also worthy of special mention are Kenneth R. Walker, *Planning in Chinese Agriculture, Socialisation and the Private Sector 1956–62*, Aldine Publishing Co., Chicago, Ill., 1965, and Dwight H. Perkins, *Agricultural Development in China 1868–1968*, Aldine Publishing Co., Chicago, Ill., 1969, both of which are especially useful for historical background.

CHINA: THE TRANSPORTATION SECTOR, 1950-71

By PHILIP W. VETTERLING and JAMES J. WAGY

I. SUMMARY AND CONCLUSIONS

Through a combination of modern and native transport facilities, the transportation sector of the People's Republic of China (PRC) is solidly supporting Peking's industrialization drive. Freight and passenger trains, trucks and trailers, buses, powered cargo and passenger vessels, and obsolescent civil aircraft operate in the modern part of the transport system. Numerous animal-drawn and man-drawn carts, porters, bicycles, and primitive watercraft such as junks and wooden sailing vessels are used elsewhere. These native transport facilities supplement the modern system and carry a large volume of cargo over relatively short distances.

China's modern transportation system has shown remarkable growth since 1950, the first full year of Communist operation of the Government. It has generally proven adequate to meet the demands of the economy, with only infrequent instances of congestion of a local or seasonal nature. Total performance by all modes of modern transport in 1971 was more than 10 times the level of 1950. Today, rail transport is predominant in the modern sector of the economy, with road and water transport playing important supplementary roles. Civil aviation is only of minor importance.

When the Communists came to power, they inherited an undeveloped and badly damaged transportation network. Reconstruction of much of the old network was undertaken during 1950-52, and bold plans were formulated for the extension of the rail, highway, and inland waterway systems. Substantial progress was made during the 1950's and, after a pause during the early 1960's, expansion was again given high priority in the late 1960's. The rail network was extended into the southwestern and northwestern sections of the country, and additional connecting links were built in the east and northeast. The highway network was expanded and improved especially in western areas such as Tibet where no railroads presently exist. The inland waterway network was restored, improved, and expanded. Inland and coastal ports were modernized and their capacities increased. By the end of 1971, the length of mainline railroads in service had increased by about 80 percent above the level of 1950. The highway network in 1971 was more than six times the length in 1950 but it still contained many roads of inferior quality. The length of navigable inland waterways more than doubled in this period.

During 1950-71, inventories of transport equipment and the operating efficiency of the various modes of transportation increased substantially. The freight car inventory is more than four times the 1950 level in number of cars and probably at least five times the 1950 level in total capacity. The truck inventory is about 12 times the 1950 level and contains many newly produced and imported vehicles. The

locomotive inventory is probably at least twice the size of 1950 and steam locomotives are now beginning to give way to more powerful and efficient diesel and electric locomotives. The size of the inland waterway fleet is not known but it contains many new tugs and motorized barges. The merchant fleet has more than 200 vessels of 1,000 gross register tons (GRT) or larger with many of the most modern now being used in international trade.

Improvement in the operating efficiency of the railroads has been evidenced by continuing increases in average load per freight car and average gross weight hauled per freight train. These improvements in operating efficiency have been attained by the following means: (1) improved organization and management; (2) introduction of more powerful and efficient locomotives; (3) an increase in the average capacity of freight cars; (4) the overloading of freight cars at times of peak traffic; (5) the use of great masses of people to assist in loading and unloading operations, particularly at the height of the Great Leap Forward in 1958; (6) the use of special loading and unloading teams; (7) technical innovations in equipment for loading and unloading freight; (8) strengthened cooperation between transport units and factories and mines; and (9) the establishment of joint transport systems between rail, highway, and waterway transport in various sections of the country. Since the Great Leap Forward greater stress has been placed on increasing labor productivity rather than on mass use of labor. New devices and technological improvements have been emphasized rather than increases in the number of workers or working hours.

Although railroad transport is the dominant form of modern transport in China, motor transport has emerged as a major freight carrier during the past 20 years. By 1957 trucks were carrying nine times as much tonnage as in 1950 and by 1970 they may have carried six times as much as in 1957. Even with these increases in volume, motor transport was inadequate to handle all the goods to be transported by highway, especially in the late 1950's. Consequently, native transport was mobilized wherever possible to carry the backlog. The lack of sufficient fuel and spare parts to operate the truck inventory at capacity also became evident in 1960. The fuel problem was solved during the 1960's, and the decrease in demand for truck transport in the early 1960's—after the collapse of the Leap Forward—helped ease other problems. Trucks are playing a very important role in China today. This role will become even more important in the future as the highway network is improved, maintenance facilities are expanded and strengthened, and the inventory of vehicles is further increased by domestic production and imports.

Highway transportation functions predominately as a short-haul service in China, except in the west where it is the primary means of transportation. It provides flexibility for local and provincial traffic and supplements the railroads and waterways in the distribution of regional traffic. By using modern highway transport for the movement of goods on a short-haul basis, the Chinese have diverted from the railroads large amounts of local and provincial traffic which could be handled only at high cost. Modern highway transport has also increasingly replaced less efficient primitive transport in the expeditious movement of goods, for example, heavy industrial equipment and construction materials.

Modern water transport has been widely used by the Chinese as an important carrier of bulk cargoes for long distances where speed is not of importance. Inland water transport has traditionally been a key element in Chinese transportation. Only during the 1950's did rail transport replace water transport as the principal hauler of goods, and only under the Communist regime has motor transport carried more tonnage than inland waterways. Although there has been an impressive increase in coastal traffic since 1950, the general development of coastal shipping has not been stressed. The industrial program of the PRC required the expansion of the capacity of inland transport. Furthermore, during the 1950's there was a reorientation of international trade away from the sea to land connections with the other Communist countries. This trend has been reversed in recent years, however, and China is now giving more attention to both the domestic and international movement of goods by sea in its own vessels. This reversal of policy was brought about by the great increase in trade with non-Communist countries and the drop-off in trade with other Communist countries in the 1960's.

In 1958 about 80 percent of the tonnage carried by the modern transportation system consisted of coal, construction materials, agricultural products, materials for the iron and steel industry, timber, and petroleum. Coal alone accounted for nearly 40 percent of the total tonnage. These proportions probably are not greatly different today although petroleum is more important than 10 years ago. The railroads probably transport at least two-thirds of the coal produced in China. The main rail lines that carry the heaviest coal traffic are the north-south lines, particularly those leading to ports on the north coast and on the Yangtze River. The geographical pattern of production and consumption of coal has not changed greatly during the past 20 years, with the mines located in the northern and north-eastern portions of the country still the major producers. These areas also are the major consumers of coal. The principal long-distance movements of coal are toward the south and west. The importance of coal in the traffic carried by all modes of modern transport accounts for the continuing campaigns that stress the economical transportation and use of coal in all sectors of the economy.

Attention has been focused recently on civil aviation in China because the Government of the PRC has shown interest in buying passenger aircraft to upgrade its obsolete civil airfleet. China has mostly old, piston-driven, propeller aircraft in its fleet, together with a few turboprop airplanes. The Chinese have recently purchased several AN-24 turboprop planes and IL-62 long-range jet aircraft from the Soviet Union. The IL-62's are the first long-range jet aircraft in the Chinese fleet. They are suitable for international operations and most likely will be used by the Chinese to implement expanded international service. The international airports at Shanghai and Canton have been expanded and reequipped with modern navigation aids such as high-intensity runway lights and instrument landing systems in order to accommodate the large passenger jet aircraft of the 1970's.

One of the primary functions of the Chinese transportation system is the movement of military supplies and personnel. Because of the sparse road network, major military movements depend heavily on the use of railroads. The highway network supplements the railroads

in the military logistics system and provides short-haul support to the military in all areas and long-haul transport in the west where no other transport is available. The Railway Engineering Corps of the People's Liberation Army (PLA) has been heavily involved in the construction of most major new rail lines in China and has demonstrated its ability to maintain and rapidly reconstruct bombed tracks and destroyed bridges during the Korean and Vietnam wars. In the west, military trucks of the transport organizations of the PLA probably make a significant contribution to civilian transport.

The prospects for transportation in China through 1975 are excellent if recent trends continue. Transport performance should keep pace with the growth of industrial and agricultural output, and no general shortage of transportation should occur. The transport system will remain generally adequate to meet the demands of the economy, with only infrequent instances of congestion of a local or seasonal nature. Railroads will remain predominant in the modern sector, but motor trucks will become relatively more important as increased domestic production and imports bring about substantial increases in the truck inventory. Although sections of some rail lines probably will be electrified, and the number of diesel locomotives will increase significantly, China will still have a large number of steam locomotives in service in 1975. The total length of the rail network will increase by several thousand kilometers when the rail lines presently under construction are completed. Additional new projects will be started during the 1970's. China will continue to build and purchase new oceangoing vessels for its merchant fleet many of which will be used on voyages to foreign ports in the Western World. In the next few years the augmentation of the civil air fleet will lead to a needed expansion of China's domestic air transport capacity and a broadening of international air service. Petroleum production now and in the next 5 years should be adequate to support any planned or probable increase in transport performance.

Part II of this paper describes briefly the historical relationship of transportation to the various regional economies of China. Parts III through VI describe and evaluate the different modes of transport for the country as a whole. Part VII briefly discusses the role of the transportation system in supporting China's armed forces. Part VIII contains a forecast of what the future holds for the transportation system in 1972-75. Appendix A contains tables summarizing available statistical data and appendix B describes the principal sources of information on Chinese transport.

II. TRANSPORTATION AND REGIONAL ECONOMIC DEVELOPMENT

During 1950-71 the transportation system of the People's Republic of China played an integral role in the economic growth of the country. Railroads bore the burden of increased economic activity in almost all regions during this 20-year period, particularly in industrial areas such as northeast China. In western China, however, where the rail and water networks are sparse, highway transport became of prime importance. In other parts of the country, roads and overland routes also had an important place in Chinese economic activity, primarily in short-haul service to the railroads and in farm-to-market transportation. Inland waterways also played an important transportation role as the Chinese enlarged and expanded their industrial base westward.

Northeast China, the most important industrial region of the country, has a well-developed transportation system that facilitates the movement of fuels, industrial raw materials, machinery and equipment, manufactures, foodstuffs, and agricultural items. An extensive rail system links all the major cities with regional market towns, major sources of industrial raw materials, and fuel resources. Eastern China possesses a network of railroad, highway, and inland water transport that speeds the extensive interregional trade of the area. The transportation facilities of the central and southern areas are more diversified than those of other regions, with a major trunk rail line running north and south and the largest navigable waterway in China, the Yangtze River, running east and west. The Yangtze penetrates into the immensely productive Szechwan Basin and provides an efficient route that facilitates the exchange of commodities. Wu-han, at the junction of the Yangtze and the Peking-Canton rail line, is an important industrial center that occupies a strategic location, controlling inland waterway, road, and railroad transport over the middle Yangtze Plain. Shanghai, China's most important port, lies near the mouth of the Yangtze.

In the southwestern part of the country a modern transportation system is only now coming into existence. With Ch'eng-tu in western Szechwan as the hub, rail lines have been constructed north to Pao-chi, southeast to Ch'ung-ch'ing and Kuei-yang, and south to K'un-ming. Numerous roads have also been built, particularly in the frontier regions of Yunnan bordering Burma and Laos. The construction of these transportation lines linking areas of heavy industry to their sources of raw materials and to the markets of eastern China has been the key to the economic development of the southwest.

In the northwest, Lan-chou is the most important railroad center with rail lines extending to the north to Pao-t'ou, to the west to Tsinghai Province, and to the far northwest to Urumchi. In southern Sinkiang, western Tsinghai, and Tibet, no railroad lines presently exist. Because the rail and water networks are so sparse in these areas, highway transport is of much more importance than in the more densely populated portions of the country. A number of new roads have been constructed, particularly those providing access to sensitive and strategic frontier areas, especially in northern Sinkiang adjacent to the Soviet frontier. The Chinese have also expended great effort on the construction and maintenance of access roads to Lhasa and other key areas of Tibet.

III. RAILROADS

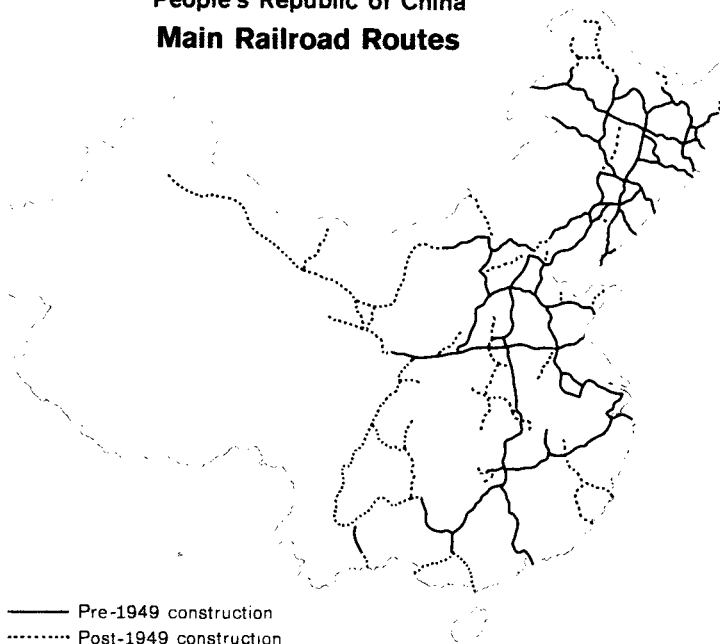
A. Network

The Chinese Communists carried out an extensive railroad construction program during 1950-71. Despite many difficulties they added about 20,000 kilometers (km.) of main and branch lines to the railroad network they inherited from the Nationalists in 1949. The 1949 network was heavily concentrated in the northern and northeastern parts of the country and had many damaged or inoperable sections. It was about equal in length to the U.S. system of the mid-1850's or the Soviet system of the late 1870's. At the end of 1971 the Chinese network consisted of more than 41,000 km. of mostly standard-gage line (4 feet 8½ inches), an amount equal in length to about one-eighth of the U.S. system.

The quality of the new railroad construction in China has been generally good. Defects have occurred, but they can be attributed in most instances either to rugged terrain, to accelerated construction to meet planned goals, or to a combination of these two factors. Basically the gains made in railroad construction were largely the result of the intensive application of the skills of the PLA Railway Engineering Corps and the labor of hundreds of thousands of Chinese peasants, although initially in the 1950's the U.S.S.R. gave the Chinese considerable guidance in planning and construction techniques.

The railroad system, as it existed at the end of 1971, is depicted on the maps below and inside back cover. In 1950 at least 40 percent of the network was located in the northeast, and lines in other parts of the country were mainly north-south oriented. The northwest was served by only one line, which had not as yet reached Lan-chou. In Inner Mongolia, the southwest, and the coastal southeast, the mileage was meager and poorly connected with the main network. During the early 1950's the Chinese concentrated on rehabilitating the existing war-damaged network and then later on extending the network into isolated peripheral areas. Among the notable construction projects completed were the Pao-chi-Ch'eng-tu and Ying-t'an-Amoy lines, as well as the extension of the trans-Sinkiang line westward from Lan-chou toward the Soviet border. This line was completed to Urumchi, the capital of Sinkiang Province, in late 1962, but has not been extended beyond this point because of Sino-Soviet tensions.

**People's Republic of China
Main Railroad Routes**



Expansion of the railroad system was largely curtailed after the collapse of the Great Leap Forward in 1960. Priorities for the construction of new lines were suspended or shifted during the subsequent period of readjustment and consolidation in the early 1960's. China's major achievements in railroad construction in 1962 appear to have been the building of branch lines and lines for special use. In 1963-64 capital investment in new railroad construction was limited and attention was given to the improvement of existing lines, repairs, and maintenance of track and rolling stock. New construction activity began to revive again in the mid-1960's when the Chinese initiated preparations for a Third Five-Year Plan (1966-70). This revival, however, was also interrupted in 1967-68 by the upheavals of the Cultural Revolution. These disruptions slowed down the construction of railroads that had been previously planned, the completion of work on railroads under construction, and the reconstruction of main trunk lines. Once the furor of the Cultural Revolution had died down the scope and intensity of railroad construction increased significantly. Much of the recent activity represents the continuation of work started in the 1950's as only a few major projects were started from scratch during the 1960's.

Since 1964 railroad construction has focused on southwestern China and more recently on central China as well. During the mid-1960's lines were completed linking Kweichow Province with both Yunnan and Szechwan Provinces. A line linking Ch'eng-tu directly with K'un-ming in Yunnan Province was recently completed after more than a decade of high cost construction through rugged mountainous terrain. This line has numerous bridges and tunnels and may rank as one of the great engineering feats of the modern world. In central China a third major north-south line has been constructed as far south as the Yangtze River. Another important line in the central provinces, the Wu-han-Ch'ung-ch'ing line, is presently under construction. When completed this line will provide the first direct rail route between the Szechwan Basin and eastern China.

The Chinese have been attempting to correct the uneven physical distribution of the railroad system in order to solidify central government control, to disperse the industrial base, and to provide more efficient logistical support to the military. In furthering these goals the Chinese have increased the number of industrial spurs and expanded numerous railroad yards, as well as building new lines. The change in the regional distribution of the network since the end of the First Five-Year Plan (1953-57) is indicated in the following tabulation:¹

¹ The regional breakdown in the tabulation is the same as that used by Yuan-li Wu on p. 135 of *The Spatial Economy of Communist China*, published in 1967. The provinces contained within each region are as follows: Northeast (Liaoning, Kirin, Heilungkiang); North (Hopeh, Shansi, Inner Mongolia); East (Shantung, Kiangsu, Chekiang, Anhwei); Central (Honan, Kiangsi, Hupeh, Hunan); South (Fukien, Kwangtung, Kwangsi); Northwest (Shensi, Kansu, Ningxia, Tsinghai, Sinkiang); Southwest (Szechwan, Yunnan, Kweichow). Tibet is excluded because it contains no railroad lines.

[In percent]

Region	1957	1960	1971
Northeast.....	38	35	32
North.....	16	15	14
East.....	12	11	10
Central.....	12	11	13
South.....	9	9	7
Northwest.....	7	11	13
Southwest.....	6	8	11
Total.....	100	100	100

The Northeast presently has about one-third of the network; the East, Central, North, Northwest, and Southwest regions have from 10 to 15 percent each; and the South has less than 10 percent. During the last 20 years the network in the Southwest and Northwest has grown mainly at the expense of that in the Northeast. However, the Chinese did not neglect the Northeast where almost as much new mileage as in the Southwest was placed in operation in the 1960's. After 1960 all provinces and regions except Tibet were connected to the railroad network by at least one main rail line.

In the latter part of the 1950's increasingly heavy traffic densities on certain parts of the network pointed up the need for improving existing facilities. For several years thereafter priority in rail investment was given to improvement of the existing network through reconstruction and double tracking and by the addition of branch and special lines. Perhaps the most significant improvement in the railroad system before 1960 was the construction of the massive Wu-han rail-highway bridge which for the first time linked the network north and south of the Yangtze River. Since then, two more great bridges spanning the Yangtze have been built, at Ch'ung-ch'ing and Nan-ching (Nanking). The 6,700-meter rail-highway bridge at Nan-ching, completed and opened to rail traffic in 1968, replaced a rail ferry on the important Peking-Shanghai line and greatly facilitated traffic between the northern and southern parts of the country. During the early 1960's efforts were made to complete double-tracking of the important north-south lines from Peking to Canton and Shanghai. However, the Chinese apparently have chosen to rely less on double tracking for the movement of traffic on heavily traveled lines than was initially envisioned during the Great Leap Forward.

B. Freight Cars and Locomotives

The Chinese freight car fleet is relatively new. About one-third of the cars have been produced since 1965. In the mid-1960's China possessed approximately 150,000 freight cars. At the end of 1971 the freight car fleet probably amounted to at least 185,000 cars, if retirements are assumed to have been 2 percent per year and average production about 10,000 cars per year during 1966-71. The following tabulation gives a rough approximation of the annual volume of freight car production at the end of the First Five-Year Plan (1953-57), at the end of the Great Leap Forward, and during 1965-71:

Year:	Production (units)	Year—Continued	Production (units)
1957-----	7,300	1968-----	8,700
1960-----	23,000	1969-----	11,000
1965-----	6,600	1970-----	12,000
1966-----	7,500	1971-----	14,000
1967-----	6,900		

As the number of freight cars in the inventory increased during the 1960's, bigger and more efficient cars replaced the pre-1950 models. Gondola and hopper cars continued to make up the largest single group of cars in the fleet, as they can be used to haul a variety of commodities. The tank car component undoubtedly increased substantially during the 1960's, keeping pace with the enormous expansion of petroleum output. The remainder of the fleet consists of boxcars and small numbers of special purpose cars such as refrigerator cars, stock cars, and flatcars.

China is the only world power that still operates a national railroad system mainly with steam locomotives. The total number of locomotives operating on the railroads is unknown but it may be about 6,000 units, assuming that China has some 30 freight cars per locomotive. The following tabulation gives a rough approximation of the annual volume of locomotive production (all types) at the end of the First Five-Year Plan (1953-57), at the end of the Great Leap Forward, and during 1965-71:

Year:	Production (units)	Year—Continued	Production (units)
1957-----	167	1968-----	240
1960-----	600	1969-----	260
1965-----	50	1970-----	280
1966-----	140	1971-----	300
1967-----	200		

The Chinese experimented with the production of diesel and electric locomotives in the late 1950's but were unable to advance beyond the manufacture of a few unsatisfactory prototypes. For the past few years, however, China has been emphasizing production of diesel locomotives, although more powerful steam locomotives have also been produced. Diesels have been introduced onto the railroad system at an increasing rate since 1965 and may now account for as much as 10 percent of the locomotive inventory. In order to supplement domestic production, China arranged for the import of 30 diesels from West Germany in 1970, with delivery to be completed before the end of 1972. Fifty additional high horsepower diesels designed especially for hauling heavy trains were ordered from France in 1971. Twenty-five electric locomotives were imported from France in the early 1960's for use on China's one short stretch of electrified main line south of Pao-chi and 40 more electrics were ordered in 1970, but the latter will only gradually be put into service during the mid-1970's. Domestic production of electrics is still in the prototype stage. It is apparent that China is now beginning to experience the revolution in railroad motive power completed in Western countries more than 10 years ago.

As a result of using diesels and electrics the Chinese will begin to realize savings in fuel costs and labor requirements and will be able to haul much heavier trains at somewhat increased speeds. Hauling heavier trains at higher speeds will result in increased line capacity, which is important to the Chinese both from an economic

and a military standpoint. Diesels, in particular, will afford a quick way of increasing capacity, as costly new construction of permanent installations such as electric power stations can be avoided. Diesels can be used on any rail line with small additions to facilities, and, in case of sudden increases in traffic, can be concentrated on any line. The steam locomotive still remains the workhorse of the Chinese fleet, but the increasing size of the diesel inventory gives the Chinese much greater power per unit and much greater flexibility in solving the various transportation problems encountered each day.

C. Traffic

Freight traffic on the railroads of China increased substantially in the 1950's, from a level of about 100 million tons in 1950 to more than 450 million tons in 1959. The large annual increases in traffic can be accounted for not only by the depressed level of the economy when the Communists came to power but also by their apparent ability to obtain high efficiency from existing equipment and facilities and to expand facilities where the need for rail service was greatest. This achievement resulted in part from the fact that the railroads were operated on a national scale, which had not been the case before, and because control was exercised through a centralized but flexible administration that permitted intensive exploitation of the system.²

During the Great Leap Forward (1958-60) the tremendous increase in commodity production, particularly in 1958, created an unusual demand for rail service, and an acute shortage of rail transport resulted. The railroads carried nearly 40 percent more tonnage in 1958 than in 1957, a remarkable achievement compared with earlier annual increases. As a consequence, serious congestion developed in certain areas. A further large increase in tonnage carried during 1959 was possible only because the Chinese concentrated considerable investment on repairing and improving existing facilities and increasing the fleet of freight cars and locomotives as well as making improvements in operating efficiency and organization.

The crushing burden on the railroads was eased in 1960 by the expansion of equipment inventories and further eased in 1961 by the precipitous drop in industrial production. The requirements of the national economy for the shipment of industrial freight declined and the volume of freight decreased substantially. A large part of the recently expanded rolling stock fleet remained idle in rail yards for long periods of time. Traffic in 1961 was probably some 20 percent lower than the 1958 level of 381 million tons.

In addition to serving heavy industry, during 1961-65 the railroads increased their support to agriculture. Freight rates for agricultural produce were lowered and the number of so-called odd-lot freight

² Until the late 1960's the railroads were administered by a system of bureaus and subbureaus under the Ministry of Railroads. In 1970 this ministry was reportedly absorbed by the Ministry of Communications which controls highway and water transport. During the Cultural Revolution the PLA also assisted in the operation of the railroad system. The number of railroad bureaus has varied from time to time. In 1958 the Ministry of Railroads underwent a complete reorganization which streamlined the administrative units in Peking, abolished all the subbureaus, and changed the regional bureaus into about 28 provincial (or city) administrations. By 1963, however, the former system had been reinstated and in 1971 the railroads were administered by approximately 19 bureaus each with several subbureaus. Individual railroad bureaus are major organizations which employ large numbers of people, often in the tens of thousands. Many of the present bureaus now administer lines in more than one province. Each bureau operates its own locomotives and engineering units and is responsible for maintaining the track in its area of control. The different bureaus have widely varying traffic loads depending on their geographic location. For example, the Chinese have reported that the Peking bureau handles some 25 percent of the total volume of rail freight in the country, and that half of this tonnage consists of coal from 10 leading coal mines.

trains was increased. The latter were intended especially to carry small and odd-lot shipments for farming communities. Services of this kind were reportedly initiated in 1963 in keeping with the directives to render aid to agriculture. By the beginning of 1963 more than 300 railroad stations reportedly had been opened primarily for the loading and unloading of chemical fertilizers. At the end of 1964 the Chinese claimed that in the first 9 months of the year the railroads had handled 25 percent more farm and sideline produce, insecticides, chemical fertilizer, and farm machinery than in the same period of 1963.

In 1965 and the first half of 1966 various measures aimed at improving the organization and planning of shipments were worked out and implementation was started. But the realization of the desired improvements was stymied by the start of the Cultural Revolution which had a sharply negative effect on the operations of industry and transport, especially railroad transport. Nonetheless, because the rail system was operating at less than capacity in mid-1966, it was able to absorb and transport several million Red Guards and other revolutionaries throughout the country without suffering any sustained breakdown.

During the Cultural Revolution the physical condition of the railroads deteriorated because of lack of maintenance and the entire management system was thrown into confusion. Temporary freight and passenger service disruptions and cargo congestion at various key rail centers led to a reduction of the level of operational activity and affected the performance of the system throughout most of 1967. These transport disruptions had some effect on industrial and agricultural production and also on the movement of foreign trade. For example, rail traffic between China and Hong Kong decreased from its high of over 1 million tons in 1966 to about 600,000 tons in 1967. And an acute coal shortage was experienced throughout the country in the fall and winter of 1967-68, caused both by the curtailment of coal production and by the slowdown in delivery.

Sporadic disruptions in service continued in 1968 until approximately mid-August when normal operating schedules appear to have been restored. After mid-1968 traffic began to increase again as the economy recovered from the disturbances of the previous 2 years. At the end of 1968 the Chinese press reported that rail transport performance had improved over 1967 and the first half of 1968. Overall the traffic level in 1968 probably was slightly above that of 1967, but it had not yet reached the level attained in 1966.

Rail transport performance improved greatly during 1969. Traffic between China and Hong Kong continued to increase, reaching a level just short of 900,000 tons. The railroads probably benefited from a major administrative development, namely, the widespread adoption of a joint transport system, which called for greater cooperation between rail, highway, and water transport. In line with the recovery in industrial production, the overall traffic level in 1969 was above that of 1966.

A further increase in traffic of 15 to 20 percent probably took place in 1970 when industrial production rose substantially. The volume of rail freight traffic in 1970 may have amounted to about 560 million tons or 10 times the volume in 1949, according to one interpretation of a Chinese broadcast of mid-October 1971.³ During the first 5 months

³ Another interpretation of the same broadcast indicates a 1970 volume of about 615 million tons. Whichever figure is correct, rail traffic in China undoubtedly reached a new peak in 1970 and again in 1971. The freight car fleet was large enough in 1970 to have handled the higher volume of 615 million tons.

of 1971 the volume of freight carried on the railroads reportedly was 15 percent above the corresponding period of 1970 and average daily loadings in May were more than 6,000 cars above the level attained in January. During the first 8 months of the year the volume of goods shipped by rail was reportedly "much greater" than during the first 8 months of 1970. For the entire year of 1971 traffic probably increased by at least 10 percent to a level approximating 620 million tons. The railroad system carried the increased volume of goods offered to it in 1970-71 without appreciable strain.

During the 1950's the average length of rail haul increased to a high of 507 kilometers in 1955 and thereafter declined gradually to about 485 kilometers in 1959. In 1958 about 25 percent of rail traffic reportedly was hauled less than 100 kilometers, 45 percent from 100 to 500 kilometers, 16 percent from 500 to 1,000 kilometers, and 14 percent more than 1,000 kilometers. Almost one-third of the traffic moved more than 500 kilometers indicating the general long-haul nature of rail transport in China.⁴ One of the major factors that caused the increase in the average length of haul in the early 1950's was the curtailment of water transport in the Formosa Strait and the resulting shift to long-haul north-south rail traffic. The later decline must have resulted from such factors as programs to achieve regional self-sufficiency, and a policy of developing sources of supply near consuming centers. No statistical data are available to indicate the direction of change in the average length of haul during the 1960's. The extension of the railroad network into outlying areas of the country may have contributed to a slight increase, but this could have been offset by more serious attempts at developing sources of supply near consuming areas, particularly for bulk items such as coal. As one eminent transportation economist has pointed out, "The absence of a marked lengthening in average hauls should be recognized as a possible aid to Chinese development."⁵

Railroads are most efficient in handling large regular shipments over long distances. They are particularly well suited for the shipment of coal. In China coal is the single most important commodity, from a tonnage standpoint, transported by rail. In spite of the recent upsurge in petroleum production coal remains the major source of energy in most parts of the country. The railroads probably transport at least two-thirds of all the coal produced in China. At the height of the Leap Forward about 40 percent of rail tonnage consisted of coal. The Chinese later indicated that in the early 1960's when the economy was depressed coal amounted to about 50 percent of the total volume of rail tons carried, although this statement may be somewhat of an exaggeration. They went on to note that if coal transportation is planned properly a solid foundation is laid for the bulk of railroad operations. The importance of coal in the traffic carried by all modes of modern transport accounts for the continuing campaign by the Chinese to economize in the transportation and use of coal in all sectors of the economy.

Materials for the construction industry and the iron and steel industry are the next most important commodities transported on the

⁴ In the U. S. S. R. in 1970 average length of haul was about 840 kilometers compared with 803 kilometers in 1960. About 34 percent of all freight traveled up to 200 kilometers, 38 percent between 200 and 1,000 kilometers, 16 percent from 1,000 to 2,000 kilometers, and 12 percent more than 2,000 kilometers.

⁵ Holland Hunter, "Transport in Soviet and Chinese Development," *Economic Development and Cultural Change*, vol. XIV, No. 1, October 1965, p. 81.

Chinese railroads. In the iron and steel category, iron ore is the most significant single material. Timber, grain, and other agricultural products also bulk fairly large. Transport of petroleum by rail has increased substantially in recent years but still amounts to only a small percentage of total tons carried. During the early 1960's heavy industrial products reportedly made up about 70 percent of the annual volume of tonnage carried on the railroads. Heavy industry's increased support to agriculture in the 1960's showed up in transport in greater shipments of fertilizer, farm machinery, and related items. As has been aptly stated elsewhere, "The transport sector in . . . China is first of all the servant of heavy industry. Other needs are secondary. Readers who think mainly of passenger transport . . . or shipments of consumer goods, simply do not appreciate the structure of priorities in . . . Chinese thinking."⁶

D. Operations

Freight and passenger traffic on the Chinese railroad system was programmed during the 1950's according to a uniform, network-wide graph that was drawn up once a year and that went into effect in May. At the beginning of the winter the graph was corrected by taking into consideration any changes in planned traffic levels and any peculiarities of winter shipments. In 1962, organizations at three different levels, stations, railroad subbureaus, and railroad bureaus, were given additional responsibility for organizing freight transportation. The train graph system of traffic control is similar to the system used on the Soviet railroads and presumably is still in use in China at the present time.

The average density of freight traffic on the Chinese railroad system increased from 2.45 million ton-kilometers (tkm) per route-kilometer in 1952 to 4.51 million tkm in 1957 at the end of the First Five-Year Plan (1953-57) and to about 5.95 million tkm in 1958. In 1970 traffic density may have been as much as 6.8 million tkm per route-kilometer. In 1971 average traffic density probably increased above 7 million tkm per route-kilometer and was the highest ever attained in China.⁷ On some heavily traveled rail lines, such as the Peking-Shen-yang, Peking-Shanghai, and Peking-Wu-han lines, freight traffic density reportedly had reached as high as 25 to 35 million tkm per route-kilometer by 1959.⁸

A substantial increase in train weight during the 1950's was one of the important factors associated with increased traffic density. The average gross weight hauled per freight train reportedly increased from 1,015.7 tons in 1950 to 1,704.0 tons in 1958. On the most heavily traveled main lines the train weight norm was 3,200 tons in 1958 compared with 1,790 tons in 1950. Even in 1963, during the campaign to support agriculture, the railroad authorities continued to emphasize the necessity of increasing the loading capacity of trains. Scattered evidence indicates that currently the Chinese are probably hauling

⁶ Hunter, *op. cit.*, p. 74.

⁷ In 1970 the corresponding figures for the United States and the U.S.S.R. were 3.48 million and 18.48 million tkm per route-kilometer, respectively. In the U.S.S.R. the rail network is used at least 5 times as intensively and in China more than twice as intensively as in the United States.

⁸ In the U.S.S.R. double tracking is usually carried out when density of freight traffic reaches about 3 million tkm per route-kilometer.

substantially heavier trains than in 1959. It is probable that the average gross weight hauled per freight train has now reached a figure in excess of 2,000 tons.⁹

One factor making possible the increase in train weight in the 1950's was heavier loading of freight cars. The average load per freight car increased from 26.6 tons in 1950 to 39.4 tons in 1959. Average load may have decreased slightly to 39.1 tons per car in 1962 during the drive to support agriculture, but the lost ground undoubtedly was recovered after the Cultural Revolution. Since 1960 average capacity per freight car has increased gradually and average load per freight car is probably more than 40 tons per car at present. A large part of the increase in train weight in the 1950's was also due to the addition of more powerful locomotives and to the increased skill and effort of the locomotive crews. Locomotive power continued to increase in the 1960's as many new diesels and more powerful steam locomotives replaced the outmoded steam locomotives used in the early 1950's.

Other indices of operating efficiency such as turnaround time, average daily run per freight locomotive, coal consumption per freight locomotive, and average speed per freight train all improved during the 1950's. Turnaround time of freight cars reportedly declined from 3.34 days in 1950 to 2.47 days in 1959, a figure unbelievably low when compared with railroad performance in other countries.¹⁰ In the early 1960's, however, the emphasis on supporting agriculture as well as much lower demand from industry and construction probably led to an increase in turnaround time as freight cars were scattered in more out-of-the-way places and remained in stations longer than in the past. Average freight train speed, which had increased from 20.9 kilometers per hour in 1950 to 25.7 kilometers per hour in 1958, reportedly increased to nearly 27 kilometers per hour in 1964 and 29 kilometers per hour by mid-1965. This improvement was supposedly due to better maintenance, improved roadbeds, shorter station halts, and higher locomotive hauling capacity. On a broader scale the November 1968 passenger timetable indicated that frequency and speed of passenger trains had been increased, implying a general improvement of track, rolling stock, and maintenance. Installation of more modern signalling equipment was also a factor. By 1965 China was reported to be using many types of signalling systems including some of the most modern.

⁹ The following tabulation indicates the gross weight hauled per freight train in the U.S.S.R. in 1960 and 1969 by the various types of locomotives:

[In tons]

	All locomotives	Steam locomotives	Diesel locomotives	Electric locomotives
1960.....	2,099	1,923	2,385	2,383
1969.....	2,537	1,525	2,521	2,727

NOTE: China at present is in a position somewhat comparable to the U.S.S.R. in the late 1950's as far as motive power is concerned. In 1960 average train weight for all types of locomotives in the U.S.S.R. was in excess of 2,000 tons and for steam locomotives only was in excess of 1,900 tons. Increasing use of diesels and electrics during the 1960's was instrumental in raising the overall average above 2,500 tons by the end of the decade. The drop in the average for steam locomotives occurred because steam locomotives, for all practical purposes, are no longer used to pull heavy trains on main lines, such as the Omsk-Novosibirsk section of the Trans-Siberian line.

¹⁰ At present, turnaround time in the U.S.S.R. is 5 days, about one-third that of the United States.

In general, the decline in freight traffic in the early and mid-1960's eased the pressures on the Chinese railroad system. Consequently the same incentives did not exist as in the late 1950's for improvement in the various indices of operating efficiency. Progress continued but it was more gradual and measured and not at the same hectic pace as in the preceding decade. The Chinese used this time well to upgrade railroad plant and equipment and place themselves in better position to face the increased traffic levels of the 1970's.

IV. HIGHWAYS

A. Network

At the end of 1970 the highway network of China reportedly consisted of about 650,000 kilometers of roads of varying quality compared with about 500,000 kilometers at the end of 1960 and some 100,000 serviceable kilometers at the end of 1950. Probably at least half of the 1970 total consisted of natural earth roads with the remainder primarily gravel. A few thousand kilometers of bituminous-treated or concrete road also existed. Most of the network requires constant maintenance because of its poor quality.

In 1949 the Chinese Communists inherited from the Nationalists a low-grade highway system characterized by roads with little or no surfacing and by bridges and ferries of low capacity. Geographically the network was concentrated mainly in the eastern coastal regions, with the best developed portion centered in the area of the middle and lower Yangtze River; only a limited number of serviceable roads existed in other areas of the country.

The Chinese began an intensive effort to rehabilitate the highway system in 1950. During the First Five-Year Plan (1953-57) a total of about 150,000 kilometers of roads were newly constructed or repaired. Evidence of Chinese concern for control of the outlying regions of the country was apparent in the priority given to such projects as the Tsinghai-Tibet, Sinkiang-Tibet, and Szechwan-Tibet highways, all completed during the plan period. In addition to these highways located in outlying regions and other highways along the coast, the Chinese built feeder roads to the railroads and waterways, inter-provincial roads, and interurban roads. During the Great Leap Forward road construction efforts were intensified and the length of the network reportedly doubled. New roads were built to connect villages, communes, and other areas previously lacking roads. About 140,000 kilometers or over 90 percent of the total amount of highways built in 1958 were simple, natural surface roads built in rural areas.

With the collapse of the Chinese economy at the end of the Great Leap Forward highway construction was abruptly curtailed. In the early 1960's the Chinese adopted a policy of retrenchment and consolidation in their highway expansion program and placed new emphasis on the repair and maintenance of the existing road network. As Peking stressed improvements in the quality of the existing network, particular emphasis was given to roads supporting agricultural activity. The responsibility of local and provincial governments for planning and carrying out road construction and improvement programs was reemphasized, and a greater effort was made to coordinate

the road maintenance tasks of local agricultural units. At the end of 1965 many defects remained in the national network, however, such as sharp curves, steep grades, weak roadbeds, and wide variances in width on even the nation's trunk and provincial highways.

Although the Cultural Revolution temporarily set back highway construction, considerable progress was made during 1966-70. A Peking broadcast of December 1971 extolled Chinese achievements in highway construction after 1965. According to this broadcast, newly constructed highways amounted to more than 160,000 kilometers in length during 1966-70. Construction was particularly rapid in mountainous areas. Motor trucks can now reach 70 percent of the rural communes in the country and more than half of the production brigades. In Tibet more than 90 percent of the counties now have some kind of motor vehicle transportation. The broadcast also pointed out that China surfaced 85 percent more road mileage with asphalt or residual oil in the first 10 months of 1971 than in the same period of 1970. In 1970 the mileage of asphalt or residual-oil roads built was 6 times that of 1965. The Chinese claimed that traffic moves at a 30 percent faster rate on residual-oil roads than on gravel roads, fuel consumption is reduced by 20 percent, and tires wear longer.

The Chinese have been preoccupied with the defense of their frontier areas since the Communist accession to power in 1949. In addition, they have recognized the value of roads in bringing these areas under central government control. Beginning in the early 1950's the Chinese initiated a comprehensive effort to develop a road system in their frontier regions, most notably in the western areas of Sinkiang and Tibet. The Sinkiang-Tibet, Tsinghai-Tibet, and Szechwan-Tibet highways all represented first attempts to consolidate Communist control in outlying areas of the country.

Since the early 1960's the Chinese have signed agreements with several bordering nations to build roads that connect China with these countries. In southern and southwestern China particularly, the Chinese have implemented roadbuilding projects. The political and military significance of these roads is generally greater than the economic benefits derived from their construction. An example is the recently completed Sino-Pakistan road, the Karakoram Highway, which crosses the 16,000-foot high Khunjerab Pass. Construction of this two-lane road took place over extremely difficult terrain and involved the use of Chinese construction personnel in an area contiguous to Sinkiang Province.

Another example is the road linking Lhasa in Tibet and Kathmandu in Nepal. The section of road between Lhasa and the China-Nepal border near Kodari was under construction when a highway agreement between the two countries was signed at Peking in 1961 for the construction of additional sections of the road within Nepal. The Kathmandu-Kodari section in Nepal was completed in May 1967, but the road has frequently been disrupted by landslides and washouts and has been closed during most of the summer monsoon seasons. Although some sections of this international road in Nepal have a bituminous-bound surface, little traffic traverses it, and its importance is considered to be primarily political in nature. Practically all items of Chinese origin which are exported to Nepal move by sea and then overland through India.

The strategically important road running from Meng-la in Yunnan Province to Phong Saly in Laos was initiated under an agreement signed in early 1962 and was completed in 1963. Since its completion the Chinese have undertaken other road construction projects in the Laotian border area. These projects include a road between Meng Peng, China, and Muong Sing, Laos, which was completed in 1964 and a new route from Meng-la south to the Laotian border, completed in 1966. In 1968 the Chinese began construction of a road leading south from the China border at Ban Botene to Muong Sai which presently penetrates deep into Laotian territory.

Since 1967 the Chinese have also constructed important new highways in northeastern China near the Sino-Soviet border. The roads are strategically located near the Amur River where border fighting occurred in 1969. Those in the extreme northeast are primarily important from the military standpoint but those in the northwestern section of Heilungkiang Province have economic as well as military significance because of the extensive lumbering and land reclamation operations carried on in this area.

B. Motor Trucks

At the end of 1971 the Chinese probably had a truck inventory of at least 500,000 units, or about 75 trucks per 100 km. of highway. The present inventory is more than twice the size of the 1965 fleet and is almost nine times the size of the 1956 inventory when domestic truck production was initiated. Most of the trucks in the inventory consist of general cargo trucks that perform a wide range of transportation services in the economy. However, many specialized vehicles used in the construction, petroleum, and forestry industries are also included. The truck fleet contains a number of different models, including the basic "Liberation" cargo truck and various other domestically produced models, several Soviet and Eastern European types, some British, French, Italian, and Japanese trucks, and even a few old American types. The greatest part of China's domestic truck production and inventory consists of the "Liberation" model, a modified version of the old Soviet ZIL-150 which the U.S.S.R. no longer produces. With the resurgence of construction activity since 1969, the Chinese have been acquiring large numbers of heavy-duty dump trucks from France and Japan.

The Chinese truck manufacturing industry was established in the mid-1950's with substantial assistance from the U.S.S.R. Less than 20,000 trucks were produced annually in Chinese plants until 1964 when the industry had fully recovered from the economic collapse following the Great Leap Forward. In 1961, for example, only about 1,000 units were produced. Between 1964 and 1966 production almost doubled and then the disorders of the Cultural Revolution affected the industry's output which declined substantially. By 1969, however, truck production had recovered again. It reached 70,000 units in 1970 and perhaps 85,000 units in 1971.

The Ch'ang-ch'un Motor Vehicle Plant, located in northeast China, produces the largest portion of trucks manufactured in the country, although several smaller plants such as the ones at Nan-ching and Tsinan also produce substantial numbers of trucks. Since the mid-1960's the Chinese have converted selected repair and parts plants

to experimental truck manufacture for local use. Little was heard of this plan until after the Cultural Revolution when these small plants began emerging in many parts of the country. By October 1970 Peking proclaimed that all 29 major provinces, regions, and special municipalities were producing their own trucks, some on a trial basis and others in series production.

In order to supplement domestic production the Chinese have purchased substantial numbers of vehicles from foreign countries. By 1967 over 100,000 trucks had been imported since 1950. These imports generally consisted of small and medium-size cargo trucks designed for general transportation service. The U.S.S.R. was the primary source of China's truck imports until 1966. Since then, Japan, Romania, France, and Italy have been the principal suppliers. Chinese truck imports from non-Soviet sources in 1969-70 totaled over 15,000 vehicles, many of which were heavy-duty trucks for construction work. In 1965 the Chinese began to export small numbers of trucks, mostly as a part of their foreign aid program, to such countries as North Vietnam, Albania, and Tanzania.

C. Traffic and Operations

The most striking change in the physical aspect of transportation in China during the 1950's was the increased use of truck transport. The tonnage carried by motor trucks in 1958 was a reported 176.3 million tons, almost 20 times the 9.2 million tons carried in 1950. Between 1957 and 1958 alone the tonnage carried by truck more than doubled. Average length of haul was less than 40 km. in 1958, indicating the short-haul nature of truck transport. Even with these increases in volume, motor transport was grossly inadequate to handle all the goods available to be transported by highway. As a result native transport facilities were used wherever possible to carry the backlog.

The growth of motor transport during the 1950's was fostered by the need to provide a feeder service from plants and mines to railroads and waterways and to perform short-distance intercity movements. Motor transport facilitated the growth of commercial centers in rural areas not served directly by railroads or waterways. The demand for motor transport also increased with the centralization of grain procurement and distribution under state control. Construction of highways to the border areas, particularly to Tibet and the western oilfields, created an additional heavy demand for motor transport.

During the Great Leap Forward considerable strain was imposed on highway transport. After a rapidly accelerated growth in 1958 modern highway transportation increased still further but failed to meet planned goals for 1959 and 1960. Substantial decreases in motor truck transport performance then occurred during 1961 and 1962 because of the decreases in the general level of economic activity throughout the country.

With the general recovery of the economy after 1962, truck transport began to regain its momentum. As economic priorities shifted, greater portions of the truck fleet and facilities were engaged in the "support to agriculture" campaign. Preferential rates for agricultural goods were broadened in 1964 and 1965 and additional truck terminals

were established to accommodate the increased production. By 1965, new records in truck transport performance were being announced, and recovery from the collapse of the Leap Forward seemed complete.

The Cultural Revolution disrupted highway operations for a time and reduced truck transport performance levels. Highways were closed, trucks were unavailable, and disorganization was prevalent in many areas of the country. By 1969 truck transportation was recovering from the disruptions of the Cultural Revolution, and the Chinese again announced that new records were being set for highway transport. Additional trucks in the inventory were providing the means for hauling increased levels of economic production, and the expansion of the highway network was opening up new areas for economic development. In 1970 motor trucks may have carried almost 500 million tons of freight or an amount approaching that of the railroads. This conclusion is based on the assumption that the relationship between truck transport performance and the number of trucks in the inventory was about the same in 1970 as in 1957, the last year of the First Five-Year Plan. Overall railroad performance in 1970 in terms of ton-kilometers was, of course, much higher than that of motor trucks because of the much longer average length of rail haul.

The increases in truck transport performance that occurred in the 1950's were due to improved operating efficiency as well as to increases in the truck inventory and expansion of the highway network. A program initiated by the Government included measures for better administrative control of truck transport at the local and provincial level, intensification of the use of existing equipment, and better use of available loading space on trucks. The large increases in performance during the Great Leap Forward were made possible by overloading of available trucks, increased use of trailers pulled behind conventional trucks, the use of two or more shifts per day, and attempts to use the idle capacity of trucks owned by functional government agencies, factories, and other enterprises.

During the latter part of the Great Leap Forward, however, the truck inventory began to suffer from misuse, inadequate maintenance, and a shortage of spare parts. During early 1960 reports of motor trucks lying idle for lack of spare parts continued to trickle in from the provinces. During the last half of the year the shortage of spare parts became critical and the utilization rate of motor trucks was seriously reduced. This shortage was partially alleviated by giving priority to the production of spare parts during late 1960 and all of 1961.

Another development of 1960 that affected efficiency of operations in motor truck transport was the general shortage of petroleum products that occurred during the last half of the year. Transportation of passengers was severely curtailed and in the more remote provinces, where truck transport is the primary means of freight haulage, measures for the conservation of gasoline were strictly enforced. In addition, many trucks were converted to burn substitute fuels, such as charcoal and natural gas.

During the economic fallback of the early 1960's the pressure on truck transport, as on the railroads, lessened considerably and operating and maintenance procedures were restored to better order. Since the end of the Cultural Revolution truck transport has appeared to be operating normally. No special nationwide operating restrictions

are currently in force although the Chinese continue to stress conservation in the use of gasoline and diesel fuel, in spite of the overall improvement in the petroleum situation in the country over the past few years.

Truck transport in the western regions of China is even more important today than it was 10 years ago. The lack of a railroad running into Tibet, for example, has left the entire burden of supplying this area on motor trucks. Many of China's best trucks are probably used in the west because of the rugged operating conditions and long hauls encountered there. Whether truck operating and maintenance facilities have kept pace with the increase in the number of trucks in use in the western provinces is problematical, but undoubtedly the pressure on these facilities is very great, and a breakdown could endanger the shipment of economic necessities and military supplies into these remote areas.

The establishment of joint transport services in China reportedly improved the efficiency and capability of highway transport operations by coordinating highway traffic movement with that of other modes of transport. Because large amounts of highway traffic are transhipped to and from railroads and inland waterways, this innovation probably has expedited the delivery of goods and materials from producer to consumer and generally benefited economic activity in the country. However, the implementation of these services occurred only recently and the total effect on the distribution system is not yet known.

D. Native Transport

The growth in performance by the modern transport system of China has generally kept pace with growth in the industrial sectors of the economy, but to some extent at least the transportation needs of the other sectors have continued to be met by traditional means. Native or primitive transportation has traditionally provided China with the basic means for moving goods over very short distances of up to 5 or 6 kilometers. Labor-intensive transportation, which includes carts, animals, and porters, has inherently provided a more flexible means of movement than other modes of transport and has required minimum capital investment. Although the amount of economic traffic which is moved by railroads and motorized highway transport has increased dramatically during the past 20 years, native transport still carries large amounts of short-haul, low-priority freight.

The importance of native transport in the overall distribution system was not fully realized by the Peking government until the Great Leap Forward. During the First Five-Year Plan, the Chinese emphasized the development of motorized highway transport and somewhat neglected native transport. When the Great Leap Forward was initiated, Peking increased control over native transport operations, equipped large numbers of carts with roller bearings, and urged better use of existing equipment. In 1959, native forms of land transport and junks may have carried as much as a billion tons, or more than that carried by all forms of modern transport.

As the railroads and motorized highway transport have expanded, native transport has become more of a supplement at local levels of economic activity to these modernized means of transport and less a primary means of movement. The number of carts, animals, and

porters presently employed by the Chinese is not known, but in 1958 more than 1 million animal-drawn and man-drawn carts were included in the Chinese inventory.

V. INLAND WATERWAYS AND COASTAL SHIPPING

A. Network

The inland waterway network of China totals more than 160,000 kilometers. At least 40,000 kilometers are navigable by modern motorized vessels. The water routes are generally oriented in an east-west direction, the most important route being the Yangtze River, which connects the Szechwan Basin with the coastal regions. The Hsi Chiang system forms a dense network in southern China around Canton. In the northeast the Amur River and its tributaries—the Sungari, Nen, and Ussuri—form a route longer than the Hsi Chiang system. During the winter, however, the rivers in the northeast are frozen for 5 to 6 months and total transport performance is therefore less in this area. Many other rivers are important as local transportation arteries. The Yellow River and most of the waterways in north China, including much of the Grand Canal, are of limited use as navigable waterways because of considerable silting and very low water during winter and spring.

During the past 20 years the inland waterway network has been improved by restoration of old ports and construction of new ones, deepening and widening of channels, installation of new navigational markers, and improvement of signal systems, some of which have been electrified. Navigation on the Yangtze—historically the great commercial artery of China—has steadily improved. Oceangoing vessels can sail as far inland as Wu-han, while junks, barges, tugs, and large river steamers sail as far as Ch'ung-ch'ing. At one time the Chinese had plans to interconnect the basins of the Amur, the Yellow, the Yangtze, and the Hsi Rivers through the construction of new canals and the repair and improvement of existing waterways. Little has been accomplished on this project, however, except for improvement of the southern half of the Grand Canal. A revitalized Grand Canal will be an important addition to the inland waterway network. When the canal is completely restored, it will provide the only north-south inland waterway of any significance and will make it possible for inland water transport to serve almost all the important industrial and agricultural regions of north and central China. At present no general large-scale inland waterway expansion program appears to be underway, although the usual maintenance work and improvements to the existing system are continuing.

Coastal shipping routes also form a part of China's domestic transportation system. For many years these routes were divided into those north of Taiwan and those south of Taiwan, because of Chinese Nationalist control of the Formosa Strait. Foreign merchant ships, which the Chinese Communists chartered to carry domestic goods from one Chinese port to another, provided the link between the north and south coasts. At the present time, the Chinese coastal fleet, with limited assistance from foreign ships, handles most of China's coastal shipping requirements. The operations of the north China coastal fleet extend northward from Wen-chou to the North Korean border and are con-

fined exclusively to the movement of domestic cargoes. The smaller south China coastal fleet operates from Swatow southward carrying domestic cargoes along the Chinese coast and carrying some of China's seaborne trade with North Vietnam.

B. Waterway Fleet

The inland waterway fleet of China consists of a multitude of vessels of a great variety of types and sizes, ranging from new passenger-cargo vessels of several thousand GRT to small sampans capable of carrying less than 1 ton. An accurate inventory of the inland water fleet has not existed since well before the Communists achieved power, if then, and it is likely that even today the Chinese do not have an accurate count of all the inland water vessels available to them. Tugs and barges became increasingly important on the rivers during the 1950's, and these craft undoubtedly make up a large part of the fleet today.

When the Chinese Communists gained control of the mainland in 1949, they acquired a small coastal fleet made up of modern self-propelled vessels of more than 1,000 GRT each. The growth of the fleet since that time has resulted in an increase in the average size and speed of vessels, and a decrease in their average age. At the present time the Chinese have a merchant fleet of more than 200 vessels of 1,000 GRT or more. The fleet is divided into two major units, one for coastal operations and one for longer international voyages. Each of these two units is in turn divided into south Chinese and north Chinese components, mainly because of the difficulties associated with navigating in the vicinity of Taiwan. The north and south coastal fleets probably contain about three-quarters of the vessels in the total fleet. The newer, more modern vessels, however, have been assigned to the international fleet. China also is known to have a fleet of modern steel vessels of less than 1,000 GRT which operate mostly along the coast.

C. Traffic and Operations

Water transport was traditionally the major form of transportation in pre-Communist China, but much of its capacity was destroyed by war. The Chinese did not particularly emphasize its development during the 1950's so the rapid growth shown by the performance data between 1950 and 1960 must be explained partially at least by the poor condition of both inland and coastal shipping when the Communists took over. Water transport performance (modern vessels only) increased from about 7 million tons carried in 1950 to some 76 million tons carried in 1958. Performance in 1970 may have been in the range of 120 to 140 million tons, if roughly the same relationship existed in 1970 between rail traffic and water traffic as existed in 1958-59.

Inland and coastal waterways supplement the railroads and carry bulk cargoes for long distances when speed is not of importance. Although major inland water traffic movements occur on the Yangtze and other large rivers, the dense network of waterways in the populous eastern third of China also provides low-cost local haulage for an infinite variety of foodstuffs and industrial goods. During the 1950's

the performance of inland water transport grew steadily in spite of a fairly low efficiency of operation. Increases in coastal traffic during the 1950's led to a steady increase in the size of the fleet and to the chartering of foreign vessels. Harbor facilities were not expanded appreciably, however, until the period of the Great Leap Forward. Although major long-haul coastal traffic, which takes place between Dairen and Shanghai, has increased in recent years, there has also been a substantial increase in short-haul traffic between less important ports.

In both inland and coastal water traffic, coal is a major commodity, moving principally down the coast and along the Yangtze River. Although all inland waterways are important in the transportation of food, the most discernible river movement of agricultural goods is along the Yangtze, which passes through the major surplus rice areas in Szechwan Province and the so-called rice bowls of the middle and lower Yangtze Valley. Materials for the iron and steel industry account for significant portions of coastal and inland water traffic. China also has at least 30 coastal tankers which are used primarily to ship crude oil from Dairen to the refinery at Shanghai.

In the past years tonnage carried on the Yangtze River normally amounted to about one-third of all tonnage carried by modern vessels on the inland waterways. It is possible that this proportion is even higher today. In 1957 the gross tonnage of ships in service on the Yangtze was reportedly more than double that of 1949, and the tonnage carried was seven times the 1949 figure. In 1961, when the economy was depressed, shipping on the Yangtze was cut back and construction of new vessels was suspended. During the economic revival after the Cultural Revolution, Yangtze River transport reached new levels of performance. The gross tonnage of vessels constructed and placed in service during 1966-70 reportedly was nine times that of 1961-65. During 1966-70 high horsepower tugs, large passenger and freight carrying vessels, heavy barges, oil tankers, and many other types of ships were placed in service on the Yangtze, and a variety of mechanized loading and unloading facilities were placed in operation. Further steps were also taken to consolidate shipping on the waterways of the Yangtze system and to electrify navigational markings. As a result of these improvements and an increased demand for service, the tonnage carried by modern vessels on the Yangtze in 1970 reportedly increased by 37.3 percent over 1969 and in 1971 a new record for tonnage carried was set during the first 6 months of the year. Overall inland waterway performance probably increased by about 15 to 20 percent in 1970 and perhaps another 10 to 15 percent in 1971. Coastal shipping performance registered a similar increase.

VI. CIVIL AVIATION

A. Network

The Civil Aviation General Administration of China (CAAC)¹¹ operates the air transport system for all of China's civilian economy. It is the instrument through which the Government maintains centralized control over the allocation of its civil air resources. The CAAC

¹¹ Formerly known as the Civil Aviation Administration of China (CAAC), the CAAC was renamed in April 1962. However, the abbreviation "CAAC" has been retained as the official acronym for the administration.

provides domestic passenger and cargo service, a small amount of international service, and a number of special support operations. It closely resembles the Soviet Union's state-operated Aeroflot in both organizational and operational aspects.

In 1949, following the war between the Nationalists and Communists, many of the existing airfields, navigational aids, and aircraft in China were either damaged or destroyed. Although some civil aviation operations existed, the lack of equipment and facilities severely restricted any expansion of service. The Communists immediately began a program of rehabilitation and construction to improve airfields and aircraft facilities. Work on a number of new airports was started between 1952 and 1957. In 1957 the Chinese reported that 29 airports had been restored or newly built in the previous 5 years. As the Great Leap Forward generated new traffic, additional facilities were constructed and old facilities expanded to accommodate it. According to press releases, 15 new airports were built in 1958, a year of feverish economic achievement. During the early 1960's little progress was made in airfield construction. From 1963 to 1966 most work on civil airfields was concentrated on major reconstruction and extension of runways. However, only the airports at Shanghai, Canton, and Peking presently have runways exceeding 3,050 meters (10,000 feet).

The number of cities served domestically by CAAC has changed little since the mid-1960's when a few additional routes were established in Sinkiang Province to accommodate the general development of that area. The CAAC timetable of April 1971 indicated a total of 75 domestic and eight international routes in the system. The domestic network consisted of about 45,000 kilometers of unduplicated routes.

On international routes the Chinese fly to the Soviet Union, North Korea, Mongolia, North Vietnam, and Burma. The only CAAC flight to a non-Communist country operates weekly between K'unming and Rangoon, Burma, with connections from Peking. Foreign airlines serving China include Aeroflot (U.S.S.R.), Air France, Pakistan International Airlines (PIA), and North Korea's airline, CAAK. In 1964, PIA became the first non-Communist airline to provide regular international flight service to China since the Communist accession to power in 1949. Following the waning of the Cultural Revolution, the Chinese began to show interest in further expanding CAAC international flight service. Possible destinations presently being considered for new international routes include Pakistan, the Balkans, the Middle East, Italy, France, and Africa. New routes to Japan, Canada, and the United States seem less likely in the near future.

China's self-imposed isolationism has accounted for the slow development of international service performed by CAAC. In addition, most developing nations use foreign aid and credit to establish international airlines, but China has chosen not to use this method. Because of these limitations, the Chinese did not acquire the long-range aircraft required for an expansion of their international air services until recently and have not allocated domestic resources to manufacture these aircraft.

B. Civil Aircraft Fleet

CAAC uses mostly piston-driven, propeller aircraft, a substantial number of which were acquired from the Soviet Union when the U.S.S.R. was assisting China in reestablishing its domestic air system.

The more than 200 single-engine AN-2's account for over half the approximately 400 aircraft in the civil fleet. The AN-2 is employed primarily for cargo transport and a variety of special services operations and to a lesser extent for passenger operations. It can accommodate 13 passengers or 1,500 kilograms of cargo and requires a runway length of only 300 meters for takeoff. It is especially well-suited for some of China's smaller airfields which are employed in local agricultural and forestry services. Other aircraft in the civil inventory include several Viscount turboprop aircraft acquired from the British in 1963 and 1964, and Soviet IL-18's, IL-14's, IL-12's, AN-12's, AN-24's, and YAK-18 trainers. In addition, the Chinese use some Alouette III and MI-4 helicopters for specialized aviation services. Most of the aircraft in the fleet are old, but the Chinese reportedly have maintained them well.

In 1970 and 1971 negotiations were initiated with the Soviet Union to purchase additional aircraft for use by the CAAC. As a result the Chinese purchased several AN-24 turboprop airplanes and IL-62 long-range jet aircraft. The IL-62 jet airliners are suitable for international operations and most likely will be used by the Chinese to expand their international service. These IL-62's are the first long-range jet aircraft in the Chinese fleet.

In addition to the Soviet aircraft, the Chinese purchased four used Trident I jet aircraft from Pakistan International Airlines in 1970. Although these aircraft have a range of 2,500 miles (4,000 kilometers), the Chinese have not used them in their international service. Since these aircraft have not been noted flying domestic routes, it is possible that they have been assigned to the military transport fleet or are used primarily for special VIP flights. However, in the event that the Chinese initiate additional international service, these aircraft could be used for flights as far away as Africa if intermediate refueling stops are included.

The Chinese also purchased six new Trident II aircraft from the British firm, Hawker Siddeley, Ltd., in 1971. These aircraft, too, have the capability for long-range international service. The Chinese have shown interest in other jet aircraft, including several U.S. models, and probably will purchase additional aircraft as new international routes are established. Despite this continued interest in the purchase of Western aircraft, the Chinese still obtain most of their air transport equipment from the Soviet Union probably in order to maintain as homogeneous a spare parts inventory as possible.

C. Traffic and Operations

By comparison with rail, water, and road transport, civil aviation is a minor service in China. It provides a number of specialized passenger and cargo functions that cannot readily be performed by other means. According to Chinese reports, civil aviation operations were quite successful during the First Five-Year Plan (1953-57). The CAAC claimed to have fulfilled the Plan goals more than a year ahead of schedule. Under the Plan civil aviation was given the tasks of broadening communications between Peking and important provincial cities and of developing special-purpose aviation. More ambitious goals were assigned to CAAC at the time of the Great Leap Forward. After showing extraordinary growth in 1958, civil aviation maintained a

steady growth during the collapse of the Leap Forward. The basic route system for CAAC flights was well-established by 1961.

Large increases in the number of passengers and the amount of freight carried were reported by CAAC in 1963 and 1964. By 1965, additional flights had been added to the CAAC schedule to increase accessibility to new areas of development in Sinkiang Province and to expand flight frequency on existing routes. During the height of the Cultural Revolution disturbances in January 1967, the State Council placed the CAAC under the control of the PLA. Civil aviation was not affected by the Cultural Revolution to as great an extent as other means of transportation, although the assumption of control by the military may have contributed to its relative stability. During 1967 many civil airports in China reported an excess of backlogged freight and some discontinued land-air shipments. In addition, some flights in northern and central China were reported canceled due to shortages of aviation fuel. The situation became worse in early 1968 when freight and passenger backlogs, fuel shortages, and general disorganization were found at many civil airports in the country. However, many of these difficulties could probably be attributed to disruptions and disorganization in other forms of transportation associated with the operations of civil aviation. Although the PLA presumably still controlled the CAAC at the end of 1971, there were no indications of any active PLA participation in CAAC operations and it is assumed that the military is controlling the CAAC in a passive manner only.

Air cargo shipped by CAAC is characteristically composed of high-value, low-volume items such as expensive machinery or equipment needed at remote construction sites or medicines and other supplies required on an emergency basis. This cargo may move either on an ad hoc basis or on scheduled flights. As a result of government policy, passengers traveling on CAAC flights are mostly government officials or foreign visitors, although long-distance air travel has been cheaper than first-class train service since air passenger rates were sharply reduced in the 1960's. With the exception of flights to such major cities as Peking, Shanghai, and Canton, most flights within the country take place on a weekly or semiweekly basis. Although flights into and out of the major cities generate most of the traffic, a large number of intraprovincial flights also exist.

One of the primary functions of the CAAC has been to perform specialized services such as the aerial application of fertilizers, insecticides, and weed killers; forestry patrols and aerial reforestation; aerial surveying and photography; and emergency flights to disease- or flood-stricken areas. Although the precise number of planes employed in specialized aviation services is unknown, a large portion of the civil aircraft fleet undoubtedly is involved in this work. In 1964, the Chinese reported that annual special-purpose flying time occupied approximately one-third of total civil aviation flying time.

The growth of the civil air network has been accompanied by the installation of extensive navigation, communication, and maintenance facilities. As a result, Chinese capability for all-weather operations has increased significantly throughout the country. The international airports at Shanghai and Canton have been expanded and reequipped with modern navigation aids such as high-intensity runway lights and instrument landing systems in order to accommodate the large passenger jet aircraft of the 1970's.

VII. MILITARY LOGISTICS

One of the primary functions of the Chinese transportation system is the movement of military supplies and personnel. This function is accomplished as a part of regular transportation operations within the country, although in time of war or national emergency the system first responds to military needs before accommodating civilian freight and passenger traffic. Centralized control of transportation operations facilitates the expeditious movement of military traffic and improves the responsiveness of the system to military requirements.

The sparsely developed and unevenly distributed railroad network physically limits military logistical capability in some areas of the country, particularly in the western provinces. The well-developed and relatively extensive network in eastern and northeastern China provides the means for expeditious logistical support to military operations in these areas. However, the limited rail network to the west restrains military logistical mobility and reduces the ability of the military to support operations. Particularly in Tibet, where no rail lines exist, military capability is significantly decreased because of the great distances to railheads.

The highway network supplements the railroads in the military logistics system and provides short-haul support to the military in all areas and long-haul transport in the west where no other transport is available. The Chinese have constructed all-weather roads in areas of strategic importance such as along the coastline of the Formosa Strait and near the borders of North Vietnam, Laos, and Burma. In addition, Peking has improved access to the Sino-Soviet borders in northeastern and northwestern China with the completion of several new roads in these areas. However, most roads throughout China require constant maintenance and rapidly deteriorate under heavy traffic conditions.

In terms of special transportation equipment allocated to the military, probably some mobile missile launching pads and other specialized military rolling stock are available, but most military supplies and personnel are moved by standardized railroad rolling stock. Increasing numbers of diesel locomotives probably will also be used for the movement of military traffic as they become available. Although truck shortages have not affected military operations as much as economic activity in the past, the rapidly increasing national truck inventory has strengthened military motor transport units and enhanced their capability to provide logistical support. Furthermore, military units probably receive a significant share of new imported and domestically produced trucks. During wartime the PLA would undoubtedly commandeered additional civilian trucks to fill out unit transport tables of equipment. According to the "Bulletin of Activities" of the PLA, in August 1961 there were some 90,000 vehicles in the entire army. If most of these vehicles were trucks, more than half the national truck inventory was under army control at that time. At present the army truck inventory undoubtedly amounts to well over 100,000 units, but is a much smaller percentage of the total national inventory than in 1961.

Major military movements in China depend heavily on the use of the railroads to transport supplies and personnel. Consequently, most major ground units are stationed at points along the railroad network. As the most efficient and expeditious means of moving large quantities of supplies or large numbers of personnel, the railroads provide the

basic means of supporting military operations in any area of the country. Even in Tibet any sizable military action would depend on supplies moved from railheads in Szechwan, Kansu, and Tsinghai Provinces. However, truck transport would be as vital as rail transport if the PLA were involved in a land war along the Chinese border.

Although rail lines are more susceptible to interdiction than other forms of transportation, the PLA Railway Engineering Corps has demonstrated its ability to maintain and rapidly reconstruct bombed tracks and destroyed bridges during the Korean and Vietnam wars. The responsibilities of the Corps include engineering planning, technical services, construction of major bridges and tunnels, and operation of repair facilities. It concentrates on the maintenance and repair of strategic rail lines, particularly in the border areas, and improves the Chinese capability to maintain logistical support for military operations in the country. The Railway Engineering Corps has been heavily involved in the construction of most major new rail lines in China, especially those lines built through rough and rugged terrain.

The strategic importance of the inland waterway system varies by region, but it generally is unimportant for logistic support of military operations. The characteristic slow speed of barges, junks, and other small watercraft in conjunction with limited area of operations and high susceptibility to interdiction limits this transport mode to a secondary support role in military operations. Civil aviation provides some support to military operations, but the majority of military traffic moved by air is transported by military aircraft. In the event of war or national emergency, however, civilian aircraft and aircraft facilities would be expected to accommodate military traffic on a priority basis. Since the military presently exerts general control over CAAC, all civil air resources are readily available for military or other national emergency uses.

Although the relative importance of primitive transportation has decreased with the introduction of modern transport equipment in increasing amounts, the animals and human porters traditional in Chinese transport still provide the Chinese Army exceptional mobility over difficult terrain, especially in areas where little or no other means of transportation are available. Also, the introduction of joint transport services in China has improved military logistical capability as better coordination between modes of transportation has improved effective delivery time.

VIII. PROSPECTS FOR 1972-75

During the past 20 years China has made great progress toward its goal of developing an efficient transportation system capable of supporting a modern industrialized economy. From primitive beginnings in 1950 when the railroads were in deplorable condition, the highway network almost nonexistent, and the inland waterway system nearly destroyed, the Chinese transportation system has developed to the point where it can (1) operate several hundred diesel locomotives daily hauling large modern freight cars of 60-ton capacity; (2) support a truck fleet of half a million units on a greatly improved and expanded highway system; (3) operate a substantial fleet of modern vessels on the inland waterways and along the coast; (4) send

a number of its own merchant vessels to foreign ports; and (5) operate a small and outmoded but fairly efficient civil air system. Although they realize that a great deal still remains to be accomplished, the Chinese have laid a sound foundation for future advances in all phases of transportation.

During the new Fourth Five Year Plan (1971-75) the prospects are bright for further improvement in the transportation picture if recent trends continue. Petroleum production should be adequate to support any planned or probable increase in transport performance. Rail transport performance should continue to keep pace with increases in the output of raw materials, manufactured items, and agricultural products. Continued increases in production and imports of locomotives and freight cars, especially diesel and electric locomotives, will lead to an increase in hauling power of the locomotive fleet of at least 30 percent and an increase in the number of freight cars to well over 200,000 units. Because bigger cars will be joining the fleet, its carrying capacity will probably also increase by at least 30 percent.

During the next 4 years, imports of diesel and electric locomotives will probably continue to be substantial. The Chinese will place more emphasis on imports of diesels, however, until additional stretches of mainline track can be electrified. As for freight cars, the production and import of tank cars probably will have high priority because China lacks a system of long-distance trunk pipelines. A need will also exist for some specialized tank cars to carry chemicals and missile fuels. In addition, a few new missile-carrying flatcars will be in demand as China begins to expand its missile inventory. Production of the most recent types of general-purpose freight cars will also be maintained as China continues to phase out cars produced before 1950.

There are no indications of general shortages of locomotives or freight cars on the Chinese rail system. Thus, production of rolling stock during 1972-75 should be able to keep pace with rising demands as traffic increases and new rail lines come into use.

Although the number of diesel locomotives should increase significantly, China will still have a large number of steam locomotives in service in 1975 and will be the only major country in the world still partly dependent on steam traction. Use of diesels will gradually spread to all sections of the country, however, particularly to the north and northeast where many heavy trains loaded with coal and other industrial raw materials must be moved daily. China's locomotive and freight car inventories, augmented by both new production and continued imports, should be capable of handling a traffic level of at least 800 million tons in 1975, a level almost three times that of 1957. Increase in size and further modernization of the locomotive and freight car fleets during the early 1970's will probably be more important than improved operating efficiency in taking care of the expected increases in traffic levels.

The length of the main railroad network in China was about 41,000 kilometers at the end of 1971. This total length will be increased by several thousand kilometers when the rail lines presently under construction are completed. Further projects will be initiated during the 1970's. During the past 20 years the Chinese have attempted to correct the uneven physical distribution of the rail system in order to help solidify central government control over some of the more remote areas of the southwestern and central parts of the county, to

disperse China's industrial base into areas potentially rich in mineral resources, and to provide more efficient logistical support to critical areas for national defense purposes. These goals are continuing to be emphasized in the current rail construction program and will be emphasized in the future. The expansion of the rail network into the southwestern and central regions of the country represents an effort on the part of the Chinese to provide the necessary transport infrastructure for overall economic development, to establish the means for transporting the rich mineral resources both within and out of these regions, and to improve the capability for transporting military supplies and troops in these areas. However, this expansion into frontier areas produces less traffic per kilometer than improvements made in the existing system, so that capital-output ratios must immediately be less favorable. The internal expansion and development found in the eastern part of the country reflect the Chinese desire to maintain and improve the existing railroad network for the purpose of providing a modern, efficient system to carry the increased economic traffic expected to be generated during 1972-75.

During the Fourth Five-Year Plan (1971-75), the performance of modern highway transportation should expand appreciably as more trucks are added to the fleet, as the highway network is further developed, and as the economy expands under the plan. During 1972-75 the country can be expected not only to increase significantly the length of the highway network, but also to implement a comprehensive road maintenance program to assure a reasonable quality in the network. The road network in the eastern part of the country will be further improved and additional new roads will be built in the west. Improved connections with Tibet and the border areas of Sinkiang are bound to be emphasized.

Peking also expects to give its truck fleet a further big boost as the new 5-year plan proceeds. Domestic production of trucks should continue to increase on an annual basis; it may approach 100,000 units per year by the mid-1970's. New truck plants will be needed and capacity will be further expanded at the old plants. Imports of specialized and heavy-duty trucks are at the highest level in a decade. These imports come mostly from Japan and France and are made up largely of heavy-duty cargo and dump trucks needed by China's military forces and at numerous construction projects in the rugged interior of the country. Current prospects are for continuation of a high level of imports during the next few years because of growing industrial and military requirements. By 1975, the truck inventory may be approaching 800,000 units, if present trends continue, and could reach as many as a million units before the end of the decade.

Modernization of inland waterway and coastal shipping will continue during 1972-75. Additional navigation aids will be installed, channels will be deepened, and inland and coastal ports will be improved. Larger and more efficient vessels will join both the inland and coastal fleets. The inland waterway network will not increase greatly in length, but the complete restoration of the Grand Canal by the middle or late 1970's will be a big boon to the north-south movement of goods on the waterway system. China will continue to purchase oceangoing vessels for its merchant fleet from foreign countries and will further increase shipyard capacity in order to

build more of its own vessels, especially large tankers. Chinese merchant vessels will make many additional voyages to foreign ports, especially to North and South America, and Africa. The first voyages to South America by Chinese ships in 1971 may especially signal future expanded operations to that part of the world.

In the next few years an expanded civil air fleet will lead to a needed expansion of China's domestic air transport capacity. As industrial output increases and new construction projects are initiated, the domestic need for both passenger and cargo service will greatly expand, including the need to transport government officials and technical people and the need to haul special equipment to remote sites. Furthermore, the existing fleet is old and largely obsolete so that new aircraft would be needed as replacements even at current traffic levels.

The existing CAAC aircraft fleet has some capability for long-distance international flights. Because of the present interest of the Chinese in expanding their international flight service, they probably will purchase additional long-range aircraft to permit expansion of CAAC service and also allow a few more foreign airlines into China. The number of aircraft that will be purchased by China cannot be determined at present, but a small number of long-range jet aircraft will undoubtedly be acquired for international use and possibly some smaller aircraft purchased to replace aircraft in the obsolete domestic-route fleet. However, the Chinese have given no indication that they have accorded high priority to purchasing a large number of aircraft for the civil air fleet. Although there may be some financial constraints for the Chinese in the purchase of new aircraft, China's booming petroleum industry can readily supply any foreseeable level of civil air activity in 1972-75. The primary aircraft for special aviation services will probably continue to be the AN-2 until a new aircraft designed specifically for these services is domestically produced.

China's existing civil air agreements with non-Communist countries will serve as the nucleus for future expansion of CAAC international flight service. Additional air service to China provided by airlines of non-Communist countries can also be expected during the next year or two. Airlines of Italy, Canada, Japan, and the United States have all expressed a desire to begin air service to China.

Improvements in military logistic capability in China will closely parallel the expansion and modernization of the transportation system during the next few years. The improvement of the transportation system in southwestern China will provide better access to strategic border areas and will enhance the responsiveness of the system to military requirements in this area. New equipment, particularly trucks, will be allocated to military units or will be available to the military for the rapid transport of supplies and personnel. Although new passenger aircraft are being purchased for the expansion of civil aviation services, the significance of these aircraft for military logistic purposes will be limited. In addition, the transport system will be able to respond more efficiently and quickly to military logistical requirements as better coordination between modes of transport is achieved through the development of joint transport services.

APPENDIX A. STATISTICAL TABLES

TABLE 1.—CHINA: THE TRANSPORTATION NETWORK IN SELECTED YEARS AT YEAREND ¹

[In kilometers]

Mode of transport	1950	1952	1957	1958	1960	1965	1970	1971
Length of railroad lines in operation	22,512	24,518	29,862	31,193	² 33,000	³ 35,000	⁴ 40,000	⁴ 41,000
Length of highways in operation	99,600	126,675	254,624	400,000	⁵ 500,000	⁶ 550,000	⁷ 650,000	NA
Length of navigable routes on inland waterways	⁸ 73,615	95,025	144,101	150,000	⁹ 168,000	NA	NA	NA

¹ All data prior to 1960 are from "Ten Great Years" (English edition), Peking, 1960, p. 144.

² Union Research Institute (URI), Hong Kong, EC-37, "Communist China 1964," vol. I, p. 20.

³ URI, EC-40, "Communist China 1966," vol. II, p. 254.

⁴ Estimated.

⁵ URI, EC-40, "Communist China 1966," vol. II, p. 260.

⁶ Ibid.

⁷ A Chinese broadcast of Dec. 22, 1971 indicated that the length of the highway network at the end of 1970 was 8.5 times that before liberation. (Foreign Broadcast Information Service, "Daily Report," People's Republic of China, Dec. 23, 1971, p. B1). In 1948 China had only 75,000 km. of highway in operation. (URI, EC 40, "Communist China 1966," vol. II, p. 259).

⁸ 1949.

⁹ People's Daily, 31 March 1960.

TABLE 2.—CHINA: PERFORMANCE OF MODERN TRANSPORT IN SELECTED YEARS ¹

Mode of transport and unit of measure	Highest pre-1949 output	1950	1952	1957	1958	1960	1965	1970	1971
Railroads:									
Tons carried (million metric tons)	136.65	99.83	132.17	274.20	381.09	² 470	² 410	³ 560	² 620
Ton-kilometers (billion metric ton-kilometers)	40.40	39.41	60.16	134.59	185.52	⁴ 228	⁴ 199	⁴ 272	⁴ 301
Average length of haul (kilometers)	296	395	455	491	487	⁵ 485	⁶ 485	⁶ 485	⁶ 485
Motor trucks:									
Tons carried (million metric tons)	8.19	9.21	22.10	83.73	176.30	(°)	(°)	⁷ 500	⁸ 550-575
Ton-kilometers (billion metric ton-kilometers)	0.46	0.38	0.77	3.94	6.96	(°)	(°)	⁴ 17.5	⁴ 19.2-20.1
Average length of haul (kilometers)	56	41	35	47	39	(°)	(°)	⁹ 35	⁹ 35
Motorized vessels on inland and coastal waterways:									
Tons carried (million metric tons)	12.64	6.65	14.32	53.77	76.36	(°)	(°)	¹⁰ 120-140	¹⁰ 135-160
Ton-kilometers (billion metric ton-kilometers)	12.83	2.90	10.61	34.39	43.91	(°)	(°)	⁴ 60-70	⁴ 68-80
Average length of haul (kilometers)	1,015	436	741	640	575	(°)	(°)	⁴ 500	⁴ 500

¹ All figures prior to 1960 are from or based on data in "Ten Great Years", pp. 146 and 148.

² Estimated on the basis of the volume of coal, grain, ferrous metals, metallic ores, timber, petroleum, cement, and other commodities transported by railroad.

³ A Chinese radio broadcast of Oct. 14, 1971 indicated that the volume of rail freight transportation in 1970 increased 10-fold compared with the early days after liberation. (Foreign Broadcast Information Service, Daily Report, People's Republic of China, Oct. 26, 1971, p. B12). The broadcast was interpreted to mean that the figure for rail tons carried in 1970 was 10 times the 1949 figure of 55,890,000 tons. The estimated 1970 figure of 560,000,000 tons also checks out against estimates of the volume of the various commodities transported by railroad.

⁴ Derived by multiplying tons carried by average length of haul.

⁵ Estimated.

⁶ Not available.

⁷ Estimated on the basis that the relationship between truck transport performance and the number of trucks in the inventory was about the same in 1970 as in 1957, the last year of the First Five-Year Plan. The 1970 figure of 500,000 tons also checks out roughly against estimates of the volume of the various commodities transported by truck.

⁸ Based on an estimated 10 to 15 percent increase in tons carried in 1971.

⁹ Based on the assumption that roughly the same relationship existed in 1970 between rail traffic and water traffic as existed in 1958-59.

¹⁰ Based on an estimated 10 to 15 percent increase in tons carried in 1971.

TABLE 3.—CHINA: INVENTORY AND OPERATING DATA ON RAILROADS AND MOTOR TRUCKS IN SELECTED YEARS

Mode of transport	Unit of measure	1950	1952	1957	1958	1960	1965	1970	1971
Railroads:									
Freight car inventory.....	Cars.....	¹ 41,000	¹ 54,000	¹ 89,000	¹ 100,000	² 135,000	³ 150,000	NA	² 185,000
Locomotive inventory.....	Locomotives.....	¹ 2,900	¹ 3,200	¹ 3,700	¹ 4,100	² 6,000	² 5,500	NA	² 6,000
Average load per freight car.....	Metric tons.....	⁴ 26.6	⁵ 28.9	⁵ 34.7	⁵ 37.6	⁶ 39.4	⁷ 39.1	² 40+	² 40+
Average turnaround time per freight car.....	Days.....	⁴ 3.34	⁵ 2.90	⁵ 2.84	⁵ 2.75	⁶ 2.47	NA	² 4±	² 4±
Average gross weight hauled per freight train.....	Metric tons.....	⁴ 1,015.7	⁵ 1,245.3	⁵ 1,520.2	⁵ 1,704.0	NA	NA	NA	² 2,000+
Average speed per freight train, including stops.....	Kilometers per hour.....	⁴ 20.9	⁵ 25.5	⁵ 25.2	⁵ 25.7	NA	⁸ 29.0	NA	NA
Motor trucks: Inventory.....	Trucks.....	NA	² 50,000	NA	² 100,000	² 150,000	¹⁰ 250,000	NA	² 500,000

¹ Based on figures in Wu, op. cit., pp. 279-280. All inventory data are as of the end of the year.

² Estimated.

³ Harald Munthe-Kaas, "Roads and Rails in China," Far Eastern Economic Review, Feb. 17, 1966, p. 276.

⁴ A. I. Il'yin and M. P. Voronichev, "Railroad Transport of the Chinese People's Republic," U.S. Joint Publications Research Service, JPRS: 3484, July 6, 1960, p. 74.

⁵ "Ten Great Years," p. 153.

⁶ Published figure for 1959. "Zheleznodorozhnyy transport," June 1960, pp. 81-83.

⁷ Published figure for 1962. JPRS: 28, 854, "Organizing Railway Transportation, Communist China," Feb. 23, 1965, p. 407.

⁸ 1959. Gudok, February 1960.

⁹ NCNA news release of June 29, 1965, from Peking.

¹⁰ Munthe-Kaas, op. cit., p. 326.

APPENDIX B

PRINCIPAL SOURCES

Information on the Chinese transportation system is available from a variety of sources. Chinese publications, press releases, and radio broadcasts provide most of the primary information. Numerous secondary sources in both English and Russian describe, analyze, and dissect the transport system in great detail. *Ten Great Years*, published in Peking in 1960, is probably the basic document for transportation data in the 1950's. It contains generally reliable statistical data on all modes of transport for the years 1949-58.

Very few Chinese monographs of a detailed nature are available for the transportation sector although one entitled *Organizing Railway Transportation* contains detailed discussions of various technical operations on the railroads. This monograph was published in Peking in June 1964 by the People's Railway Publishing House and has been translated by the U.S. Joint Publications Research Service in JPRS 28,854, February 23, 1965. Information of a more recent and pertinent nature on railroads, highways, waterways, and civil aviation is available primarily from current Chinese press and radio releases. This information is provided in the U.S. Foreign Broadcast Information Service *Daily Report* series on the People's Republic of China and the British *Summary of World Broadcasts* on the Far East. A JPRS series called *Translations on People's Republic of China* is available and *China News Analysis*, published in Hong Kong, also provides pertinent source material.

In 1970-71, the number of press and radio reports on transportation developments has increased substantially. Many of these reports, however, involve only individual railroad bureaus, individual provinces for highway transport, or individual rivers for inland water transport. Only in one or two cases have national figures been involved. Although some absolute figures have been released, most claims are given in percentage terms only. This development is a vast improvement over the period 1961-69 when there was practically no hard information on Chinese transport.

Timetables represent a basic reference aid used in the analysis of transportation in China. The most recent railroad timetable available was published in Peking in July 1971 and translated in JPRS 55,806, April 26, 1972. The most recent schedule of civil aviation flights is dated October 1971. This document is generally published every 6 months by CAAC. The railroad timetable has been useful in the past for determining new rail lines opened to passenger traffic. The civil aviation timetable provides information on the number of cities served by CAAC and furnishes information from which the direction and density of traffic and total route mileage can be determined.

Several Russian publications contain detailed analyses of the Chinese transportation system. One excellent treatise on the railroads during the 1950's is A. I. Il'yin and M. P. Voronichev, *Railroad Transport of the Chinese People's Republic*, published in Moscow in 1959 and translated in JPRS 3484, July 6, 1960. Other works in Russian include L. A. Kisvyantsev, *Transportation in the People's Republic of China*, Moscow, 1958, translated in JPRS 854-D, August 17, 1959, and S. L. Shiryayev, *Development of Railroad Transport in the People's Republic of China*, Moscow, 1969. This latter book contains a good discussion of railroad transport during 1961-65 and a detailed account of railroad operations during the Cultural Revolution. It does not contain any new statistical data, however. The Russian language monthly periodical, *Zheleznodorozhnyy transport (Railroad Transport)* was occasionally useful in the past in reporting developments about Chinese railroads before they appeared in the Chinese press.

The most comprehensive secondary source in English is Yuan-li Wu, *The Spatial Economy of Communist China*, New York and London, 1967. This book contains the most complete collection of raw data on the Chinese transportation system through the early 1960's available in any one place. Another principal source of information is the annual review of the situation in China, published by the Union Research Institute of Hong Kong in its Communist China Problem Research Series. Each of these annual volumes, published since 1956, contains a chapter or section on transportation. These articles are particularly useful because they supply a wealth of data from original Chinese sources on all modes of transport. They consolidate significant Chinese press releases and radio broadcasts and provide some independent analysis.

Two important secondary sources for information on Chinese civil aviation were the Rand Corp.'s Memorandums RM-4666-PR, June 1966, and RM-4666-1-PR, December 1968, entitled *Civil Aviation in Communist China Since 1949*. These two reports, written by Harriet E. Porch, provide valuable information on the development of civil aviation in China since 1949. They cover such topics as administration, operations, traffic, and aircraft inventory. Jane's *All the World's Aircraft* gives detailed information on the types of aircraft used by the CAAC and permits an appraisal of these aircraft. The Western press has also been very useful in providing recent information on civil aviation. A proliferation of articles on possible Chinese aircraft purchases and extended Chinese international air service has recently appeared in the U.S. and foreign press. Many articles on Chinese civil aviation in general have been published in the press and in periodicals since the Chinese have shown interest in acquiring additional aircraft.

Source material for the military logistics section of the paper was largely restricted to two books on the PLA and two articles on Chinese military capabilities. Information on military logistics is limited; thus, much of the section is based on a general knowledge of the transportation system and its operations. Two books on the PLA, *The Chinese People's Liberation Army*, New York, 1967, by Samuel B. Griffith II, and *The Red Army of China*, New York, 1963, by Edgar O'Ballance, provide general background information on military logistics operations in the country, although little specific description of these operations is included. General Griffith also published an interesting article in *Foreign Affairs*, January 1965, entitled "Communist China's Capacity to Make War," which presents an overview of China's military logistic capabilities. Also, an article by Michael Yahuda in *Current History*, September 1969, entitled "China's Military Capabilities," includes some material on military logistics, especially in the area of the Sino-Soviet border. The mammoth publication (776 large pages with small print) entitled *The Politics of the Chinese Red Army: A Translation of the Bulletin of Activities of the People's Liberation Army*, Stanford, 1966, contains little information on military logistics, but it did yield a figure for the number of military vehicles in the army in 1961.

In addition to the sources mentioned above, a number of journal articles contain interesting and informative accounts of various aspects of the Chinese transportation system. Following is a list of the more pertinent articles:

Ranjit Chaudhuri, "The Present State of Transportation in China," *China Report*, November-December 1968, p. 1.

Holland Hunter, "Transport in Soviet and Chinese Development," *Economic Development and Cultural Change*, October 1965, p. 71.

Victor D. Lippit, "Development of Transportation in Communist China," *The China Quarterly*, July-September 1966, p. 101.

Colina McDougall, "Revolution on China's Railroads," *Current Scene*, August 16, 1968, p. 1.

Harald Munthe-Kaas, "Roads and Rails in China," *Far Eastern Economic Review*, February 17, 1966, p. 275.

Jan S. Prybyla, "Transportation in Communist China," *Land Economics*, August 1966, p. 268.

"Railroads and Highways," *China News Analysis*, December 4, 1964, p. 1.

Data on the Soviet railroads were taken from Soviet handbooks and from an excellent article entitled "Soviet Railways: a vast new plan as traffic totals soar," in the October 1971 issue of the *International Railway Journal*.

Part III. PROBLEMS IN HUMAN RESOURCE
MANAGEMENT

CHINA'S SCIENCE AND TECHNOLOGY: CONTINUITY AND INNOVATION

By LEO A. ORLEANS

I. SUMMARY AND CONCLUSIONS*

Since the Cultural Revolution China has once again demonstrated her almost uncanny ability to "bounce back." True of the country as a whole, it is also true of her science, technology and education. The rather widespread conviction that the Cultural Revolution has had calamitous and lasting effects on science and technology stems primarily from the belief that the assault against the scientists, engineers, and professors decimated their ranks and left those remaining demoralized, embittered, and ineffective. It is true that the intellectual community was probably affected more than any other segment of the society, but it is now obvious that it did not suffer any permanent damage. If Mao Tse-tung is to be held responsible for the attacks against intellectuals, he should also be given some credit for keeping these attacks under control, for it is important to realize that Mao is neither anti-intellectual nor anti-science. On the contrary, he has great respect for knowledge and learning. What he is against is elitism and it is this very common characteristic that the policies of verbal abuse and physical work have been trying to eradicate from the consciousness of the Chinese intellectuals.

Actually, perhaps the words that best describe today's science in the People's Republic of China are continuity and innovation. The policies that guided scientific and technological development in China during the 15 years prior to the Cultural Revolution are still in effect, and what are often assumed to be vacillations are little more than temporary changes in attitudes and pressures due to the political mood of a particular period. In other words, politics have always been in command—even when in practice this was not the case; scientists and engineers, particularly if they were foreign trained, were always suspect—even when they were in ascendancy; applied science to meet immediate economic needs always took priority over basic research—even though during more relaxed periods individual scientists may have strayed from this principle; self-reliance, for whatever purpose, was always preferred to dependency on outside assistance—even though at times ideology gave way to expediency. Because all these principles were pounded with special fervor during the Cultural Revolution, some recent observers of the China scene interpreted them as significant changes from the past, whereas they actually represent more of a continuum.

At the same time that there has been continuity in the basic principles relating to science and technology, the Cultural Revolution did bring some important changes, but these were more a reflection of

*Warm thanks to David L. Putnam and Margaret Finarelli for their very helpful comments.

innovations in the economy and education than in science and technology *per se*. The policy of developing local industries in rural China resulted in a demand for a different level of scientific and technical know-how among the broad masses and added, to the longstanding demand by Mao that intellectuals be personally exposed to the life and problems of the workers and peasants, an actual need for this type of contact in order to help build and develop the new economy of the countryside.

China is experimenting with some imaginative policies and methods in the field of education as well. In this connection, attention has been focused on a reduction in the number of years allocated to the various educational levels. Actually, this is not as drastic a departure from the old system as is generally assumed and, furthermore, it seems to meet adequately most of the requirements of the new economic policies. It is, however, likely to have an adverse effect on the training of top professionals for China's advanced science and technology and just how Peking intends to fill this gap in the system is still a subject for speculation.

In addition to the innovations in theory and policies, there has also been an explosion of substantive innovations in China's technology and science. Rather than concentrating all the efforts on applied research and development in the institutes and laboratories of the Chinese Academy of Sciences, both the professionals and the masses have been urged, each in his own way, to experiment and to innovate in order to improve efficiency and increase productivity on the farm and in the factory. This national effort of great proportions is not only having a salutary effect on the productivity of the agricultural and the light industry sectors of the economy, but has undoubtedly increased the confidence and the satisfaction of the workers and peasants, as participants in the modernization of the country.

On a higher plane, China has adopted the philosophy that she will not compete with the leading countries in basic research for the sole purpose of advancing knowledge, but will concentrate her more limited resources on the adaptation of existing scientific and technical attainments to her own needs. This does not mean, however, that all knowledge will travel in one direction; China has already demonstrated that limiting research to practical requirements need not restrict achievement. By no means has she lost interest in advanced science and technology and, despite the Cultural Revolution, Chinese scientists have managed to stay abreast with most of the latest developments. China subscribes to the important journals published around the world and current indications are that she will be attending more and more international scientific conferences—carefully selected for disciplines in which Chinese scientists will be able to participate with confidence and pride.

Basically, then, China continues to "walk on two legs" in science and technology, just as she has been doing in many other fields. Although she is placing great emphasis on local industries and what may be termed local science and technology, China continues to expand her urban economy and to compete with the advanced countries in the modern industrial sector and in advanced science and technology.

II. A BRIEF HISTORICAL SURVEY

China has a rich history in science and technology. Although because of her isolation the influence of Chinese civilization on Western science was minimal, it played an important role in the development of the cultures and peoples of East and Southeast Asia. Marco Polo in the late 13th century and the merchants, missionaries, and diplomats who followed him to the Middle Kingdom, all reported on the country's wealth and technology, which was ahead of contemporary Europe and the countries of the Mediterranean and had been for a thousand years. Many of ancient China's achievements, however, came about despite numerous obstacles and attitudes that were not conducive to scientific development and that to some extent determined the characteristics of Chinese science. Because some of the ancient impediments to scientific development persisted into the twentieth century, they are worth reviewing in connection with the post-1949 policies and programs.

Hundreds of years of history cannot be generalized, but some of the dominant points in relation to science do hold throughout most of the centuries. For example, the basically utilitarian approach to science adopted by the Communist regime goes far into China's past. Most of China's scientific progress was based on observation, description and practical trials, more than on experimentation and rigorous demonstration leading to the development of theory which was the foundation for the Western scientific revolution. China's scientific and technical traditions, even as today, emphasized technological innovations for immediate practical application rather than pure science. The notion of "science for science's sake" was never important except perhaps to individual Chinese scientists.

As early as the Han period, which goes back over 2,000 years, the government was wary of scientists. In those days most scientists apparently had a job in the government and their primary interest was in politics. This interest in politics "led them away from theory and pure science and brought them quickly into a position which the ruling dynasty regarded with extreme suspicion."¹ Because the true Chinese scholar was much too preoccupied with literature, history, poetry and other cultural pursuits, the lot of the scientists tended to deteriorate. The prejudice of the educated population against scientists became particularly strong after Taoism was firmly established as a popular cult by the end of the sixth century. Concerned with obtaining immortality and good fortune often by magical means, Taoism got the reputation of being a "superstitious cult of the stupid people."² Because the uneducated Taoist priests adopted the pseudosciences of alchemy and astrology as integral parts of their practices, anything that resembled this type of activity was naturally suspect. While some of the nonscientific intellectuals recognized the potential of science as a source for new technology for military and economic development and as an instrument for the betterment of society, most considered pursuit to be an occupation that was fit only for the ignorant and the lowly. In addition to the opposition of the scholars, there was also

¹ Wolfram Eberhard, "The Political Function of Astronomy and Astronomers in Han China," in *Chinese Thought and Institutions*, edited by John K. Fairbank, Chicago, University of Chicago Press, 1957, p. 67.

² C. P. Fitzgerald, *China*, New York, Frederick A. Praeger, 1961, pp. 273-274.

the hostility of the gentry, who believed that the "magic" practiced by the scientists could eventually affect their own dominance.

According to Needham, the evolution of Chinese science may be represented by:

* * * a relatively slowly rising curve, noticeably running at a higher level, sometimes a much higher level, than European parallels between, say, the 2d and the 15th centuries. But then after the scientific renaissance had begun in the West with the Galilean revolution * * * the curve of science and technology in Europe begins to rise in a violent, almost exponential, manner, overtaking the levels of the Asian societies and bringing about the state of affairs which we have seen during the past two or three hundred years.³

It is this gap that developed after the 15th century between Western and Chinese technology that was responsible, in part, for what the Chinese refer to as the century of national humiliation. China's defeats in the Opium War of 1840-42 and the Sino-Japanese War of 1894-95 proved to the imperial Manchu regime that Western military power relied on advanced technology which could only be counteracted by the development of indigenous military technology.

Progress in the introduction of modern science and technology into China was slow at the turn of the century, picked up some impetus after the 1911 revolution, and showed a significant upsurge during the Republican period of the 1930's and 1940's. As more and more of the young intellectuals resolved to pursue careers in science and engineering, there was a growth in educational facilities, in scientific research, in the publication of scientific journals, and in the number of scientific societies. Thousands of young people went abroad to study in Japan, in Europe, or in the United States, albeit some of them did not return to China. During the 20 years ending with 1947, some 15,000 students received science degrees and 30,000 obtained engineering degrees from Chinese institutions of higher education, most of which were essentially modeled on American lines.

Considering the turmoil precipitated by the social, economic, and political conditions in China during most of the first half of the 20th century, the progress made by the Nationalist Government in developing a scientific and technological base in the country represented a reasonable start—but only a start. Most of the emphasis was in the field of engineering and despite some qualified scientists, there were no significant achievements in the sciences during that period. Furthermore, what advantages may have been derived from technological development were limited to a fraction of the urban population, while the Chinese people experienced virtually no benefit from the largely foreign-controlled industries springing up in the coastal cities of the country. Even among the urban population this localized industrial revolution brought more wretchedness and despair than benefit. The claim of the Communists that the Chinese people were being exploited is difficult to rebut.

III. CONTINUITY OF IDEOLOGY AND POLICIES

When the Communists secured control of the Chinese mainland in 1949 they knew in general what their goal was, but it took them several years to work out the details and develop an approach that would fit

³ Joseph Needham, "Glories and Defects of the Chinese Scientific and Technical Traditions," in *Neue Beiträge Zur Geschichte der Alten Welt* (New Contribution to the History of the Old World), Volume 1, Old Orient and Greece, Akademie-Verlag, Berlin, 1964, pp. 87-109.

into their ideological framework. Ambitious "to catch up with the world's advanced levels," they were cognizant that this could only be achieved through major advances in science and technology and considerable time was spent in determining the specific policies and priorities that would lead toward that end. These policies, as well as the progress and the problems relating to the development of science and technology in the People's Republic of China during the first 15 years of the present regime have been well analyzed and documented in a number of books and numerous articles.⁴ The effort here will be devoted primarily to reviewing the effects of the Great Proletarian Cultural Revolution on the various aspects of scientific and technological development and only as much background discussion will be included as is necessary to clarify the events of the past 6 or 7 years.

Many reasons have been suggested to explain why Mao initiated the Cultural Revolution and there is probably a little truth in most of them. But whether it was a power struggle, or a desire to provide China's youth with revolutionary experience, or a reaction to the differences with the Soviet Union, or Mao's final effort to remake the nature of China's man, one thing is clear; the brunt of the Cultural Revolution was taken by the country's more cultured and more educated population—the intellectuals—and in that sense had a direct bearing on the scientists and engineers and on the whole scientific and technological establishment. The question is, of course, what exactly was (or is) the effect of the Cultural Revolution on science. The answer must still rely essentially on a somewhat subjective interpretation of the available data—data so short on fact and so long on politics that one can find a quotation to support any bone he may wish to pick.

Considering the reports that came out of China during the height of the Cultural Revolution it was easy to assume that the contrivers of this cataclysm were intent on proving Mao's dictum that "there is no construction without destruction." In view of the renewed intensity of the attacks on intellectuals, the upheavals in education and some of the revised economic tactics, it would also be natural to suppose that drastic changes occurred in Peking's policies toward science and technology. Some changes did occur and they will be discussed, but it is probably more important to realize that there has been a remarkable continuity in Peking's attitudes and programs relating to science and technology. In other words, the basic concepts expressed by Mao in his writings have been the core of the philosophy of the People's Republic for 20 years, only the intensity of the propaganda and the strictness with which policies were interpreted and implemented fluctuated with the ebb and flow of political campaigns, which in turn tended to reflect Mao's dominance.

Politics in Command

First and foremost is the idea that politics are in command—and science is no exception. The efforts to convince the scientists that

⁴ For example, Sidney H. Gould, ed. *Sciences in Communist China*. Washington, American Association for the Advancement of Science, 1961; John M. Lindbeck, "The Organization and Development of Science," *China Quarterly*, April-June, 1960; C. H. G. Oldham, "Science in Mainland China: A Tourist's Impressions," *Science*, Feb. 12, 1965; Yuan-li Wu and Robert B. Sheeks, *The Organization and Support of Scientific Research and Development in Mainland China*, New York, Praeger Publishers, 1970; Leo A. Orleans, "Research and Development in Communist China: Mood, Management, and Measurement," in *An Economic Profile of Mainland China*, Joint Economic Committee of the U.S. Congress, Washington, 1967, pp. 549-78. Richard P. Suttmeier, "The Chinese Academy of Sciences: Institutional Change in a Research-Oriented Organization," unpublished Ph.D. dissertation, Department of Government, Indiana University, 1969.

science and politics are inseparable and to compel them to reform, to engage in political study and to adopt a new philosophy of serving the people have persisted almost since the inception of the regime; it was the receptivity on the part of the scientists that tended to vary. After every political drive the more customary patterns of life and organization would slowly creep back into the society and as intellectuals and technocrats would gain the upper hand, the ubiquitous slogans tended to blend into the ever present general political din. When the ideology slipped too far to the right, a concentrated drive would be mounted to shift the emphasis back from material incentives to the illusive satisfaction that was to be derived from correct ideology and political thinking. The Great Leap Forward of 1958 and the Cultural Revolution are, of course, the prime examples of this process but less dramatic campaigns were also undertaken and each time the scientists and other intellectuals had to show greater obeisance to the party or the People's Liberation Army (as the case may be) and to prove their political reliability in both word and deed.

This dilemma of the Chinese Communists in relation to intellectuals is particularly acute vis-a-vis scientists. Whereas in his often quoted essay "On the Correct Handling of Contradictions Among People," Mao himself has pointed out that "China needs the services of as many intellectuals as possible for the colossal task of socialist construction," the regime did not hesitate to attack artists, writers, lawyers and all the social scientists. Accusations and attacks against the physical scientists and engineers have, at times, been just as severe, but because the Chinese leaders well realize to what extent their ambitions for the country depend on the performance of these individuals, this long-standing love-hate relationship was especially painful to all concerned.

Bourgeois Background

Although the overwhelming majority of scientists and engineers are usually said to be "good or comparatively good," most of them are nevertheless the product of a bourgeois society and therefore are also said to have an improper mental attitude, are individualistic, seek personal fame, love objective study, and, most important, are indifferent to politics and to the people. This is more or less in line with Chinese traditional etiquette which considered selfishness and self-glorification on the part of persons of high position as immoral. The Communists substitute politics for manners: "If you have no politics in your head, you cannot free yourself from the trammels of academic studies and personal fame and rewards, and will achieve nothing," they say.

The difficulty of shedding a bourgeois background only complicates the relationship for both the regime and the young scientists. Since despite all the push provided the worker and the peasant, a very high proportion of university students up till the Cultural Revolution were offspring of the more educated urban segment of the population, the problem is a persistent one. For example, "Even some of the younger intellectuals who have grown up in the new society have been partly or wholly corrupted by bourgeois individualism because they have been influenced by outmoded education and traditions and by the ideology of the exploiting class . . ."⁵

⁵ *Kuang-ming Jih-pao* (Kuang-ming Daily), Peking, Mar. 21, 1966, hereafter referred to as *KMJP*.

Public confession or self-criticism, as a partial answer to the above dilemma, is also a continuing phenomenon and not an invention of the Cultural Revolution. Exhaustive confessions of the individual's sins in order to achieve salvation were demanded by the Buddhist religion and it has been an important doctrine in Mao's philosophy. Those who err are urged to "lay bare their mistakes and shortcomings, conscientiously conduct self-criticism, and humbly accept criticism from the masses." Scientists were required to participate in this process and they too examined their shortcomings, pinpointed their ideological errors, and pledged to cast off the handicap inherent in their bourgeois backgrounds or associations.

Applied Science

Peking's current emphasis on the practical application of science—on applied rather than basic research—is not new. In March of 1951 the Academy of Sciences was instructed by the government to make a systematic determination of the requirements of the production sectors of the economy and to gear scientific research toward satisfying those needs. Considering China's tradition in applied rather than basic research, this directive should have been fairly easy to implement, but apparently there is an ever-present tendency on the part of the "revisionist," Western-trained scientists to stray and get involved in research of which the end result may not have a direct or immediate pertinence. To counteract this bias, the reminders never cease but are only periodically accelerated, as during the Great Leap Forward and the Cultural Revolution. The following statement in a 1966 issue of the *People's Daily* is similar to hundreds of others that appeared in the past and have been particularly prevalent since 1966:

All scientific research is for the purpose of developing production and must be integrated with production practice. Subjects for research come from production and results of research without any exception return into production.⁶

Self-Reliance

The policy of self-reliance also was not inspired by the Cultural Revolution, although it became a major drive only after 1959 and the break between the People's Republic and the USSR. Actually, the need for self-reliance has been expressed by Mao on many occasions and was only temporarily muted during the period of Sino-Soviet cooperation. Although originally Mao's insistence on self-reliance referred primarily to the question of how to assume control over China with a minimum of outside assistance, the emphasis on self-reliance during the early 1960's, and particularly during and since the Cultural Revolution, was adapted to the problems of economic growth and development. China was determined that she would no longer depend on foreign science and technology in her program of modernization, but rather would utilize primarily Chinese-designed equipment and components. This would preclude the necessity to scrap a whole machine because of an inability to obtain parts for equipment imported from another country. Furthermore, Mao believed that much of the technology copied from foreigners was too sophisticated for the conditions in China and that there was too much

⁶ *Jen-min Jih-pao* (People's Daily), Peking, Jan. 20, 1966, hereafter referred to as *JMJP*

uncritical copying of everything foreign. As one of the periodic articles on the subject in the *People's Daily* pointed out, many comrades—including leadership comrades—"always 'nodded' to new foreign products and 'shook their heads' to China-made products"; it concluded that "blind adoration of foreign products hinders the creative development of our new products and techniques."⁷

Despite the political diatribes which at the height of the various campaigns expressed unqualified aspersions on everything foreign, the call for self-reliance was not really a demand for scientific isolationism. The more serious articles inevitably included more rational ideas. Representative is an article by a chemist in *Hung-chi*, China's theoretical journal. After the usual lipservice about "blindly running behind foreign countries," he points out that one should not "exclude foreign figures in an unprincipled manner" and "should learn the scientific achievements of other countries."

To the Factory and the Farm

Even the much publicized practice of "sending down" scientists and other intellectuals to work in factories or on the farm—*hsia fang*—is in no sense an innovation of the Cultural Revolution. To break down the traditional Chinese distinction between those who work with their hands and those who work with their brain, the Communists have consistently attempted to force intellectuals to dirty their hands and in this way obtain a certain empathy for the common folk. The first remodeling campaign against the intellectuals was launched in 1951 when many university professors, research scientists and others found themselves in labor reeducation camps—supplementing their "expertness" with an appropriate share of "redness." Even during the period of the First Five-Year Plan, a period of great economic growth, many of the graduates of higher education found themselves sent down to work in the countryside.

The antirightist campaign that followed the blooming and contending of the Hundred Flowers period in 1957 was a major blow against the intellectuals and within a year this campaign blended into the Great Leap Forward with all its anti-intellectual aspects. Political reeducation through physical labor was an integral part of the campaigns and many scientists and other intellectuals were sent down to take part in manual labor and to identify themselves with the workers and peasants.

Because of an increase in authority given the professional personnel—as opposed to Party cadres—and a return to the profit motive, the years between the economic crises of 1959–61 and the Cultural Revolution were relatively good for the scientists and the engineer. The concept of *hsia fang*, however, was ever present, although during these years it focused on getting educated urban youth to the countryside, both for economic reasons and to prevent a reemergence of the social alienation between these budding intellectuals and the masses.

Consequently, when the Cultural Revolution once again brought forth the emphasis on "redness" rather than "expertness" the concepts and demands were not unfamiliar to the intellectuals—only the intensity was new. They acknowledged the thoughts of Mao Tse-tung once again as the supreme guide in scientific work and

accepted the sojourn on the farm or work in a factory in order to be reeducated by the peasants and workers because this action was indispensable to professional survival.

IV. HOW THE CHINESE SCIENTIST SURVIVES

Just as every poor harvest in China precipitates predictions of mass starvation, the periodic intensification of the attacks against scientists likewise brings forth prophecies that science in China will finally be killed by the Communists. Given the continuity in the policies toward science and scientists and the persistence of political pressures against the scientific and technical personnel of the People's Republic, it is the contention here that, whereas literature, the arts, the social sciences indeed suffered a serious setback as a result of the Cultural Revolution, its effects on the country's scientific and technological establishment have not been as great as has generally been assumed. Only the long-range effects—those stemming from the reforms in education which will be discussed below—may be more serious, but even this is by no means certain.

Tempered by Fire

Considering the reported excesses of the Cultural Revolution how is it possible to suggest that its effects on science were not really catastrophic? Keeping in mind the policies and attitudes summarized above, let us look at the developments during the past half-a-dozen years not with a Western perspective, but, rather, from the vantage point of the Chinese scientists and engineers.

Two of the basic laws of nature are very applicable to the scientist in China. First, there is the survival of the fittest. After almost 20 years of recurring thought reforms, surely the ideologically weak species have, by now, been wiped out or, to use their favorite expression, "plucked out." Those who survived prior to the Cultural Revolution surely managed to endure the most recent onslaught as well. Second, not only animals and plants make the necessary adjustments to their environment—the human species is also quite adept at acclimating, even prospering in, what might seem to be a hostile environment. This practical trait of the Chinese people is well known—they are masters at enduring adversities whether of nature or of man. If security and professional activity require reciting the thoughts of Mao or confessing the crime of one's heritage, the pain is certainly compensated by the ensuing salvation.

The Experience of Kuo Mo-jo

Kuo Mo-jo—among other things, vice chairman of the Standing Committee of the National People's Congress, chairman of the Academy of Sciences, and China's top intellectual—is not a common scientist, but because to a slightly lesser or greater degree thousands of other scientists suffered a very similar process during the cultural revolution, his well-publicized experience is worth relating. In early May of 1966 Kuo made a public confession that was reported around the world. In his criticism of his past actions and thoughts he said:

In the past scores of years, a pen was always in my hand, writing and translating works amounting to many millions of words. However, in the light of present-day

standards, what I have written, strictly speaking, should all be burned. It has no value—none whatsoever.⁸

The reason for his inadequacy was, of course, the fact that he had not studied Chairman Mao's thinking as he should have.

When this confession was published around the world, many assumed that this was obviously the end of Kuo Mo-jo. Only 2 weeks later, however, he told a leading member of the Japanese Liberal-Democratic Party who was visiting Peking that he did not anticipate any changes in his position or his role, pointing out that "self-criticism is important in China, especially within the Communist Party. Thus my self-criticism is nothing new. I do not believe one's activities will be stopped or position changed each time he engages in self-criticism. I will continue with my efforts."⁹ He was right. Although under considerable pressure during the Cultural Revolution, he survived and continues to be a leading member of China's scientific and cultural community. His story is by no means unique.¹⁰

Common Sense and Understanding

Most important from the individual scientist's point of view is that, despite the name-calling and the vilification, he knows his own worth and importance to the regime and, between the attacks on his person, he is told just that in no uncertain terms. The more bitter the attacks, the more likely are the balancing statements emphasizing the need for the expertise of the scientist. Even as in former years, it is not difficult to find appropriate examples published since the Cultural Revolution. For instance in 1971:

The participation of engineers and technicians is indispensable in designing industrial products and laying out technical processes, in trial-producing new products, in technical innovations, in scientific research, and so forth. A multitude of facts fully prove that the masses of engineering and technical personnel are useful, not useless.¹¹

Or, also in 1971, the Revolutionary Committee of the Coal Research Institute in Fushun reached the conclusion (no doubt after some lengthy and tedious discussion) that "intellectuals were not a burden but a precious asset for the cause of Socialist revolution. Without the participation of intellectuals, our cause of Socialist revolution and construction could not be victorious."¹² All this is obvious and funny to us, but we should also give the Chinese engineer and scientist some credit for common sense and a sense of humor. Most likely he too considers the above obvious and funny.

He is also wise enough to understand Peking's dilemma and to appreciate why there are these attacks against him and his knowledge and how they are being utilized by the regime. He knows that China has been "walking on two legs," therefore, in addition to making a significant investment in science and technology, increasing the size of the scientific and technical manpower pool and in general expanding the bona fide scientific and technological establishment, she has yet

⁸ *JMJP*, May 5, 1966.

⁹ As reported in the *Japan Times*, May 17, 1966; see FBIS Daily Report: Communist China, May 17, 1966. Hua Lo-keng represents a good example of the experience of an internationally recognized scientist. Trained in Cambridge University and the University of Berlin, this mathematician came under such fierce fire during the Cultural Revolution that many thought he would never reemerge. He did, however, and ended up at Mr. Nixon's table during the President's visit to Peking.

¹¹ New China News Agency, June 7, 1971, hereafter referred to as NCNA. All the NCNA citations are from FBIS daily reports.

¹² *KMJP*, Oct. 6, 1971.

another goal. Mao is convinced that true modernization can never really be achieved unless the general level not only of the workers, but of the peasants as well, is raised to a reasonable level of skill and technical common sense. When Mao says "The lowly are the most intelligent, the elite the most ignorant," he is trying only to increase the self-confidence of the masses and is using the backs of the intellectuals as stepping-stones to reach his objective.¹³ He knows the value of scientists and he also knows that they will withstand the abuse. That is why Chinese press and radio continue to tell the people:

What in the world is science? All sciences and technology are the result of the wisdom and talents of the working people that have been summed up and proven correct in practice. Foreign countries have sciences and technology, so does China.¹⁴

The downgrading of Western-trained scientists seems to be an effective adjunct to the other policies and programs directed at raising the technical awareness of the Chinese people.

Western adulation of science and scientists is also not compatible with the treatment that is implied in the sending of scientists to work among the masses. Here too, however, it is not the intent of the regime to bury true scientists in the soil any more than it believes that scientific genius will somehow spring up from the soil. It is important to realize that scientists are sent down to the farm or the factory essentially to pursue their specialization—but pursue it in terms of specific needs of the economy. Who goes to work in the rural areas? Primarily scientists from the institutes of agriculture, veterinary sciences, plant genetics, botany, and other institutes, who in one way or another can make a direct contribution to the productivity of the peasants and, yes, perhaps even learn from them. The scientific and technical personnel whose work is more relevant to industry and the urban economy are sent to work with the workers in a factory or other enterprise. For example, in December 1970 one newspaper reported that some members of the Botany Research Institute went to a vegetable station and succeeded in finding a new method for storing persimmons longer without spoilage, while members of the Physics Research Institute went to a grinding wheel plant in the city and mechanized the operation of wheel turning, which had been done by hand before. These are not permanent assignments; usually they require only a few weeks to a few months away from the home base. Whether it is fair to contend that the atmosphere is unfavorable to serious research in China depends on the definition of the latter term. To the Chinese, practical research that supports production is serious research.

There is another aspect of the problem that should be considered in any discussion of how the Chinese specialists themselves may be reacting to Peking's policies. It is difficult for us even to imagine this possibility, but isn't it conceivable that a significant proportion of the scientists actually support those actions of the regime which seem to be directed against them and see a certain validity to the approach in terms of the economy and the future of the country? After all, the overwhelming majority of them have not been trained outside China and are rather a product of the system, and economic, social, and political contradictions are not uncommon in any country that is making rapid technological strides.

¹³ In our society, the "Black is beautiful" slogan perhaps serves a similar purpose.

¹⁴ NCNA, Aug. 28, 1970.

Even looking at China from the outside it may be posited that given the level of economic development and the existing priorities, Peking's concept of what the scientists' role should be is not entirely unreasonable. In the United States, where funds for basic research have been plentiful, sweeping changes are now contemplated by the Government: "Research in the United States is about to undergo a basic change in which far greater emphasis will be placed on quick and practical benefits to society."¹⁵ If the budgetary squeeze is affecting science in America, then China can certainly ill afford the luxury of having her scientists spend their time on basic research as long as there is so much to be done in terms of contributing to the country's immediate needs. Despite vocal encouragement of self-reliance, the Chinese are well aware that scientific advances and breakthroughs can be borrowed from other countries but a recurring problem with a particular machine or a requirement for a new insecticide have an immediate adverse effect on the economy. Even original or basic research is not out of the question. The only stipulation made is that this type of research again be chosen from the needs of production or for the benefit of the people rather than from an abstract interest.

The one consequence of the Cultural Revolution considered to be the most disturbing in terms of the scientists and most disruptive in terms of the sciences was the stationing of units of the People's Liberation Army (PLA) in the Academy of Sciences and many of its institutes. Placing military representatives in scientific institutions in ludicrous and undoubtedly damaging to any professional activity, but there is the inevitable "but." The "aid-the left" or "three-support and two-military" personnel, as they are generally known, seem to have been stationed in virtually all the industrial, construction, communication, finance, trade, cultural, and educational "units" of any size, as well as at the brigade level in agriculture. They were there to take the place of the Communist Party members who exercised controls prior to the Cultural Revolution, and whose role was severely damaged. The two main functions of the PLA representatives were the administration of the institutions and a responsibility for correct political philosophy of the personnel of these enterprises and establishments. In that sense their role was not too different from that of the party representatives who, for the first 16 years, were accused of stifling research at the academy. True, some of the scientists were themselves Party members, but seldom a year passed without a reported tug of war between the party and the scientists.

Undoubtedly at the height of the Cultural Revolution there were serious "differences" between the scientists and the new military administrators. With the gradual normalization of conditions in China, however, the role of the PLA is on the decline, particularly in science, where these military administrators do not have the necessary background to involve themselves in any day-to-day work-related activities of the members of the scientific institutions.

Sometimes we tend to overreact to words and, in so doing, not look beyond them. We have finally become accustomed to China's flamboyant language in the field of foreign relations and few people take seriously Peking's statements of how China will smash American imperialism and Soviet revisionism. The same restraint and common

¹⁵ *The Washington Post*, Jan. 2, 1972.

sense must be exercised when reading statements relating to domestic problems and policies. Anthony Wedgwood, a member of the British Parliament and a recent visitor to China, pointed out that literal translations from Chinese often make nonsense of ideas that are common to both societies and that the only thing to do is to "listen patiently while these concepts wash over you and gradually, as you get familiar with them, an understanding of what they mean comes naturally."

It is certainly true that many scientists have spent time in the so-called May 7 cadres' schools which went up in the countryside—"the largest classroom with the best teachers"—to provide for ideological remolding, but these were temporary assignments. It is also true that even now scientists and engineers continue to spend a proportion of their time on the farm or in a factory. But references to scientists engaging in "scientific activity side by side with the worker comrades" should not shock the reader. The scientist is there primarily as a teacher, although it is not inconceivable that in the process of this forced contact, he also learns something and, within the new system of priorities, is better able to support production. The point here is that, except perhaps during the most militant periods, the scientists are not normally abused. Thus, the seemingly unrestrained attacks against his Chinese colleagues are likely to be much more painful to the Western scientists who read them out of context, than to the object of the abuse who probably has become quite immune through exposure and who is pursuing his daily responsibilities, if not with enthusiasm, then at least with discerning acquiescence.

V. EDUCATION AND MANPOWER FOR SCIENCE AND TECHNOLOGY

The effects of the Cultural Revolution on China's education were drastic; schools cannot be closed for 2, 3 or 4 years without some unfortunate consequences in the training of important manpower resources. There have been many changes in the regime's philosophy toward education. The latest developments are still unfolding and until the resulting system stabilizes, any evaluation is understandably speculative. Nevertheless, it can be said that the most drastic suggestions proposed during the Cultural Revolution are no longer being expressed. Relevance is now paramount, but some theory is admitted to be necessary; children from all sectors of the society should have an equal opportunity to advance in school, but well-prepared, bright students are still preferable; students should have a voice in their education, but orderliness in classrooms and respect for teachers are expected of all; and so forth. Even in the innovations brought about by the Cultural Revolution it is possible to discern a certain continuity between the old and the new systems.

On the whole, it must be admitted that until 1966 Peking deserved a decent grade in the general approach and achievements in education. Despite periodic disruptions and ventures into uncharted pedagogical waters, China has managed to create and operate a system quite suitable to her conditions and goals. Because she was able neither to provide the hundreds of millions of people with a first-rate education nor to utilize a uniformly well trained labor force, she advanced on "two legs." She encouraged an atmosphere of learning, made literacy

among the masses one of the primary goals, managed to elevate the overall educational level of rural youth, and trained adequate numbers of middle-level specialists and technicians; at the same time, she did not neglect the economy's requirements for higher level professional personnel, particularly engineers and scientists. China consciously elected to emphasize the training of specialists, rather than those with a broad academic background. This was true at the higher education level, where thousands of specialists were graduated from 2-year schools in engineering, medicine, economics, and so forth, and it was also true at the secondary level. Various referred to as vocational, specialized, or technical, schools were set up at the secondary level to train youth in such fields as "engineering," agriculture and forestry, public health, and finance and economics. Although after 1958 most of this type of training was taken over by production and service organizations running the work-study or on-the-job training programs, the training of the secondary level specialists continued to be an important aspect of the Chinese educational system.

The Cultural Revolution

Despite the fact that in early 1966 the educational system was moving forward and quite adequately meeting the growing needs of the country's expanding economy, Mao apparently saw quite a different picture—one that greatly displeased and worried him. Concerned, among other things, about the built-in advantages enjoyed by the children of better educated urban parents and convinced that education was once again slipping away from the people to the professional teachers, technocrats, and even party leaders with bourgeois ideas, he decided to shake up the educational system.

The essential reforms proposed by Mao at that time may be summarized briefly as follows: (1) Abolish the old university entrance examination system to overcome the advantages which accrued to children from cultured and prosperous families; (2) shorten the curriculum at all levels of education and place much more emphasis on political indoctrination and military training; (3) integrate study with productive labor at all schools and all levels; and (4) eliminate all theoretical study and research which are not an integral part of a production effort. In order to revamp the schools, he closed them—to carry the educational revolution through to the end—and concomitantly utilized the released students as shock troops—little warriors—of the Cultural Revolution, better known as Red Guards.

For a year or more, the Red Guards had a very busy schedule indeed, but when it was time for them to return to school, Mao found that it had been much easier to close the schools than to reopen them. The most important problem was in getting youngsters who had experienced the freedom and prestige of being Red Guards to return to their classes: "Some of the students seemed to enjoy greater freedom being out of school, while some, though having returned to school, could not sit down quietly, due to an inadequate sense of organizational discipline. Under such conditions, the smooth progress of 'making revolution by resuming classes' was seriously affected."¹⁶ The teachers also were a problem for they were afraid of renewed attacks against them: "Some teachers still harbor certain worries

¹⁶ NCNA, July 12, 1967.

about joining the students in opening classes and making revolution there. Some . . . are afraid that the younger revolutionary fighters will not trust them, and others are afraid to expose themselves by expressing wrong views.”¹⁷ In addition to the delays caused by students and teachers, there were also the time-consuming effort of revising old textbooks in line with the new philosophy, and the very basic problem of trying to agree on the format of the new educational system and on what was to be taught. As a result, the reopening of schools was spread over several years; in general, the higher the level, the later the school opened.

By the fall of 1970 most of the eligible children were again attending primary and secondary schools and by the fall of 1971 about one-quarter of the institutions of higher education were in operation. The broad guidelines and general principles issued from Peking were implemented, but since most of the decisions as to the nature and content of education were to be worked out at the local level it is impossible to describe the structure of the still evolving system except in general terms. Curricula at all levels now stress the ideological and vocational, downplay traditional academic training and, depending on the type and location of the school, include productive labor in field or factory. The length of study at the primary and secondary levels has been reduced throughout the nation, but because of continued experimentation which takes into consideration “actual conditions” within the local school districts, a great diversity exists. In some localities the 6-year primary and 6-year secondary schools have each been shortened by 1 year; in many areas primary and junior middle schools were merged into 7 years of instruction, with senior middle schools (where available and on a selective basis) to provide an additional 2 years of instruction; some schools are experimenting with 4 years for both primary and middle school students; and undoubtedly other combinations are also being tried. Thus, where it is available, precollege level education may range anywhere from 8 to 10 years.

A description of the educational system in one county in Shansi Province appears to be typical of the country as a whole.¹⁸ Five-year primary education is universal in this county, and many production brigades have introduced 7-year education. There are, however, only 11 senior middle schools in the county which constitute 4 percent of the total number of schools. Primary schools can be found in every village, and junior middle schools in every people’s commune; presumably 95 percent of the school-age youth are in school—a figure that undoubtedly refers to kids of primary school age. Except for teachers’ salaries and part of the maintenance costs which are provided by the state, primary and middle schools are now responsible for all other expenses. If these figures are, in fact, representative of the country, then the proportion of school-age children in school is higher than it has ever been in the past.

Evaluation of Precollege Education

As of the end of 1971 China’s educational system was still undergoing changes and still experimenting, but some tentative evaluation

¹⁷ NCNA, July 13, 1967.

¹⁸ *Peking Review*, Nov. 12, 1971, pp. 20-21.

on how primary and secondary schools are meeting the country's needs may be attempted.

Just as there was during the Great Leap in 1958, there is now a proliferation of education and a large proportion of the population is participating in some form of part-time learning or training process. By stretching the definition a little, almost everyone over 5 years of age may be termed "a student." How many kids are actually going to school, however, is almost impossible to estimate, and because of the decentralized controls and the multiplicity and variety of educational units, it is doubtful if any accurate statistics will become available for some time.

One conclusion that would be difficult to dispute is that the Cultural Revolution brought about an improvement of education in the rural areas and that the expanded rural system goes hand-in-hand with the changes that have taken place in the economic sector of China—the increasing number of small local industries in the countryside. Aside from the shift away from the cities, the training of China's middle-level scientific and technical personnel has not changed too drastically. The reason for this is that most of the secondary schools were always oriented toward vocational study, just as they are now. Even the reduction in the combined primary and secondary education from 12 to 9 or 10 years does not constitute a major change, since most students who participated in secondary education never went beyond the junior level, for a total of only 9 years. Considering the greater number who are now going beyond the primary school and the practical experience they get in production, China should be able to produce adequate numbers of low- and middle-level technicians for agriculture, for local industries, and even for the urban economy.

The schools that have been most affected by the reduced and changed curriculum are the full 6-year urban secondary schools that graduated the bulk of the entrants to the country's comprehensive universities. And this brings us directly to the problems of higher education—where is it now and where is it going.

Higher Education

It is particularly difficult to evaluate the post-Cultural Revolution educational reforms as they pertain to higher education and their effects on China's requirements for professional scientific and technical manpower. The changes are quite drastic and need to be examined in some detail. It is important to emphasize once again that much experimentation continues in higher education and that the existing differences between individual institutions are an integral part of the still developing system.

Because of the turmoil and confusion during the preceding 2 years, it is not surprising that Mao Tse-tung found it necessary to issue a directive in mid-1968 declaring that "it is still necessary to have universities; here I refer mainly to colleges of science and engineering." Although a few schools were opened during the next year—most worker-type colleges established by industrial enterprises—it took 2 more years for the first of the regular universities to resume classes. The delay was caused by the need to determine what will be the new role of the institutions of higher education and how they will perform that role. Each university set up a Revolutionary Committee which

was composed of representatives of the party, the workers, the old professors, the students, and the PLA. It was the Committee's task to determine what will be taught, by whom and to whom, and how the educational process will operate.

In conjunction with the opening of the old universities, the Great Leap Forward notion of school-run factories and farms or factory- and farm-run schools was reintroduced. Along with their regular classes, colleges and universities were required to offer short-term and part-time training courses—also a throwback to the Great Leap period. In addition to breaking down the barriers between mental and manual labor, the integration of education with production was to imbue the teachers and students with the qualities of self-reliance and harden them through arduous struggle.

In practice it seems that the school-run factories and workshops are more successful than the reverse. The reasons are quite understandable. Factories, whose main concern is production, consider the running of schools as secondary, especially since there is a feeling that schools tend to detract from the production effort. Factories also are not too anxious to recommend deserving workers for schooling, since the deserving workers are also the best producers: “. . . some workshops do not let their good cadres go (to school), which is a manifestation of departmentalism.”¹⁹ On the other hand, the school-run factories not only do not disrupt production, but actually add to it. Most of the school workshops are of only marginal economic significance, but in some cases their production is actually included in the state plan. Here too, however, some tensions arise because the schools still have to rely on some help from production units. For example, one school approached the Chemical Industry Bureau for assistance in the operation of their workshop, but the Bureau was “not interested in our work” and “when it came to requests for raw materials, the answer was ‘sorry, no.’”²⁰ On the whole, however, the school-run factories seem to be operating fairly successfully. They turn out some products for local consumption and, even more important from a practical point of view, they are putting machines and equipment of colleges of science and technology (some of which might be considered obsolete for economical use by industry) to productive utilization.

The Curriculum.—Although earlier reports indicate that the period of study at institutions of higher education may be reduced to anywhere from 1 to 3 years, most of the universities now open usually call for 3 years for science and engineering courses and 2 years for most of the other disciplines. This reduction is not quite as drastic as it might seem at first glance, because a significant proportion of the graduates were products of less than full 4-year higher education even before the Cultural Revolution.

To accommodate the revised curriculum and to make teaching materials revolutionary, critical, to the point, and adapted to local conditions, all the courses and textbooks were critically evaluated and revised. The curriculum was worked out jointly in each class by the students, the professors, and the pedagogical revolutionary section of the Revolutionary Committee. It was then discussed by the entire Revolutionary Committee before it was submitted to the university party committee for ratification. Because each university essentially

¹⁹ NCNA, July 22, 1970.

²⁰ NCNA, July 22, 1970.

went through the same process independently, the hours and courses now vary from school to school. In this connection the *Red Flag* noted one amusing complaint: "On the question of curriculum in some departments, teachers who are good at theoretical knowledge stress that theoretical research should be emphasized in the course; those teachers who specialize in computers stress that computers should be developed, and those teachers who want to change their jobs say that courses should be canceled altogether."²¹

One visitor reported the following distribution of time at Tsinghua University, an approach which seems fairly realistic and probably typical: "In general, 15 percent of the class time goes to studying the thoughts of Mao, 70 percent to professional study including practical work, 5 percent to agriculture, and 5 percent to military training."²² Considering the decline of the Mao cult in China, the 15 percent of the time allocated to the study of Mao's thoughts has probably been reduced and should be more accurately referred to as "political study." Such slogans as "unrelentingly condemn the revisionist opium of 'academic education above all,'" are no longer common in China; rather, one sees the following complaints: ". . . some schools have completely ignored the intellectual education of their students, and in their commitment to stress labor they have gone to the other extreme in that they have paid no attention at all to classroom teaching and textbook knowledge."²³ In other words, there definitely seems to be an effort to reach some sort of happy medium between academic education and the other prescribed activities.

The Teachers.—So much has been reported about the purges of university professors that the reader might be bewildered by the statement indicating an overwhelming majority of the staff has been recycled and reinstated. According to one report, 95 percent of those who were teaching at Tsinghua University in 1966 are teaching again, and the hope is to raise this number to 98 or 99 percent.²⁴ Perhaps Tsinghua is not typical because its staff is unusually qualified, but it must be remembered that the Chinese do not believe in wasting scarce human resources and that every effort is being made to rectify the fallen.

A new type of instructor has also been introduced into the institutions of higher education. The integration of study with production was accomplished not only by having the student spend time working either in a school-run factory or an outside production enterprise, but also by bringing worker, peasant, and soldier teachers into the universities. The key question is: What is the role and the authority of these individuals? For the most part, they seem to be the more experienced and the more knowledgeable workers and peasants. Their mission is not only political—to strengthen the ties between university and factory—but also to bring some practical knowledge to both the student and the old-style professor, and to help them incorporate this experience in new educational materials. Accordingly, ". . . students invariably approach the workers while engaging in on-the-spot study in the factories and the teachers while studying in classrooms."²⁵ Furthermore, there are almost invariable balancing statements in support of the professionals: "The original teaching staff is indis-

²¹ *Hung-chi* (Red Flag), No. 10, 1971. FBIS, September 7, 1971.

²² A. Cassell, "The Revolution in China's Universities," *Le Monde*, Paris, February 1971. What they do with the remaining 5 percent of the time remains either a mystery or a typographical error.

²³ NCNA, May 14, 1970.

²⁴ A. Cassell, "The Revolution in China's Universities," *Le Monde*, Paris, February 1971.

²⁵ NCNA, May 14, 1970.

pensable . . . We should see that their old system must be destroyed but some of their professional knowledge of the natural sciences and some of the experience they accumulated in the past still have a role to play once such knowledge and experience are placed under the leadership of the correct line and are integrated with production."²⁶ Looking at the emphasis and chronology of the written word, it seems quite clear that, excepting any specific technical contribution they might be able to make, the role of the revolutionary teachers is on the decline.

The students.—The Cultural Revolution had its greatest impact on the genus of college student. Mao's complaint that prior to the Cultural Revolution higher education was primarily for the urban elite is basically valid. For the most part only the graduates of urban secondary schools (in practice, college preparatory schools) attained the necessary background to pass the entrance examinations in order to be admitted into one of the major universities. As late as the mid-1960's, after 15 years of the regime's trying, only about one-half of the students in institutions of higher education came from worker-peasant background, and most of these were probably enrolled in the specialized colleges which had only a 2-year curriculum.

Since the reopening of institutions of higher education the requirements for admission have been changed. Entrance examinations have, in fact, been abolished and prospective college students must have first contributed at least 2 years to production. They are selected (often elected) from among the young workers, peasants, and discharged soldiers, as well as from among some of the "intellectual youth" who were sent down to the countryside during the Cultural Revolution. Thus, among the new contingent of students at Tsinghua University, referred to as a model, 45 percent are workers, 40 percent are peasants, and the remainder are from the People's Liberation Army. To be admitted, they all had to present a written account of their practical experience and demonstrate their analytical capability.²⁷

Chinese sources leave no doubt that "the marked incompatibility arising out of the uneven cultural standards of the students" has created a problem.²⁸ Some students with higher cultural standards said they did not have enough to occupy their time, while those with lower cultural standards were having trouble keeping up. This should have been completely predictable and although the regime claims to be adamant against the creation of separate classes for people with different qualifications it will surely be forced to cope with the problem. The "red pairs" concept in which better students are supposed to help those who do not have the background or the capabilities has been discussed for some time. A more important departure from the ideas of the Cultural Revolution was expressed in Red Flag: ". . . for a certain period of time teaching should be carried out with different lessons and requirements for different students in accordance with their actual levels, and a number of students should be given supplementary lessons on basic theories."²⁹ This is obviously the first step in accommodating "achievers."

²⁶ *Hung-chi* (Red Flag), No. 8, 1970, FBIS, July 23, 1970.

²⁷ A. Cassell, "The Revolution in China's Universities," *Le Monde*, Paris, February 1971.

²⁸ *Hung-chi* (Red Flag), No. 6, 1971.

²⁹ *Hung-chi* (Red Flag), No. 10, 1971; FBIS, Sept. 7, 1971.

Some Perspective on Higher Education

It is still a little early to attempt any definitive evaluation of China's higher education in science and engineering since the Cultural Revolution—the shaking down process continues. Nevertheless, some trends are evident and what seems to be emerging is neither as bad as some critics would have us believe nor as good as members of the “nothing-is-ever-wrong-in-the-PRC” school maintain.

Those who see only what is wrong can rightly refer to the stream of intense abuse directed at the teachers, students, curriculum, and all other aspects of the old educational system during the Cultural Revolution. They can point to what happened to the study of humanities, which was singled out for special criticism, survived the attack, but continues in a rather delicate condition. The qualifications of the new college students and the “revolutionary teachers” certainly do not lend themselves to academic excellence. Is it not reasonable, under the circumstances, to come to the conclusion that China's educational system and intelligentsia suffered “an irreparable blow during the Great Proletarian Cultural Revolution”?

Admittedly the regime seems to have done everything possible to support the critic of the new educational system, at the same time making it difficult to find an adequate defense for the changes that have been implemented. It is possible to find a rationale, however. Furthermore, it is important to do so, because the alternative is to assume that China is bent on suicide and that, we can all agree, is unlikely. China's education has been shaken to its foundation, just as Mao intended it to be, but if the current setup is viewed within the context of China's needs and priorities, rather than in relation to what education is in the West, it does not seem to have suffered an “irreparable blow.” China will “make it”—she always has.

Actually, all the reasons in support of this contention have been discussed or alluded to in the text—only a brief summary should suffice. First there is the matter of goals. Because China knows her own limitations, she has no intention of competing with the world in the fields of advanced science and technology except on a selective basis and, as a general rule, she is content to borrow and adapt the existing knowledge. If discoveries of international significance or interest develop, so much the better, but the priorities are elsewhere. Peking is attempting to educate and train as many people as possible who can quickly fit into a production process that emphasizes small and medium enterprises and the utilization of local resources.

China also has a modern industrial sector which should require more qualified personnel. But, as already mentioned, even this sector managed to function with a large proportion of engineers who were the product of less than the full 4-year colleges. In 1955 only 56 percent of the chief engineers and high level technicians in China were college graduates; only 16 percent of the engineers and technicians; only 5.7 percent of the nearly 15,000 top level industrial management personnel.³⁰ These proportions have increased since then, but they are adequate to prove that the People's Republic has been able to show economic growth despite a limited pool of manpower with completed higher education.

³⁰ John P. Emerson, *Nonagricultural Employment in Mainland China: 1949-58*, U.S. Bureau of the Census, Washington, U.S. Government Printing Office, 1967, p. 465.

What about the top of the educational pyramid? Surely every country, no matter how pragmatically oriented, needs some scientists of the caliber that were educated in the West or in Japan before 1949 or in the Soviet Union before 1960; and who for 15 years provided the top leadership in science and technology. Will the new system be able to produce persons at this level of professional competence? Although on the basis of the information now available there is no way to avoid a negative answer to this question, there are two important factors to consider. First, the Chinese have for years been using a type of apprentice approach to train top level people. As a matter of fact, for many years the standard Chinese alternative for graduate study was assigning bright young students to work with recognized older scholars and specialists. There is no reason why this approach should not at least partially fill the void left by the reduced formal requirements in higher education. Second, there has been a distinct trend away from the more radical ideas of the Cultural Revolution and toward the inevitable recognition that theoretical knowledge and book learning in general must supplement practical experience.

In other words, during the Cultural Revolution China was at the nadir of one of her periodic political and economic cycles; the closing of schools left a certain void in the training of high-level professional manpower that will unquestionably have some lasting effects, but the present halting adjustments will, eventually, result in an acceptable compromise between ideology and expedience.

Educational Achievement—A Numbers Game

Having discussed the policies and problems posed by the Cultural Revolution in the field of education and the training of specialized manpower, is it possible to present a quantitative assessment of the educational achievement of the manpower now available to Peking? Since there is such great economic reliance on the middle and lower range of technical personnel, can an estimate be made of not only the number of persons who have completed higher education but also the number of those who have a primary and secondary education? The difficulties involved in any such exercise are almost insurmountable. First, there has been vitually a complete void in statistics on education (particularly the precollege level) in the People's Republic of China for over a dozen years. Second, and even more important, with the exception of the 1950's, education on the Chinese mainland has been "walking on many legs." This means that there has been a multiple approach to education; not only have there been many different types of schools, but the whole system has been undergoing continuous major organizational changes with the accompanying changes in the prescribed content and length of the curriculum. Thus, depending on the school and the years in which he attended it, a child could complete the primary school in his locality after 3, 4, 5 or 6 years; secondary education, after anywhere from 2 to 6 years; and higher education, from 2 to 4 or more years. Even were statistics available, meaningful analysis of the level of development of the graduates of such a multifarious system would be extremely difficult; without adequate statistics, it is a flight of conceptual fancy.

EDUCATIONAL ACHIEVEMENT IN THE PEOPLE'S REPUBLIC OF CHINA, BY AGE AND SEX, 1970

[In thousands]

Age	Higher ¹			Secondary ²			Primary ³		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
10 to 14							29,000	15,000	14,000
15 to 19							53,000	29,000	24,000
20 to 24				6,700	4,350	2,350	30,300	17,650	12,650
25 to 29	270	181	89	11,830	8,289	3,541	8,900	4,530	4,370
30 to 34	910	637	273	7,690	5,813	1,877	4,600	2,810	1,790
35 to 39	396	289	107	3,404	2,751	653			
40 to 44	201	151	50	2,699	2,469	230			
45 and over	100	80	20						
Total	1,877	1,338	539	32,323	23,672	8,651	125,800	68,990	56,810

¹ All persons who have completed at least 2 years of higher education.² All persons who have completed at least 2 years of secondary education.³ All persons who have completed 6 years of primary education.⁴ Includes all persons 30 years of age and over.⁵ Includes all persons 40 years of age and over.

Note: See appendix for methodology.

Nevertheless, because China's economic prospects to a large extent depend on the progress that is being made in education, a set of estimates is offered in the accompanying table for those who might find them useful. Although this effort may be more an aspect of guts than proficiency, those who wish to follow the methodology may find a certain legitimacy in the estimates and, hopefully, agree that the suggested figures may even be in the elusive "ball park."

Some of the figures in the table may look odd and require explanation, particularly the small number of primary school graduates in comparison with secondary graduates. There are several factors responsible for this. Anyone with less than a completed primary education was excluded; therefore, only persons who had completed the full 6 years of primary school are included. Since many rural primary schools have shorter than a 6-year curriculum, there is a considerable difference between the number who have attended elementary school and the number completing the full 6 years. On the other hand, anyone with at least 2 years of secondary education was included in the figures on secondary education. Furthermore, in an effort to avoid double counting, graduates from secondary schools were not included in the primary education columns; graduates from higher education were likewise excluded from both the secondary and primary education graduates. The small number of primary graduates 25 years of age or older reflects the limited educational facilities in the pre-1949 period and the lower enrollments in the early 1950's, while at the same time the expanding secondary schools were enrolling a large proportion of persons with completed primary education. It should also be noted that all the estimates are based on a 1970 population of 750 million,³¹ and that no effort is made to account for mortality among the younger graduates—a minor point in comparison to the other assumptions.

As for the number of bona fide scientists and engineers, an estimate can be made with reasonable confidence. It is estimated that in mid-1970 there were 600,000 engineers and 110,000 scientists in the People's

Republic.³² Perhaps as many as half of the engineers have had less than 4 years of college, but most of the scientists finished the standard curriculum. Thus, engineers constitute over 30 percent of the total number of persons with completed higher education and scientists, close to 6 percent. Although it is too risky to carry these estimates forward, undoubtedly the overwhelming majority of college students are now enrolled in the technical and scientific fields.

VI. SCIENCE AND TECHNOLOGY IN PRACTICE

Since science and technology are now so directly related to production, it is necessary to look at China's economic plans and activities in order to get some indications of the priorities assigned to the scientific and technical personnel over the past half-a-dozen years. First, it should be repeated that China has no systematic, planned basic research in the sense that that term is understood in the West, only accidental basic research. There is no work done with the sole aim of achieving a fuller understanding of a subject; that resulting knowledge will be applicable to production is a prime requirement prior to initiation of research.³³ Furthermore, under present conditions there is no reasonable way to measure research and development (R. & D.) from the outside, and it can safely be presumed that there are no data on R. & D. *per se* even inside China.

The fact that there is no basic research and that there is no way to measure research does not mean that there is no R. & D. in the country. On the contrary, there is great emphasis on applied R. & D. which now falls under a single rubric: "innovation." Chinese reports claim that literally thousands of new products are being "innovated" every year by both the scientist and the pseudoscientist. The "fighter" (member of the PLA) who has come up with a new feed for pigs, the peasant who has "discovered the law governing the growth of peanuts," the worker who invented a drill "which surpasses the world's advanced level," and the scientist who is responsible for an X-ray spectrophotometer are all scientific innovators. For that matter, so is the chap who may have devised a better way of stacking lumber.³⁴

The emphasis on indigenous worker-peasant science and on innovations and, conversely, attacks on foreign bourgeois science do not mean that Western research is ignored. On the contrary, they keep close watch over all new technology and in Peking's view there is no contradiction here:

We oppose the traitorous policy of "imports first" but at the same time we do not want to deny the necessity of importing technical know-how. We want to make a conscientious effort to learn about anything that can be adapted to the needs of our country and to absorb experiences useful to us. However, we must plan our policies keeping our own strength in mind. Under no circumstances should we abandon the principle of self-reliance and become dependent on foreign countries.³⁵

³² On the basis of both reports and conjecture, it was estimated that between 1949 and 1966 Chinese institutions of higher education graduated 577,840 engineers and 98,387 scientists (L. A. Orleans, "Communist China's Education: Policies, Problems, and Prospects," *An Economic Profile of Mainland China*, Joint Economic Committee of the U.S. Congress, Washington, 1967, p. 511.) The estimates included here generally take into account the number of scientists and engineers who were in China prior to 1949, those few who managed to complete their education after 1966, and a modest level of mortality covering the whole period.

³³ One of the few exceptions to this rule is in the field of medicine where all advances will directly serve the people and relevance requires no justification.

³⁴ One interesting product of R. & D. was reported by a commune farm tools factory which invented a chopsticks washing machine which is able to wash 400 pairs of chopsticks every 3 minutes (*Hueh K'o-hueh* [Study Science], No. 8, April 1960)—undoubtedly, something every Chinese home should have. On the other hand, an impressive array of advanced products may be viewed at the Shanghai Industrial Exhibition and at the annual fairs in Canton.

³⁵ NCNA, Nov. 3, 1970.

By adhering to this policy and by combining "scientific research, production and application," it is professed that China will take its own road of scientific development which will "in the near future" make it possible to "catch up with or surpass the advanced world levels" in science and technology.

Activities in Rural China

The current reliance on the technician more than the scientist and on innovation rather than on laboratory research goes hand in hand with the economic policies and programs of the PRC. The policy designating agriculture as the foundation for the development of the national economy was introduced in 1961 following the failure of the Great Leap, and it was strongly reaffirmed throughout the Cultural Revolution. In conjunction with the emphasis on agriculture was the drive to establish a network of small supportive industries, based largely on local resources, but also drawing on talent and equipment from urban industries. Often little more than workshops, local industries have flourished over the past few years and seem to be providing rural China with an ever larger share of chemical fertilizers and cement, farm machinery and implements, generators and transformers, and a variety of spare parts, as well as other products to meet the economic and consumer needs of the countryside.

From the Western point of view, many of these local industries may seem inefficient and even wasteful, but for a country with limited resources and with well over 600 million people living in the rural areas, it is an approach that makes sense not only in terms of productivity but, perhaps even more important, in terms of manpower utilization. For the past decade the authorities have realized that, given the conditions in China, the development of the urban economy could not possibly absorb the excess rural manpower; a more feasible solution was adopted, that is, develop the countryside. Thus, millions of peasants, young and old, supplemented by other millions of recent urban migrants, are now busy building or working in these small factories and workshops, either on a full-time or part-time basis. This means, of course, that the new generation of Chinese youth must be provided with skills and technical know-how which were previously nonexistent. It means that the new rural schools which stress practical education—agricultural techniques and vocational training—must be designed to dovetail into the rural economy. It explains the significance of having urban professional and skilled personnel spend a portion of their time working in the rural areas. It also means that the scientific and technical know-how (unsophisticated as it may be) now present in the countryside is, in fact, reflected in a considerable amount of experimentation and innovation in support of both agriculture and local industry.

It is also important to point out that the "new look" in rural China extends beyond the developments in agriculture and the local industries designed to meet the needs of agriculture and the peasants. Presumably guided by concern over international tensions, there has also been a trend of dispersing industries by moving relatively high technology plants out of the cities (and, incidentally, further muddying the customary distinctions between "urban" and "rural"). These new complexes—a modern version of Mao's self-sufficient "base

areas"—will not be able to rely entirely on the rural-trained technician and will be competing with the urban industrial installations for the better educated engineer and scientist.

The need to combine research in agricultural science with production was a serious concern of the regime even in the 1950's, but in those days it was a relatively rare phenomenon and it was a worthy news item whenever agricultural scientists and agronomists from the Chinese Academy of Agricultural Sciences decided to "enrich and promote their research work" by spending some time in the country talking to the peasants. A greater effort to achieve some cooperation between scientist and peasant was made in the early 1960's when agriculture became the focus of economic attention. At the same time numerous, local and national level conferences were held which, among other things, urged rural youth to take an active part in scientific experiments; to "inherit the farming experience of the older generation and adopt scientific methods of farming"; and to improve seed selection and seed cultivation, pest prevention and plant disease treatment, and soil conservation in order to promote agricultural production.³⁶ During this period many more science workers "joined the production front" and worked with the peasants.

It took the Cultural Revolution, however, for the regime to realize some of the long-standing aims to draw rural China into the 20th century. Because of the new influx of "educated youth," and a greater presence of scientists and specialists of every variety, ever greater numbers of people have been exposed to basic technology and the "scientific method" in agriculture. Almost all the provinces have been holding provincial symposiums on scientific agricultural experimentation. A typical symposium in Kwangtung Province "summed up and propagated the advanced experiences and achievements during the past year concerning scientific experiments in animal husbandry, sideline production, fisheries, agricultural machinery, as well as the development of small hydroelectric installations." The report also states that all agricultural communes have set up their own "agricultural scientific institutes," that all brigades and production teams have formed "scientific experimental groups," and that more than 1 million persons are participating in scientific experimentation in the province.³⁷

The developments in rural China have been summarized in a recent issue of *Peking Review*. Deep ploughing, improving alkaline and sandy soil, and other experiments have transformed large tracts of sandy, saline and alkaline land. Breeding and popularization of good strains of wheat, rice, maize, sorghum, cotton, rapeseed, peanuts, and tuber crops have "sent their per-mu yield in many places zooming." Introduction of interplanting and growing two or three crops a year instead of one in a good number of places has greatly raised the land utilization rate. In addition, bacterial fertilizers and microbe insecticides, made from local materials by indigenous methods, have been popularized in many areas. Other successful experiments include: Tea indigenous to southern China is now being grown in some places in the north; sugar beet cultivated in the north has been introduced to the southern provinces; silkworms can now be bred outdoors, and so forth.³⁸ Experimentation, research and innovation naturally

³⁶ NCNA, Oct. 29, 1965.

³⁷ NCNA, Nov. 23, 1970.

³⁸ *Peking Review*, Oct. 16, 1971, p. 22.

are conducted not only in agriculture per se, but also in connection with all phases of rural economy such as farm tools, farm machinery, and local industry in general.

It would be a mistake to assume from all these reports, however, that China's rural areas are now one vast agricultural laboratory—the country is too big, with too many people and too many areas that are still relatively isolated. At the same time it is impossible to deny that today's young Chinese peasants are better educated, probably better motivated, certainly more concerned and aware that science and technology can contribute to production and that “mass scientific experiments” have, in fact, produced fruitful results.

Urban Science and Technology

Ordinarily, in looking at scientific and technological research and development, the approach would be to consider separately the relevant activities in factories, in universities and in the various institutes of the Academy of Sciences. It should be quite clear by now that such a straightforward approach is no longer possible in China. The research in these three sectors is too interrelated and, no matter whether voluntary or forced, so is the collaboration between the workers and the professionals.

There is a continuous flow of reports relating to China's industries. They seldom discuss the overall status of an industry or give national production figures (except in percentile growth); rather, these reports describe the developments in a specific factory, plant, mine, or even workshop. Occasional production figures are given, but the most consistent reporting is related to experimentation, innovation, new designs, new methods, trial production, and so forth—all due to the efforts of workers themselves or in cooperation with scientists and engineers who now spend a large proportion of their time solving production related problems. Statistics are plentiful on the number of technical innovations, the number of modifications of equipment, and new products. In Liaoning, for example:

Statistics show that in the first eight months of this year (1971), the province's factories and mines made more than 21,000 technical innovations, including 1,000 or so important ones. New materials and techniques, such as precision casting, nodular cast iron, powder metallurgy, engineering plastics, cold extrusion, hydraulic pressure, fluidics and electronics have been widely adopted by metallurgical, chemical, machinery, railway and other industrial departments.³⁹

The atmosphere of experimentation seems to be pervasive and it would appear that everyone is trying to get into the act. Perhaps the reports exaggerate this phenomenon, but every worker seems to be competing against every other worker in thinking up “innovations,” and it is this spirit of participation and contribution that the Chinese leadership has been trying to achieve.

In addition to what might be called personal competition for innovation, the factories are also in competition with each other. In response to the call to “take one trade in the main and run various undertakings,” each enterprise is attempting to be as self-sufficient as possible in terms of its own needs. Related to this drive is the widespread push to increase production and practice economy by fully

³⁹ *Peking Review*, Oct. 15, 1971.

utilizing all waste liquids, solids and gasses.⁴⁰ "Turn waste into treasures, turn useless things into useful things and turn single use into multiple use" also becomes a competitive endeavor and a challenge for innovation, with each plant trying to outdo the other.

Examples of how this policy works in practice are plentiful. A paper mill successfully utilized black liquor, a waste material from the paper-making process, to produce solid ammonium humate, a new kind of fertilizer. It has now built a small chemical workshop to produce this new fertilizer.⁴¹ On a larger scale, in order to fully utilize the manpower, equipment, technical know-how, and waste materials, the Ta-lien Locomotive Plant reportedly built twelve small factories, including a cement plant, a ball-bearing plant and a silicon plant.⁴² Efforts to utilize all waste materials extend beyond the industries themselves. During 1970, for example, the dependents of the oil field workers set up a group of medium- and small-sized plants including a chemical fertilizer plant, candle plant, screw plant, soap plant, and oil paper plant—all of them using waste liquid, gas, and slag from the petroleum production process as their raw materials.⁴³ In each case, the enterprise was involved in research, in experimentation, in development—in innovation.

The amount of research performed in universities in China was not too significant even before the Cultural Revolution, and it certainly has decreased since then. All the institutions of higher education are supposed to follow what is referred to as the "open door policy in scientific research." The imaginary door is presumably between the university and the factory and it is supposed to be constantly swinging in both directions: Any research undertaken in the university is to be closely coordinated with the needs of production and both the professors and the workers are to move between the two establishments with ease. Only through this type of integration between the workers and the university staff—where they struggle for production together, conduct scientific experiments together, and study together—will the institutions of higher education be able to provide the country with "a large contingent of working class intellectuals who are both red and expert and who will serve socialism."⁴⁴

With so much emphasis on the integration of research with production, it seems reasonable to assume that the Chinese Academy of Sciences may have lost some of its responsibilities and that some of its institutes perhaps became more closely associated with individual production ministries or, as part of the general decentralization, with provincial governments. Nevertheless, the Academy is not only still very active, but because of the highly qualified professionals on its staff, the level of innovation and experimentation in support of economic requirements is probably more advanced. At this level, the tug-of-war undoubtedly continues and some scientists (those, of course, who are still influenced by Liu Shao-chi's counter-revolutionary revisionist line) persist in thinking that "it may be proper to popularize the application of theories in production, but carrying out theoretical research in this way is impossible." Academicians who continue to think this way are admonished:

⁴⁰ See, for example, Leo A. Orleans and Richard P. Suttmeier, "The Mao Ethic and Environmental Quality," *Science*, Dec. 11, 1970.

⁴¹ *JMJP*, Apr. 21, 1971.

⁴² *JMJP*, Nov. 23, 1971.

⁴³ *JMJP*, May 8, 1971.

⁴⁴ NCNA, Oct. 12, 1971.

If they will only move their legs, go to the forefront of production, and modestly listen to the opinions of the workers and peasant masses, it will not be difficult for them to learn that in production there are many practical as well as theoretical problems to be solved. * * * In short, there is something in almost every field of production for research workers. * * * Many theories have been discovered in the course of popularizing and applying the fruits of certain scientific research. Such theories are precisely what we urgently need to solve problems in industrial and agricultural production.⁴⁵

With reference to the Academy of Sciences, however, there is an admission that it is possible to have scientific research which is only "indirectly related to production"—research that is "long-range and exploratory in character." But even this research can be undertaken only when the scientist has a good knowledge of its applicability to production and when he himself has had experience in production.

Science and Defense

Any paper on science in China would be incomplete without at least a brief comment on the question of the effects of the Cultural Revolution on the military and defense-related scientific establishment.

Although there has been widespread speculation on this subject, there now seems to be general agreement that the regime was fairly successful in shielding the defense establishment from the more damaging effects of the Cultural Revolution. In August 1966, soon after the Cultural Revolution began to gain momentum, the Central Committee of the Chinese Communist Party published a communique one point of which made a special ruling in reference to scientists and technicians: "as long as they are patriotic, work energetically, and are not against the Party and socialism . . . efforts should be made to help them gradually transform." Perhaps the key word here is "gradually"—a notion not exactly the most popular among the militants of that period. Presumably this ruling applied to all scientists, but another factor reinforces the precept even more in relation to defense personnel. As a general rule, the greater the applicability of the work being done by an institution or an individual, the more protected were those involved from the turmoil of the Cultural Revolution. And who could be more relevant in Peking's view than scientists and engineers engaged on the nuclear program or any other military project? Surely they were more equal than the rest.

A much better case for the assumption that defense and military establishments were protected during the Cultural Revolution can be made on the basis of more demonstrable indicators. The most obvious is the nuclear program. Although some observers believe that the program suffered some delays and at least one failure, the Chinese can show some significant accomplishments. They managed to test three weapons in 1966, two in 1967, one in 1968, two in 1969, one in 1970, one in 1971, and the last one in January 1972; they also launched two satellites—one in 1970 and one in 1972.⁴⁶ Such a schedule for nuclear and space activities could not possibly be maintained if the political squeeze exerted by the Cultural Revolution had reached Lop Nor, for example.

Furthermore, considering the leadtime required for advanced weaponry, it seems certain that there was a vigorous military R. & D.

⁴⁵ NCNA, Jan. 6, 1971.

⁴⁶ Charles H. Murphy, "Mainland China's Evolving Nuclear Deterrent," *Bulletin of the Atomic Scientists*, January 1972.

program operating in China throughout the period of the Cultural Revolution. Otherwise it would be difficult to see how China could deploy medium- and intermediate-range missiles, how progress could be made on intercontinental ballistic missiles, and how she could be building a nuclear-powered submarine, F-9 fighter bombers and TU-16 medium-range bombers, new light tanks, and a variety of other military hardware.⁴⁷ All this not only implies that scientists and engineers in these activities have been protected, but also raises another possibility. The military have always had first call on specialists, but a significant proportion of these professionals had to remain in the civilian economy. Is it possible that the spurt in military R. & D. during and since the Cultural Revolution profited by the closing of all the universities and many of the civilian oriented research institutions? Certainly, considering the shortage of such personnel, it is difficult to imagine that the professors and other research scientists sat around for 2, 3, 4 years reading the thoughts of Mao. Could they have been transferred into defense activities or, for personal security reasons, even volunteered to devote their energies to a pursuit that insured immunity from external attacks?

VII. PUBLICATION AND CROSS-POLLINATION IN SCIENCE AND TECHNOLOGY

No other field of knowledge is more dependent upon both national and international cross-pollination than the scientific and technological community. Considering the present character of China's science and the fact that since mid-1966 there has been no publication of any professional journals in the People's Republic, how is scientific and technical information being appropriately disseminated? Most probably, inadequately.

Journals and Books

Prior to the Cultural Revolution, China published scores of scientific and technical journals and thousands of books of various levels of sophistication—a large proportion of them by the Science Press of the Chinese Academy of Sciences. These were supplemented by the annual publication of hundreds of scientific and technical books and monographs. Exposure to all these publications might easily prompt the conclusion that the publish or perish philosophy even penetrated the bamboo curtain. The Chinese Journal of Internal Medicine, for example, reported that during just one year the editorial offices received a total of 1,631 manuscripts, of which 391 were published, 912 were returned and the rest were awaiting editorial decision.⁴⁸

It is not surprising that Peking terminated virtually all publication during the Cultural Revolution. Most of the members of the Academy of Sciences and university faculties who normally would have been contributing articles to scholarly journals were instead preoccupied with the study and discussion of the thoughts of Mao or doing their stint in the factory or the countryside. The atmosphere was hardly conducive to research, writing and publication, and anyway the presses of China must have been running overtime for at least 2 years, just turning out the hundreds of millions of copies of Mao's various writings.

⁴⁷ *New York Times*, Feb. 1, 1972.

⁴⁸ *Chung-hua Nei-k'o Tsa-chih* (Chinese Journal of Internal Medicine), Volume 8, No. 1, January 1960; JPRS 33807, Mar. 25, 1938.

More recently, however, the regime has encouraged some types of scientific and technical activities to resume communication and limit duplication in research.

Exchange of Information

At the top of the scientific pyramid there was probably little difficulty in disseminating any truly significant achievement—with or without appropriate journals. The main problem was elsewhere. Considering the generally low level of technology in China, there are many areas in which improvements could be made by persons with limited technical backgrounds. Among the myriad innovations by millions of people, there must have been some significant accomplishments. Innumerable improvements—even the very simple ones—in industrial and agricultural equipment, tools, methods, and so forth could be of immediate benefit to the economy if they were widely reported. Only during the past couple of years has an effort been made to cope with this aftereffect of the Cultural Revolution.

Apparently one of the methods frequently used for exchanging information is the organizing of nationwide conferences on subjects of economic priority. There are quite a few reports of meetings on the production of chemical fertilizers, metallurgy, some aspects of public health and medicine, and many other production oriented specializations. In view of the limited opportunities for exchange of information, Chinese professional conferences may well provide the scene for a more significant interchange of substantive data than many of ours.

There are also, apparently, teams of workers and specialists that visit factories and other establishments in order to relay information about their technical achievements and innovations; and they, in turn, may be visited in their own enterprise by interested individuals. There is speculation, but no proof, that informally reproduced copies of various scientific and technical papers were and are distributed selectively to key institutions and individuals who may be able to utilize the information.

In late 1969 and early 1970, Peking started once again to publish a modest number of monographs and books—almost all of them either political or technical in nature. In April 1971 the first issue of a new monthly journal—*K'o-hsueh shih-yen* (Scientific Experiment)—was published. Although it is a general magazine that caters to the Chinese workers, peasants, and soldiers, it does contain some simple techniques and useful innovations that should be of considerable value in the factory and on the farm. Undoubtedly the volume of published materials will now gradually increase, but at least during the next few years, the emphasis should continue to be on the "how to" technology, rather than on the more sophisticated scientific and engineering topics.

International Contacts

The Cultural Revolution also interrupted China's effort to stay abreast of scientific and technological progress in the more advanced countries. Until 1966, Peking scrupulously collected S. & T. materials from foreign countries, subscribing to many hundreds of journals published around the world. The Cultural Revolution to some extent interrupted the acquisition of foreign literature, but more through neglect than intent, and soon the Chinese were again following their

policy of widespread collection of foreign information in most fields of science and technology. An example of this in the medical field was brought back by Dr. Gray Diamond who reported that the libraries of the Chinese Medical Association and the Chinese Academy of Sciences were stocked with the most recent issues of medical journals from every country, including copies of the *New England Journal of Medicine* and a recent copy of the *Missouri State Medical Association's* monthly journal.⁴⁹ Another recent visitor made a more general observation when he said that "the obvious knowledge that they had of what we were doing in scientific policy indicated that they had not ceased to study us even if we were ignorant of what had happened to them."⁵⁰ Peking is quite serious about adapting the world's advanced technology to the needs of China. To pursue this goal, they are not only receiving current international scientific and technological literature, but are once again sending highly qualified professional delegations to select international conferences.

Recent indications that China is anxious to resume a variety of contacts with the rest of the world, combined with her known interest in science and technology, have resulted in great optimism about the future of scientific exchange. A word of caution is in order. China wants to learn, but she will not make this desire too obvious lest it reflect adversely on her whole political system. Eager to take advantage of international conferences and fact-to-face meetings between scientists, she nevertheless will be very selective for the time being, choosing fields in which she can participate as an equal and display her own achievements. Peking is intent on overcoming the national inferiority complex which set in during the century preceding the Communist takeover; no weakness, no matter how understandable, can be admitted. As China's confidence and security grow, as she is accepted as a peer in the field of science and technology, as her need for outside contacts increases, the frequency and nature of her participation in the international scientific community will increase and develop.

APPENDIX

METHODOLOGY FOR THE CALCULATION OF EDUCATIONAL ACHIEVEMENT

A. PERSONS WITH PRIMARY EDUCATION

The following table summarizes most of the reported statistics on primary school enrollment and graduates:

[In thousands]

	Enrollment	Graduates
1949-50.....	24, 391	2, 829
1950-51.....	28, 924	4, 232
1951-52.....	43, 154	5, 942
1952-53.....	51, 100	9, 945
1953-54.....	51, 664	10, 136
1954-55.....	51, 218	10, 254
1955-56.....	53, 126	12, 287
1956-57.....	63, 464	12, 307
1957-58.....	64, 279	16, 225
1958-59.....	86, 400	.....
1959-60.....	90, 000	.....

Source: L. A. Orleans, *Professional Manpower and Education in Communist China*, Washington, D.C., 1960, p. 32.

⁴⁹ "Inside Look at Chinese Medicine," *American Medical News*, Oct. 11, 1971.

⁵⁰ Anthony Wedgwood, "China—Land of Struggle, Criticism and Transformation," *New Scientist*, Jan. 6, 1972.

The enrollment figures are realistic, but it must be remembered that although the normal ages for primary school are seven through 12, the above figures include large numbers of overaged children and youth. The data on the number of graduates are much more problematical. Although the majority of children, particularly in the rural areas, have not been going beyond the lower primary schools, they were counted by the authorities as primary school graduates after completing 3 or 4 years of school. Those who went on to upper primary schools were counted again after completing the remaining primary school years. Other reports give more realistic numbers of graduates that no doubt include only those who completed the full 6 years. In 1956, for example, the New China News Agency reported 13,370,000 graduates from primary schools between 1953 and 1956, as opposed to a total of 42,622,000 derived from the above table.

Since there is no reported series of annual figures for the graduates of the six-year elementary schools, and since the last reported data on primary education goes only as far as 1959, an independent method is devised for estimating the number of primary school graduates as of mid-1970. Inevitably it involves a great many assumptions—assumptions that attempt to take into account educational policies, programs and procedures over the past 20 years.

POPULATION WITH COMPLETED (6-YEAR) PRIMARY EDUCATION, 1970

[Absolute figures in thousands]

Year (1)	Number in primary school ages (7 to 12) (2)	Number of 12-year-olds (3)	Percent graduating (4)	Number graduating (5)	Age in 1970 (6)
1953	73,000	12,000	25	3,000	29
1954	74,000	12,000	25	3,000	28
1955	76,000	13,000	30	3,900	27
1956	78,000	13,000	30	3,900	26
1957	82,000	14,000	35	4,900	25
1958	85,000	14,000	40	5,600	24
1959	89,000	15,000	45	6,800	23
1960	93,000	15,000	40	6,000	22
1961	97,000	16,000	40	6,400	21
1962	100,000	17,000	45	7,700	20
1963	102,000	17,000	50	8,500	19
1964	105,000	17,000	55	9,400	18
1965	107,000	18,000	55	9,900	17
1966	109,000	18,000	55	9,900	16
1967	111,000	18,000	50	9,000	15
1968	114,000	19,000	50	9,500	14
1968	117,000	19,000	50	9,500	13
1970	120,000	20,000	50	10,000	12

Col. 1: As of Jan. 1—approximate midpoint of the school year.

Col. 2: John S. Aird, *Estimates and Projections of the Population of Mainland China, 1953-86*, U.S. Bureau of the Census, Washington, 1968. The rounded figures from the selected model are intended to provide only an order of magnitude.

Col. 3: Figures in col. 2 divided by 6, thus assuming an equal number of persons for each age group in the school ages. Because of compensating factors, the inaccuracy inherent in this assumption is relatively small.

Col. 4: The figures for the 1st 5 years are consistent with reported data; after 1957 the trend represents a subjective estimate.

Col. 5: Product of cols. 3 and 4.

Col. 6: Assuming each child was 12 years old when he graduated.

To complete the picture, the following estimate is made of the number of persons who finished primary education prior to 1953:

(a) In 1953 there were approximately 285 million persons between the ages of 15 and 49.

(b) Assuming that 10 percent (maximum) of this number completed 6 years of education, a figure of 28.5 million is derived.

(c) Projecting 28.5 million to 1970 (using a life expectancy of 40 years), we get a figure of 17 million.

Thus, as of 1970 there were an estimated 17 million persons 30 years of age or over who completed 6 years of primary education.

Based on the figures derived above, the following table can be constructed:

AGE-SEX COMPOSITION OF PERSONS WITH COMPLETED PRIMARY EDUCATION (6 YEARS), 1970

[Absolute figures in thousands]

Age	Number	Adjusted number	Male	Female	Percent female
(1)	(2)	(3)	(4)	(5)	(6)
12 to 14.....	29,000	29,000	15,000	14,000	48
15 to 19.....	46,700	53,000	29,000	24,000	46
20 to 24.....	32,500	37,000	22,000	15,000	41
25 to 29.....	18,700	21,000	13,000	8,000	36
30 plus.....	17,000	20,000	15,000	5,000	25
Total.....	143,900	160,000	94,000	66,000	42

NOTES

Col. 2: Summation of figures into 5-year age groups from previous table and above calculation.

Col. 3: Those 15 and above in col. 2 were increased by 15 percent to account for persons who completed 6 years of schooling in subsequent years. Figures were then rounded to add to 160,000,000.

Cols. 4 and 5: Assumption is made that there is now a near equality in the male-female distribution of primary school children. In the early 1950's girls constituted only about $\frac{1}{5}$ of the primary school enrollment; $\frac{1}{4}$ prior to 1949.

Col. 6: Col. 5 divided by col. 3.

The estimate of 160 million persons in the People's Republic of China with completed 6-year primary education may seem low, but it must be remembered that 85 percent of the population continues to live in rural areas where 6 years of schooling has not been available to all the children.

B. PERSONS WITH SECONDARY EDUCATION

Whereas under primary education only persons who have completed the full 6 years have been counted, anyone with 2 or more years of secondary education is included. The table that follows presents the number of graduates from the various types of secondary schools which were operating in the 1950's. The total number of graduates is then compared with the number of graduates from 6-year primary schools.

GRADUATES FROM SECONDARY SCHOOLS (2 TO 6 YEARS), 1950-58

[Absolute figures in thousands]

Year	General	Specialized	Technical and industrial	Total	Percent of primary graduates
1950.....	296	75	7	378	-----
1951.....	284	57	6	347	-----
1952.....	221	68	10	299	-----
1953.....	454	118	21	593	20
1954.....	644	169	32	845	28
1955.....	969	235	59	1,263	32
1956.....	939	174	58	1,171	30
1957.....	1,299	146	50	1,495	30
1958.....	1,313	191	69	1,573	25

Source: L.A. Orleans, Professional Manpower and Education in Communist China, Washington, D.C., 1960, pp. 35, 42, 47.

As is evident from the last column, the proportion fluctuates between 20 and 32 percent. It is assumed that with the exception of the Cultural Revolution years 25 percent of those completing primary school went on to attend at least 2 years of middle school. This percentage is then applied to the primary school graduates for the years 1958 through 1966. For the years 1967 through 1970 an arbitrary adjustment is made. The summation of the figures reported above is utilized for the first 8 years.

PRELIMINARY ESTIMATE OF GRADUATES FROM SECONDARY SCHOOLS

[Absolute figures in thousands]

Year	Primary graduates	Completed 2 to 6 years of secondary
1950-58.....		7,964
1959.....	6,800	1,700
1960.....	6,000	1,500
1961.....	6,400	1,600
1962.....	7,700	1,900
1963.....	8,500	2,100
1964.....	9,400	2,400
1965.....	9,900	2,500
1966.....	9,900	2,500
1967.....	9,000	600
1968.....	9,500	700
1969.....	9,500	900
1970.....	10,000	1,100
Total.....		27,464

Let us consider the figure of 27,464,000 derived above. The theoretical age of the graduates of the full 6 years of secondary schools is 18. This is almost meaningless in terms of any effort to estimate ages of the population with this level of education. Although certainly many young people complete several years of secondary education while in their teens, it is very common for secondary level education to be delayed anywhere from a year to 10 or more years. In order to account for those people who delayed their secondary education, the 27,464,000 is increased by 15 percent to 31,596,000. Having made this adjustment it is not unreasonable to assume that on the average, persons completing at least 2 years of secondary education are 20 years of age.

These adjustments and assumptions are represented in the following table:

FINAL ESTIMATE OF GRADUATES FROM SECONDARY SCHOOLS

[Absolute figures in thousands]

Year	Graduates	Adjusted graduates	Age in 1971
1950.....	378	435	40
1951.....	347	399	39
1952.....	299	344	38
1953.....	593	682	37
1954.....	845	972	36
1955.....	1,263	1,453	35
1956.....	1,171	1,347	34
1957.....	1,495	1,720	33
1958.....	1,573	1,810	32
1959.....	1,700	1,956	31
1960.....	1,500	1,726	30
1961.....	1,600	1,841	29
1962.....	1,900	2,186	28
1963.....	2,100	2,416	27
1964.....	2,400	2,761	26
1965.....	2,500	2,876	25
1966.....	2,500	2,876	24
1967.....	600	690	23
1968.....	700	805	22
1969.....	900	1,035	21
1970.....	1,100	1,266	20
Total.....	27,464	31,596	

Combining and rounding the secondary school graduates into 5-year age groups and estimating the male-female ratio results in the following table:

AGE-SEX COMPOSITION OF GRADUATES OF SECONDARY SCHOOLS (2 TO 6 YEARS), 1970

[Absolute figures in thousands]

Ages	Graduates	Male	Female	Percent female
20 to 24.....	6,700	4,350	2,350	35
25 to 29.....	12,100	8,470	3,630	30
30 to 34.....	8,600	6,450	2,150	25
35 to 39.....	3,800	3,040	760	20
40 and over.....	3,000	2,700	300	10
Total.....	34,200	25,010	9,190	27

Note: The percentage of females in secondary schools was reported as follows: 1952, 23.5%; 1957, 30.8%; and 1958, 21.3% ("Ten Great Years," Peking 1960). These figures represent a basis for the above estimates. The 40 years and over group is a projection of the reported secondary graduates between 1912 and 1948 ("Chung-kuo Nien-chien" [Chinese Educational Yearbook], Shanghai, 1948).

C. PERSONS WITH HIGHER EDUCATION

Peking has published more figures on higher education than on any other level, so that relatively speaking these estimates are the most reliable. Anyone with at least 2 years of higher education is included in the figures which follow. As in the case of secondary education, an even larger number of persons embark on higher education after interrupting their schooling, so that a somewhat higher average age—25 to be exact—is assumed for persons completing higher education.

GRADUATES FROM INSTITUTIONS OF HIGHER EDUCATION

Year	Graduates	Age in 1970	Year	Graduates	Age in 1970
1949.....	21,000	46	1960.....	135,000	35
1950.....	18,000	45	1961.....	162,000	34
1951.....	19,000	44	1962.....	178,000	33
1952.....	32,000	43	1963.....	200,000	32
1953.....	48,000	42	1964.....	200,000	31
1954.....	47,000	41	1965.....	170,000	30
1955.....	55,000	40	1966.....	170,000	29
1956.....	63,000	39	1967.....	10,000	28
1957.....	56,000	38	1968.....	20,000	27
1958.....	72,000	37	1969.....	30,000	26
1959.....	70,000	36	1970.....	40,000	25

Note: Figures for the years 1949 through 1966 are from L. A. Orleans, "Communists China's Education: Policies, Problems, and Prospects," IN: U.S. Joint Economic Committee, "An Economic Profile of Mainland China," Washington, 1967, p. 511. Although for 3 years after 1966 all universities were closed, as a form of "tokenism" it is assumed that a few thousand individuals either managed to do some work or, having had their education interrupted after finishing 2 or more years, may be considered as having completed their studies. It is also possible to make a reasonable argument that the ascending number of graduates between 1967 and 1970 should be reversed. Since the final table combines ages 25 through 29 the argument, although still valid, becomes academic.

The following table combines the above figures into 5-year age groups and distributes the totals between males and females.

AGE-SEX COMPOSITION OF GRADUATES OF HIGHER EDUCATION (2 OR MORE YEARS), 1970

[Absolute figures in thousands]

Age	Graduates	Male	Female	Percent female
25 to 29.....	270	181	89	33
30 to 34.....	910	637	273	30
35 to 39.....	396	289	107	27
40 to 44.....	201	151	50	25
44 plus.....	100	80	20	20
Total.....	1,877	1,338	539	29

Note: In the pre-1949 period, females were reported to have constituted 18 percent of the graduates of higher education. This figure increased to 25 percent in the late 1950's. It is estimated that this trend has continued since then.

POPULATION POLICY AND DEMOGRAPHIC PROSPECTS IN THE PEOPLE'S REPUBLIC OF CHINA

By JOHN S. AIRD

After 22 years of Communist rule, demographic prospects in the People's Republic of China (PRC) are still in doubt. The future course of fertility and mortality depends on the direction of official policies and on the evolution of those facets of society that affect the vital rates. There can be no certainty in regard to any of these matters. Recent history is the best basis for surmise about the future, but the record is equivocal. The official attitude toward family limitation has been among the least stable aspects of Peking's domestic policy.

The specific questions most critical for China's future demographic development are whether or not a sustained program for contraception, sterilization, abortion, and late marriage will be mounted in the cities and throughout the vast countryside, whether economic and social changes supportive of family limitation will take place, and whether administrative intervention can impose family planning on those who will not adopt it voluntarily. Related to these questions are other, more basic questions as to the degree of ideological dogmatism or pragmatism with which future leaders of the PRC will approach population policy and other issues of domestic administration, the effectiveness of the administrative system, the continuity of central leadership, and the course of economic development. None of these questions may be answered with certainty.

Domestic policies and programs in the PRC have shown considerable variation in the past 22 years. In fact, there is some support for the thesis that political and economic management has followed a cyclical pattern of oscillation between extremes. At times the official position has been doctrinaire; political principles have taken precedence over economic practicalities, and decision-making has been highly centralized. At other times political ideals have been sacrificed to economic necessity and considerable discretionary latitude has been allowed to local authorities to solve practical problems and achieve concrete objectives. To the extent that policy has been cyclical, it has lacked continuity. The discontinuities have undoubtedly rendered central policies less effective than they might otherwise have been and contributed to the tendency of the cadres at all levels to distrust central initiatives and to protect themselves against the hazard of policy instability by the universal bureaucratic tactics of delay, avoidance of personal commitment, superficial compliance without significant action, and deceptive reporting to higher levels. Whether the failure of the local authorities to implement the more extreme central policies has held back the drive for national economic development or has instead saved the central authorities from the consequences of their own bad judgment may be debatable, but the long term, noncyclical

EDITOR'S NOTE.—See heading "General Note" on p. 331 for abbreviations used in the footnotes to this paper.

decline in altruistic idealism among the cadres, who joined the regime with great enthusiasm in the years immediately after the Communist victory in 1949, must represent a dissipation of a vital administrative resource that cannot easily be restored.

Other evidence suggests that changes in domestic policy in the PRC cannot be fully explained as reactions to swings of the political pendulum. The record does not seem to justify the conclusion often reached prematurely by foreign observers during the waning phases of a period of political extremism that the leaders of the Chinese Communist Party (CCP) learn from experience and tend toward moderation. Too often an interval of apparent pragmatism has been followed by a new plunge into adventurism. Yet the new extremes have not been mere reversions to former positions. The Party leaders neither abandon their fundamental principles nor implement them in the same form in which they failed in prior trials. Hence, it is necessary to examine the total experience of the wavering family limitation efforts in the PRC before extracting from it whatever meaning it may have for the future.

This paper traces the development of family limitation policies in the PRC in relation to population problems, population theories, economic trends, and other aspects of civil administration that seem to have influenced official decision-making. The record of population policies in the PRC can be subdivided into six fairly discrete periods: (1) from 1949 to September 1954, during which policy on family limitation was strongly negative; (2) from September 1954 to June 1958, during which the regime moved from the first indecisive steps toward support of family limitation into an all-out campaign to lower the birth rate; (3) from June 1958 to January 1962, during which first political euphoria and then economic anxiety held family limitation in abeyance; (4) from January 1962 to June 1966, the span of the second family limitation campaign; (5) from June 1966 to the summer of 1969, when birth control work was interrupted by the "cultural revolution"; and (6) from the summer of 1969 to the present, when family limitation has for the third time become official policy. Particular attention will be addressed to the first family limitation campaign, when press coverage was relatively complete and candid and revealed more clearly than in any other period the determinants of official policy and the conditions that limited its success. After discussing developments during each of the six periods, the implications of these developments for demographic prospects during the next two decades will be assessed and represented quantitatively in alternate model population projections.

I. THE PERIOD OF DOCTRINAIRE MARXISM: 1949 to 1954

When Mao Tse-tung and his associates established their new regime in the fall of 1949, they at first assumed a posture of boundless confidence on the population question. Ostensibly, they accepted the promises of Marxism at face value, but it is doubtful whether the Party Central Committee took as simplistic a view of the relationship of ideology to actuality as the official position might imply. There is little doubt that the Party leaders believed in the ultimate wisdom of their Marxist precepts, yet they also recognized the need to adapt Marxism to the specific circumstances of China. In fact, the adaptation of Marxism, a product of Western industrial societies, to an Asian

peasant society is the basis of Mao's claim to a place in the Marxist hagiology. In reinterpreting Marxism in the light of conditions in China, the Party leaders introduced an option of flexibility which they have sometimes exercised with considerable freedom without openly departing from Marxist premises. The degree of conformity had to be sufficient to convince the Party functionaries down in the ranks, if not the people as a whole, that official policies remained faithful to the spirit and essence of Marxist theory, and that compliance was therefore right and proper, or at least unavoidable. While it was not necessary that the Party leaders have as simplistic a trust in ideology as the lower echelon cadres, the leaders could not afford to abandon altogether their belief in the theoretical rational which legitimized their authority, justified whatever exercise of power was necessary to impose their will, and confirmed their confidence that the tide of history was running in their favor. Thus, the Party leaders were neither the slaves nor the masters of ideology in any absolute sense.

Unfortunately, the mandate of Marxism on the subject of population was not every explicit except in the negative. Marx denounced Malthus in scathing terms. The explanation of overpopulation in Malthusian theory was contrived, according to Marx, to justify the use by capitalist societies of induced unemployment as a means of exploiting the workers. However, in socialist society, which placed the means of production in the hands of the workers, such manipulation would not occur, and hence there would be no unemployment and no surplus population. Marx held that overpopulation was never "absolute" (resulting from demographic or economic necessity) but only "relative" (derivative of the pattern of social and economic organization). Hence each type of society had its own peculiar "law of population." The particulars of the socialist law of population were never elaborated. Marxists believed that state ownership would inspire the workers to such hitherto unknown levels of productivity and inventiveness that economic adversity, including population problems, would soon be banished forever. If ever a socialist society should face such problems, Engels said, it could more easily solve them than could any other kind of society. Lenin added, however, that the fact that the masses had no use for Malthusianism did not in any way prevent a socialist society from repealing laws against abortion and contraception. The confidence of these declarations was warming but their vagueness and equivocation made it difficult to ascertain on what logical basis the confidence rested.

The Initial Posture: Unqualified optimism

The Chinese Communist leaders interpreted the Marxist precepts to mean that China's abundant population was an asset to economic development, which could be accomplished without the need for large capital investment. Full mobilization of China's human resources, they expected, would speedily raise the country to the status of a first-class power. China's perennial population problems were the heritage of indigenous Chinese "feudalism" and foreign capitalist exploitation. Under the leadership of the CCP, the politically awakened masses would soon change all these things.

The optimistic stance of the Party leaders was set forth in a release by the New China News Agency (NCNA) on September 16, 1949, which was later included in the collected works of Mao:

It is a very good thing that China has a big population. Even if China's population multiplies many times, she is fully capable of finding a solution; the solution is production. The absurd argument of Western bourgeois economists like Malthus that increases in food cannot keep pace with increases in population was not only thoroughly refuted by Marxists long ago, but has also been completely exploded by the realities in the Soviet Union and the Liberated Areas of China after their revolutions. . . .

Of all things in the world, people are the most precious. Under the leadership of the Communist Party, as long as there are people, every kind of miracle can be performed. . . . We believe that revolution can change everything, and that before long there will arise a new China with a big population and a great wealth of products, where life will be abundant and culture will flourish. All pessimistic views are utterly groundless.¹

The concluding reference to "pessimistic views" is revealing, for there would have been little need to attack such views unless they had a significant following in influential circles. Presumably not all of the Party leaders believed China's food and population problems would be easily solved. Nevertheless, the optimists were evidently in command of the power structure and therefore of the mass media, which carried only one side of the argument throughout the early years. A gradual erosion of the optimistic attitude seems to have taken place from about the middle of 1953 until, by the spring of 1957, the thinking in the Central Committee regarding food and population had become markedly Malthusian. This change seems to have been related to the Party's reassessment of the situation in agriculture.

Agricultural Difficulties and Rising Doubts

For all their optimism, the Party leaders were aware that the success of their revolution was contingent upon raising the productivity of agriculture so that China could be free of the perennial threat of famine. The first step toward higher agricultural productivity was "land reform." In 1950, the Party's director of rural work, Teng Tzu-hui, explained the priority attached to "land reform" as follows:

. . . It is also necessary to mobilize fully the masses during agrarian reform and to overthrow the enemy thoroughly, as well as to build up a real revolutionary dictatorship of the peasant. Without attaining these conditions, it will be impossible to think of raising the productive zeal of the peasants and their productivity while remnant feudal influences still exist and the demands of the peasants are not yet met.

On the other hand, if feudal influences are thoroughly overthrown, their land and property confiscated, and the economic demands of the broad masses of peasants met, then the production zeal and productivity of the peasants will be greatly raised, and the productivity of the rural areas will be greatly developed. This can also be definitely asserted.²

The increases in agricultural production widely reported in 1951 and 1952 were attributed forthwith to "land reform." One report, claiming staggering crop increases in 1952, boasted that "boundless future production increase" was assured, that Malthusian theories had been

¹ "The Bankruptcy of the Idealist Conception of History," Sept. 16, 1949; in *Selected Works of Mao Tse-tung*, vol. IV, Peking: Foreign Languages Press, 1961, pp. 453-454.

² Teng Tzu-hui, "The Political Significance of Agrarian Reform," *Ch'iang-chiang jih-pao*, Hankow, Dec. 27, 1950; translated in *CB*, No. 212, Sept. 25, 1952, p. 6.

proven false, and that the world need not suffer from hunger even if its population trebled.³ The persistence of local famines in China during 1951 did not unduly alarm the leadership because of their confidence that such problems would soon be eliminated forever. However, there were also many reports of maladministration of the "land reform" movement that had an adverse effect on agriculture and for which the local cadres were held responsible. The catalog of their malfeasances included complacency, bureaucratism, blind optimism, "commandism," overestimation of past achievements, impatience for quick results, alienation from the masses, failure to cope with spring famine, failure to calm the anxieties of the peasants so that production could be maintained, and neglect of production.⁴

The common program of the Chinese People's Political Consultative Conference (CPPCC) passed on September 29, 1949, had stated that "in all areas where the agrarian reform has been carried out, the right of ownership over the land obtained by the peasants shall be protected."⁵ This promise was often repeated during the next several years, despite the fact that some formerly landless peasants who had been given land confiscated from landlords were said to be showing signs of spontaneous capitalism, a failing the Party believed inevitable with landowners. Actually, as a Party Central Committee statement drafted in December 1951 and finally published in March 1953 revealed, the Party had promised to respect land ownership mainly to win the support of the middle peasants. It had no intention of letting private ownership continue indefinitely. In order to overcome economic difficulties caused by the scattered nature of individual peasant activities, the Party directive said,

. . . We must promote "organization," and, on the principles of voluntary participation and mutual benefits, develop the active nature of mutual aid and cooperation among the peasants.⁶

The promotion of "organization" was a reference to Mao's often repeated phrase that the peasants must "get themselves organized for production," meaning that they must be cooperativized. The effort to move them in this direction began almost immediately after land reform with a drive to enlist them in mutual aid teams and in the first agricultural producer cooperatives. In this way, the December 1951 directive concluded, "it will be possible for us to realize our final objective in the rural areas—the leadership of the entire body of peasants on the road to socialism and communism."⁷ By September 1952, about 40 percent of all peasant households were in mutual aid organizations and some 4,000 cooperatives had been set up.

But the peasants were reluctant to accept organization when they discovered that it meant a loss of control over the conditions of work, and the rural cadres were obliged to resort to coercive tactics. By the end of 1952, these tactics had begun to have a noticeably adverse effect

³ Fan P'u-chai, "Ts'ung t'u-ti kai-ke hou nung-ts'un sheng-ch'an-li te fa-chan ch'ih Ma-erh-su-ssu-p'ai te huang-miu te jen-k'ou-lun" ("Critique of the Erroneous Population Theory of the Malthusian School from the Standpoint of the Development of Rural Productive Forces After Land Reform"), *KMJP*, Sept. 28, 1952.

⁴ See the selection of articles on "land reform" in South China in *CB*, No. 184, June 12, 1952.

⁵ "Common Program of the Chinese People's Political Consultative Conference," Sept. 29, 1949; translated in *CB*, No. 9, Sept. 21, 1950, p. 7.

⁶ "CCP Central Committee Decision on Mutual Aid and Cooperation in Agriculture," (Issued on Dec. 15, 1951), *JMJP*, Mar. 26, 1953; translated in *CB*, No. 240, Apr. 30, 1953, p. 3.

⁷ *Ibid.*, p. 12.

on production, and the cadres were again warned against the excesses of haste, "adventurism," "commandism," and compulsion. Whereupon, early in 1953, the cadres proceeded to dissolve a number of the newly formed cooperatives to restore peasant incentives,⁸ only to be ordered later in the year to resume the march of cooperativization.

The rural cadres and the Party leaders were under considerable pressure because of agricultural difficulties in 1953 and 1954. Both years witnessed widespread local crop failures and famines, which were particularly severe in 1954, a year of major floods in the monsoon areas of southeast Asia. Although official grain figures continued to increase during both years, the rate of increase was below the rate of population growth, and the actual situation may have been worse than the figures indicated because of the upward bias in official grain figures caused by expansion of the crop reporting system. In 1953, an effort had been made to institute a more effective method of government purchase and redistribution of surplus grain in order to alleviate local food shortages, but the new arrangements seem to have aroused peasant suspicions and further damaged production incentives. In the fall of 1954, public sales of government grain reserves began to rise sharply in both rural and urban areas as the fear of impending food shortages spread among the population. These developments heightened the concern of Party leaders and cadres alike.

Changing Attitudes Toward Population Problems

During the earlier part of this period, the few references to population that appeared in the press reflected Mao's 1949 position. In January 1951, an article in a geographical journal reiterated the theme that a large population means abundant manpower, which is the most precious form of capital and China's guarantee of a prosperous future.⁹ A *People's Daily* editorial in August 1952 discussing the 3,000,000 unemployed in China insisted that the need for manpower was paramount as the nation began large-scale construction:

Large as our country is, it is only evident that the greater our manpower, the better, when we undertake the new democratic construction and march toward socialism. Only the capitalistic system finds it impossible to solve the unemployment problem. . . . The fantastic so-called theory of "over-population" of theirs has long become completely bankrupt.¹⁰

In September an NCNA dispatch claimed that, thanks to the "release of immense productive forces in agriculture" through "land reform," China had become self-sufficient in food and fibers for the first time in 200 years.¹¹ In October a noted academician intimated that the creativity of the emancipated masses had already manifested itself in miracles and that more would soon follow,¹² and another writer recalled that Mao had written years earlier that the "millions of masses who wholeheartedly support the revolution" were "like a wall of steel

⁸ Nothing was said in the press about this development while it was taking place, but in October 1955, Mao cautioned the cadres against repeating "the mistake of 1953 of the large-scale dissolution of cooperatives." See Mao Tse-tung, "On the Cooperativization of Agriculture," NCNA, Peking, Oct. 16, 1955; translated in *CB*, No. 384, Oct. 19, 1955, p. 5.

⁹ Li Hsi-tan, "Ti-ta wu-po jen-chung te hsin Chung-kuo" ("A New China with Vast Territory, Rich Resources, and a Large Population"), *Ti-ti chih-shih (Geographic Knowledge)*, vol. 2, No. 1, January 1951, p. 8.

¹⁰ "To Effect Full Employment in a Planned and Systematic Manner," NCNA, Peking, Aug. 2, 1952; translated in *SCMP*, No. 388, Aug. 3-5, 1952, p. 58.

¹¹ "Li Shu-cheng Sums Up Rapid Progress in Agriculture in New China," NCNA, Peking, Sept. 22, 1952; translated in *SCMP*, No. 422, Sept. 24, 1952, p. 18.

¹² Feng Yu-lan, "My Understanding about the New Society in the Past Three Years," *JMJP*, Oct. 8, 1952; translated in *SCMP*, No. 435, Oct. 18, 1952, p. 19.

which no force can break."¹³ In May 1953, a writer of a magazine article ridiculed the idea that overpopulation was the cause of China's poverty and insisted that a rapid increase in the country's human resources was a favorable condition for economic development.¹⁴

However, by the spring of 1953 the mood had already begun to change as food shortages persisted. A *People's Daily* editorial warned of increasing demands for grain which would be difficult to meet "in our country with such a large population where mechanization of agriculture has not been carried out." The editorial forecast "many years of effort" during which "the food problem is likely to appear as still an urgent problem."¹⁵ In midsummer, Teng Tzu-hui, taking account of food shortages and famines in various regions, observed candidly that the 1952 grain crop was inadequate to provide for the annual increase in population and that a "colossal reform task" lay ahead if the regime was to serve the needs of the 470 million peasants and "gradually turn our agriculture from the backward economy of the small peasant into socialized mechanized agriculture."¹⁶

Tentative Steps Toward Birth Control

The summer of 1953 seems to have been a turning point within official circles in regard to birth control. The public position had been that birth control was "reactionary," "antihumanitarian," an outgrowth of capitalism,¹⁷ and a "way of killing off the Chinese people without shedding blood."¹⁸ As late as April 1953, the Maritime Customs Office in Canton instituted a ban on the import of contraceptives, not exempting those prescribed by doctors.¹⁹ However, in August 1953, the State Council instructed the Ministry of Public Health to help the masses exercise birth control,²⁰ (though the public was not informed of this decision until March 1957) and in July 1954 the ministry "drew up measures" relating to birth control that were submitted to the Government Administration Council for approval.²¹ These actions seem to have had no visible results.

The lack of public disclosure reflects ambivalence in official circles, which is further apparent in the treatment of population figures and rates of increase. If a large population was, as Mao had said, a "good thing," a larger population should have been welcomed as an even better thing. Yet when the authorities began to receive evidence from the "land reform" population investigations that the rural population was much larger than pre-Communist population data suggested, there was no great eagerness to publicize the new figures. The official

¹³ Chou Ping-lin, "People's Democratic Government Provides Opportunity for Manifesting the Great Creative Capacity of the Chinese People," *JMJP*, Oct. 9, 1952; translated in *SCMP*, No. 438, Oct. 23, 1952, p. 21.

¹⁴ Yen Chien-yü, "Ts'ung yü-kuan jen-k'ou te chi-ko wen-t'i t'an tao hsin Chung-kuo ti-i-tz'u jen-k'ou tiac-ch'a te chung-ta i-i" ("A Discussion of the Great Significance of the First Population Census of New China Starting from the Discussion of Several Problems Concerning Population"), *Hsin chien-she* (*New Construction*), No. 5, May 3, 1953, pp. 34-40.

¹⁵ "Grain Production Increase Is the Primary Task on the Production Front," *NCNA*, Peking, Apr. 11 1953; translated in *SCMP*, No. 551, Apr. 15, 1953, p. 14.

¹⁶ Teng Tzu-hui, "Rural Work: Its Basic Mission and Policy," *JMJP*, July 23, 1953; translated in *CB*, No. 255, Aug. 10, 1953, pp. 3 and 13.

¹⁷ E. Stuart Kirby, "China's Population Problem," *Far Eastern Economic Review*, vol XXIV, No. 17, Hong Kong, Apr. 24, 1953, p. 613.

¹⁸ Sun Ching-chih, "Su-ch'ing ti-li-hsieh chung te ch'ung mei ssu-hsiang" ("Eliminate Worship-America Ideology in the Field of Geography"), *JMJP*, Apr. 25, 1952.

¹⁹ "Import Ban of Contraceptives," *Ta-kung pao*, Hong Kong, Apr. 7, 1953, (telephone report from Canton); translated in *SCMP*, No. 545, Apr. 6-7, 1953, p. 8.

²⁰ "Exercise Appropriate Birth Control" (editorial), *JMJP*, Mar. 5, 1957; translated in *SCMP*, No. 1487, Mar. 12, 1957, p. 6.

²¹ Shao Li-tzu, "Concerning the Problem of Dissemination of Knowledge about Contraception," *KMJP*, Dec. 19, 1954; translated in *SCMP*, No. 978, Jan. 28, 1955, p. 26.

population total for rhetorical purposes remained at 475 million until the 1953 census confirmed a magnitude more than 100 million larger. The preliminary announcement by General Election Committee Secretary Teng Hsiao-ping on June 19, 1954, of the startling new total of 583 million, contained no interpretive commentary, a curious omission, since its magnitude was bound to evoke concern and the local Party cadres would have needed to know at once what response they should make. Teng merely noted that the new figure was accurate and could be used for planning purposes.²² An editorial in the *People's Daily* on June 20 noted that the new figure showed a "marked increase in the country's population" but had no other comment.²³ These circumstances suggest that the Party Central Committee was unable to agree on what line to take.

In August 1954, a feature article in the *People's Daily* by a pseudonymous author set forth what was probably the position of the conservative Marxists on the population question. Its general theme was that the figure of 600 million was good news and a cause for rejoicing to all the people in "the camp of peace and democracy" but not to the "imperialists" and their population experts. The article ridiculed Malthusian fears, quoted Mao's ebullient NCNA statement of September 1949, and boasted of the strength of China's "wall" of 600 million people, an allusion to Mao's "wall of steel" metaphor of many years earlier.²⁴ On population matters, the conservatives seemed to be still firmly in the saddle.

II. THE FIRST FAMILY LIMITATION CAMPAIGN: 1954 TO 1958

The experts in China who had been concerned with the population problem also had their spokesman, and his turn came next. He was Shao Li-tzu, a non-Communist intellectual who was known before 1949 as a propagandist for birth control. Shao was a deputy to the First National People's Congress (NPC), which convened in the fall of 1954, and on September 18 he delivered a speech to the Congress calling for a national program on family limitation. Shao echoed the conservatives' pride in the vastness of China's territory and population but went on to point out that these same attributes were responsible for the annual recurrence of natural calamities and the slow pace of economic development. "It is a good thing to have a large population," said Shao, "but in an environment beset with difficulties, it appears that there should be a limit set." Citing Lenin's statement that, despite the fact that the working class had no use for Malthusianism, contraception and abortion could still be permitted, Shao called on the state to provide "practical guidance" in birth control.²⁵ His speech was reprinted in full the same day in the *People's Daily*, and, although Shao reported in a subsequent article published on December 19, 1954, that he had received many letters critical of his position,²⁶ his critics

²² "Census and Election Completed in China: Population of China Over 600 Million," NCNA, Peking, June 19, 1954; translated in *SCMP*, No. 832, June 19-21, 1954, p. 2. The figure of 600 million in this title includes estimates of Chinese living outside the PRC.

²³ "Greeting the Completion of the Basic Level Elections Throughout the Country," *JMJP*, June 20, 1954; translated in *SCMP*, No. 832, June 19-21, 1954, pp. 5-7.

²⁴ Jo Shul, "Six Hundred Million," *JMJP*, Aug. 7, 1954; translated in *SCMP*, No. 690, Sept. 17, 1954, pp. 31-33.

²⁵ "Deputy Shao Li-tzu Speaks on Birth Control at National People's Congress," *JMJP*, Sept. 18, 1954; translated in *SCMP*, No. 920, Nov. 2, 1954, pp. 3-5.

²⁶ Shao Li-tzu, "Concerning the Problem of Dissemination of Knowledge about Contraception," *loc. cit.*

were unable to press their attacks through the public media. Given the Party's control of communications, this was not accidental.

Indecision and Equivocation

Shao seems to have expected an official birth control campaign to begin forthwith, for he says he wrote his December article as a "prelude to the dissemination of knowledge about contraception."²⁷ But equivocation on population problems and family limitation continued into the middle of 1956. When the final census results were released on November 1, 1954, census official Pai Chien-hua insisted that China's 600 million people were the "most precious" form of capital and a "tremendous strength" with which to build socialism and safeguard the peace of the world. He denounced the "fantastic rumor" fabricated by "bourgeois economists" that China would be unable to feed her masses and thus would be compelled to commit aggression against her neighbors. However, he conceded that "in an economically underdeveloped country, rapid increase in population may cause difficulties of living."²⁸ Also about November 1954, the State Statistical Bureau and the Ministry of Public Health abandoned their experimental work in the registration of vital statistics which had been conducted since before 1952 in a sample of urban and rural areas with a population of some 7.5 million persons. One of the reasons given for the discontinuance was the duplication of registration work between the local health offices and the local branches of the Ministry of Internal Affairs and the Ministry of Public Security,²⁹ which were in charge of population registration in rural and urban areas, respectively. Another reason was that the investigations were being used by certain "bourgeois" students of vital statistics in China as a device for promoting Malthusian population theory, hence the termination of the investigations was a blow to these reactionaries.³⁰

On November 1, 1954, Pai Chien-hua, in his commentary on the final census figures released a set of vital rates that were undoubtedly based on the Ministry of Public Health investigations and were subsequently included in an annual series of "national" vital rates. About 2 months later, on December 27, 1954, a symposium was convened in Peking by no less a figure than Liu Shao-ch'i to discuss "the problem of birth control," after which the Second General Office of the State Council directed "the responsible officials of the relevant departments" to organize research groups "for the discussion of the contraception problem."³¹ Once again, the fact that these steps had been taken was not revealed until March 1957.

In March 1955, the Seventh National Congress of the CCP issued a statement implying limited support for birth control, but no word of

²⁷ *Ibid.*

²⁸ Pai Chien-hua, "600 Million People—A Great Strength for Socialist Construction of China," *JMJP*, Nov. 1, 1954; translated in *SCMP*, No. 926, Nov. 11-12, 1954, pp. 32-34.

²⁹ "Chung-hua jen-min kung-ho-kuo kuo-chia t'ung-chi-chü kuan-yü t'ing-pan sheng-ming t'ung-chi shih-pan kung-tso ti i-chien," ("Opinion of the State Statistical Bureau of the People's Republic of China Concerning Termination of Vital Statistics Experimental Work"), Nov. 1, 1954; in State Statistical Bureau, *T'ung-chi kung-tso chung-yao wen-chien hui-pien* (*A Compilation of Important Documents on Statistical Work*), vol. 1, Peking, 1955, pp. 592-594.

³⁰ Ku Wei-lin, "Wo tui t'ing-pan sheng-ming t'ung-chi shih-pan kung-tso ti jen-shih" ("My Understanding of the Suspension of Vital Statistics Experimental Work"), *T'ung-chi kung-tso t'ung-hsin* (*Statistical Work Bulletin*), No. 1, Jan. 23, 1955, pp. 36-37.

³¹ "Exercise Appropriate Birth Control," *loc. cit.*

this action was given out until the Eighth Congress convened the following year, and the text of the statement was never made public.³² About this time, several articles giving instructions in the practice of contraception appeared in the main Party journals for youth and women in what seemed to be the start of a mass campaign for family limitation. The articles defended the practice against arguments that it was an expression of Malthusianism, that it would reduce China's population and thus slow economic development, and that it would foster "bourgeois decadence." They also asserted for the first time what was to become a familiar refrain in future birth control propaganda, that birth control was a "natural" and urgent "demand of the masses" that served the interests of health and "socialist construction."³³

Still the campaign did not materialize. Instead, there seems to have been some lapse of interest in birth control on the part of the Party leaders from the spring of 1955 through the summer of 1956. At the second session of the First NPC in July 1955, Shao called for a "strengthening" of propaganda for contraception and a relaxation of restrictions on sterilization. His motion was forwarded by the Committee on Motions, of which Shao was a member, via the State Council to the Ministry of Public Health, but even these modest actions were not alluded to in the press until Shao mentioned them in a speech to the third session of the Congress a year later.³⁴

The Acceleration of Agricultural Cooperativization

The faltering of the birth control movement from March 1955 to August 1956 coincided with a major new turn in agricultural policy. Birth control had gotten its start in a period of widespread food shortages following the poor harvest of 1954. From September 1954 through April 1955, local demands for supplementary grain caused a high rate of sales from the government grain reserves, which would not have been permitted if the authorities had not believed the claims of shortages genuine and serious. There were also some indications that the production "enthusiasm" of the peasants had been dampened as much by the stringent "unified purchase and sale" policy of November 1953, which obliged them to surrender all their surplus grain at less than market prices, as by the excessive rainfall of 1954. In March 1955, on the eve of spring planting, this policy was superseded by the new "three-fixed" policy, which was to establish the amount of government purchases in advance and adhere to that amount, letting the peasants retain any additional surplus they produced.

The most important development in domestic policy in 1955 was the acceleration of agricultural cooperativization. Prior to 1955, the pace of the cooperative movement had been slow, and there were intervals of retrogression. In December 1953, the Party Central Committee had set a target of 35,800 cooperatives by autumn 1954, with the possibility of reaching 40,000 or 50,000 by year's end if conditions were favorable. It was made clear that these targets were

³² "Speech by Comrade Ts'ai Ch'ang," *Eighth National Congress of the Communist Party of China*, Foreign Languages Press, Peking, 1956, vol. 2, p. 286.

³³ Chou O-fen, "How to Treat the Question of Contraception," *CCKN*, No. 4, Feb. 16, 1955; translated in *SCMP*, No. 1017, Mar. 29, 1955, pp. 29-30; and "How to Approach the Problem of Birth Control," *HCKFN*, No. 4 and 5, Apr. 23, 1955; translated in *ECMM*, No. 2, Aug. 22, 1955, p. 2.

³⁴ Shao-Li-tzu, "The Problem of Birth Control," *NCNA*, Peking, June 26, 1956; translated in *CB*, No. 405, July 26, 1956, p. 17.

not to be attained by coercive tactics.³⁵ Yet in spite of the adverse conditions in agriculture during 1954, more than 100,000 cooperatives had been formed by midsummer, and locally set target figures for the spring of 1955 totalled more than 600,000.³⁶ The latter figure was adopted by the Central Committee as its own target in October 1954.³⁷ Thereafter, all precautions to the contrary notwithstanding, "commandism" was again reported in the villages and the resulting peasant demoralization led to the slaughter of livestock and losses in production. Reviewing this situation on March 3, 1955, the State Council insisted that these were but the growing pains of a basically healthy movement, but more significantly it concluded that:

... In the interests of a healthy and normal development of the movement for cooperation in agricultural production, the movement for cooperativization of agriculture should be slowed down somewhat. Before the spring plowing, no new cooperatives should be established and efforts should be concentrated on reorganization of existing cooperatives, centering on spring plowing and production. The existing cooperatives should be consolidated . . .³⁸

Accordingly, the cooperatives were "reorganized" and 5 percent were eliminated.³⁹

A little later in the spring, however, the official line began to change. In May and June, the authorities clamped down on the sales of grain, charging that, with a few exceptions, "most of the peasants who said they were short of grain did not really need it."⁴⁰ What shortages there were had been caused, it was asserted, by the "false hue and cry" of hoarders who precipitated a run on the state grain stores and thus a maldistribution of the available supplies. Early in July, Vice-Premier Li Fu-ch'un called for a steady increase in cooperativization simultaneously with consolidation. He claimed that 90 percent of the cooperatives were well run and could increase agricultural yields by 10 to 20 percent within a year or two with only a small investment if properly managed. Still, he warned that undue haste and "commandism" could cause declines in production.⁴¹ At the end of July, Liao Lu-yen, Minister of Agriculture, answered critics of the Party's program for agriculture by declaring flatly that 1) the cooperativization program was not a failure but had proved its success by increasing production, 2) despite defects, the mutual aid and cooperative movements had the support of both poor and middle peasants, and 3) with a few exceptions, the lot of the peasants had improved as a result of these policies. He left no doubt that cooperativization must go forward regardless of the outcry from the rural areas.⁴² Mao himself, addressing a conference of local Party secretaries on July 31, 1955, indicated that the cooperativization movement must advance without further delay. Though he admitted that the situation at

³⁵ "CCP Central Committee Decision on the Development of Agricultural Producer Cooperatives," NCNA, Peking, Jan. 8, 1954; translated in *CB*, No. 278, Feb. 15, 1954, pp. 11 and 13; and "Correctly Carry Out CCP Central Committee's Decision on Development of Agricultural Producer Cooperatives," (editorial), *JMJP*, Jan. 9, 1954; translated in *CB*, No. 278, Feb. 15, 1954, p. 15.

³⁶ Teng Tzu-hui, "Rural Work During the Transition Period" (Speech to Rural Work Conference of the Central Committee of the New Democratic Youth League, July 15, 1954), *CKCNP*, Sept. 1, 1954; translated in *CB*, No. 306, Nov. 22, 1954, p. 4.

³⁷ Mao Tse-tung, "On the Cooperativization of Agriculture," p. 3.

³⁸ "State Council Decision on Spring Plowing and Production" (adopted by the Council on Mar. 3, 1955), NCNA, Peking, Mar. 9, 1955; translated in *CB*, No. 318, Mar. 15, 1955, p. 3.

³⁹ Liao Lu-yen, (Untitled speech before the NPC on July 26, 1955); translated in *CB*, No. 352, Sept. 1, 1955, pp. 4-5.

⁴⁰ Ch'en Yun, "On the Question of the Unified Purchase and Distribution of Grain," NCNA, Peking, July 21, 1955; translated in *CB*, No. 339, July 27, 1955, p. 8.

⁴¹ Li Fu-ch'un, "Report on the First Five-Year Plan for the Development of the National Economy" (delivered to the NPC on July 5 and 6, 1955), *Ta-kung pao*, Hong Kong; translated in *CB*, No. 335, July 12, 1955, pp. 31-35.

⁴² Liao Lu-yen, *op. cit.*, pp. 4-8.

this time was critical, he demanded an end to the debate as to whether cooperativization could develop further, whether the existing cooperatives could be consolidated, whether the movement had outpaced the "level of awakening of the masses," whether the Party had the skill to lead the masses to socialism, and so on. He ridiculed those comrades who wanted to move cautiously, likening them to "a woman with bound feet, . . . walking in an unsteady manner and . . . all the while complaining that other people are going too fast." He predicted that a "high tide" of cooperativization would arrive very soon and proposed that the yearend target figure of 650,000 cooperatives be raised to 1,300,000.⁴³

Mao's new target meant that just over a fifth of all peasant families would be in cooperatives. But by late December 1955, Mao revealed that over 60 percent of China's 110 million peasant households had "joined" the "semi-socialist," or "lower level," cooperatives.⁴⁴ By the end of January 1956, 78 percent of all peasant households were in cooperatives, including 21 percent in "higher level" cooperatives.⁴⁵ By June 1956, 91.7 percent of all households were in cooperatives, including 62.6 percent in "higher level" cooperatives,⁴⁶ and by the end of November, 86 percent were in cooperatives, of which 83 percent were in "higher level" cooperatives.⁴⁷ Only a few households in minority areas remained independent. The "movement" was virtually completed.

When he made his address on cooperativization to the conference of Party secretaries on July 31, 1955, Mao was still inclined to view population pressure as an impediment to rural development:

. . . The situation in China is as follows: due to the large population, there is a lack of cultivated land . . . , natural calamities are frequent . . . , and operational methods are backward. The broad masses of peasants, though their livelihood has been improved, or even greatly improved, after land reform, still have difficulties in many cases and are not yet prosperous.⁴⁸

Sometime between this conference and the sixth plenary session of the Party's Seventh Central Committee which convened in Peking from October 4 to 11, 1955, Mao's outlook changed to one that strikingly foreshadowed the ideas and mood from which the "leap forward" and the "people's communes" were to spring less than 3 years later. In September 1955, a compilation of documents purporting to describe the experiences of a number of local cooperatives was prepared as a handbook for rural workers, with a preface and editorial comments on each selection written by Mao, and circulated in prepublication draft to local Party committees for comment.⁴⁹ After the Party plenum, the collection was revised and published early in 1956, with Mao as "editor." In his commentaries, Mao still conceded that there was a surplus of labor power in rural areas, but he insisted that with the full utilization of this labor under socialization the surplus would become a

⁴³ Mao, *op. cit.*, pp. 1-13.

⁴⁴ Mao Tse-tung, preface to *Chung-kuo nung-ts'un ti she-hui-chu-i kao-ch'ao* (*Socialist Upsurge in China's Countryside*), People's Publishing House, Peking, vol. 1, 1956, pp. 1-4. The preface is dated Dec. 27, 1955.

⁴⁵ Ch'en Po-ta, "The Socialist Transformation of China's Agriculture," NCNA, Peking, Feb. 2, 1956; translated in *CB*, No. 377, Feb. 15, 1956, p. 36.

⁴⁶ "The Gigantic Achievements in Socialist Construction and Transformation During the First Half of 1956," *T'ung-chi kung-tso t'ung-hsin* (*Statistical Work Bulletin*), No. 15, Aug. 14, 1956; translated in *ECMM*, No. 55, Oct. 29, 1956, p. 3.

⁴⁷ "Agricultural Cooperation in 1956," NCNA-English, Peking, Jan. 1, 1957; in *SCMP*, No. 1443, Jan. 4, 1957, p. 8.

⁴⁸ Mao Tse-tung, "On the Cooperativization of Agriculture," p. 8.

⁴⁹ "Communique of C.P. Central Committee on 6th Plenary Session," NCNA, Peking, Oct. 15, 1955; translated in *SCMP*, No. 1151, Oct. 15-18, 1955, pp. 7-8.

shortage and productivity would rise, because "the masses of the people possess unlimited creative power."⁵⁰ Because of the "colossal latent capacity among the masses of peasants," there would be no need for investment of capital, since they could raise most of what they required by their own efforts.⁵¹ When the individual peasant household economy had been completely replaced by the collective economy, eliminating all traces of private ownership of land, livestock, and implements, production would greatly increase. Mao confidently predicted that by the end of the third five-year plan period in 1967, the output of grain and other crops would probably have increased by between 100 and 200 percent. "The masses," he declared, "have seen their bright future."⁵² With the future so bright, the present looked less gloomy at least to the Party leaders, and the need for birth control less pressing.

The euphoria continued into the first part of 1956. In January, Liao Lu-yen cited the large population as one of the factors that would enable China to realize its ambitious targets for agricultural production.⁵³ Early in February, Ch'en Po-ta, Mao's personal secretary, told the CPPCC that China was not overpopulated but could absorb "at least another 600 million people," contrary to the evil rumors spread by foreigners and still believed by some people in China.⁵⁴ In April, Chou En-lai told a group of foreign visitors in Peking that, since the rate of increase in food production exceeded the rate of increase in population, the growth of the population would cause no difficulties. He asserted that China needed population and therefore did not need birth control.⁵⁵

Recurrence of Food Shortages

However, the bright future darkened somewhat in the spring of 1956 as it became necessary to issue special orders on how to deal with spring famine,⁵⁶ and a further "check-up" and reorganization of the state grain distribution system was ordered.⁵⁷ By June the discussion of food problems had begun to take a distinctly pessimistic turn. An article in the journal *Grain Work*, the official organ of the Ministry of Food, explained that the food problem was caused by the increasing demand for grain, which in turn was due in part to rising levels of living and in part to population growth. The article pointed out that food imports could not solve the problem because of the size of the country.⁵⁸ In the same month, Food Minister Chang Nai-ch'i, in a report to the third session of the NPC, cited official food and population figures for 1955 to show that, even though the per capita food grains available were higher than in previous years, the amount was

⁵⁰ Mao Tse-tung, *Chung-kuo nung-ts'un te she-hui-chu-i kao-ch'ao*, pp. 27-28.

⁵¹ *Ibid.*, pp. 32-33.

⁵² *Ibid.*, pp. 43-44.

⁵³ Liao Lu-yen, "Explanations on the Draft 1956-67 National Program for Agriculture Development," Peking, Jan. 26, 1956; translated in *SCMP*, No. 1219, Jan. 31, 1956, p. 23.

⁵⁴ Ch'en Po-ta, *loc. cit.*

⁵⁵ W. R. Geddes, *Peasant Life in Communist China*, Monograph No. 6, Society for Applied Anthropology, Cornell University, Ithaca, N. Y., 1963, p. 16.

⁵⁶ "State Council Directive on Relief Work to Tide Over Spring Famine," NCNA, Peking, Mar. 25, 1956; translated in *SCMP*, No. 1250, Apr. 3, 1956, pp. 6-8.

⁵⁷ "Check Up and Reorganize Planned Marketing of Grain in the Countryside," (editorial), *Ta-kung pao*, Tientsin, Mar. 16, 1956; translated in *SCMP*, No. 1256, Mar. 27, 1956, pp. 13-15.

⁵⁸ Lu Chih-heng, "The Food Problem and Party Food Policy During the Transition Period," *Liang-shih kung-tso (Grain Work)*, No. 12, June 29, 1956; translated in *ECMM*, No. 51, Sept. 10, 1956, pp. 11-12 and 17.

"not really much."⁵⁹ Subsequently, it was disclosed that natural disasters had occurred, one after another, from the beginning of the summer, and in August the Ministry of Agriculture issued an emergency notice on calamity relief and called for urgent efforts to increase production of late crops.⁶⁰ In September, a responsible official of the Central Relief Committee told an NCNA correspondent that the situation in respect to natural calamities and famines was again serious, though not as acute as in 1954.⁶¹

Public concern about the adequacy of food supplies led to an increased demand for supplementary grain from the state stores, which drove sales to an "abnormal" level soon after the early rice crop was harvested.⁶² The Party Central Committee became concerned that the food crisis of the previous year was about to be repeated.⁶³ Toward the end of October, the State Council conceded that, despite the "unreasonable sales" of grain, a policy of relaxation of control over rural markets had been in force for 2 months, resulting in the complete abandonment of state grain purchases in some areas,⁶⁴ and the same complaint was repeated a month later.⁶⁵ The State grain procurement plan for the summer was not fulfilled. It was admitted that among the cooperatives there was a conspiracy to frustrate procurement work as the local cadres and peasants contrived to retain their grain surpluses rather than sell them to the State.⁶⁶ The government itself was reacting to the threatened crisis with confusion and uncertainty, an indication that, though they expressed confidence in public to calm the people, the Party leaders were gravely concerned.

Their misgivings related not merely to the grain situation but also to the broader question of whether or not cooperativization had increased agricultural production and thus assured solution of the problems of population growth and economic development. In the middle of June 1956, Li Fu-ch'un and Teng Tzu-hui still insisted that in accelerating cooperativization Chairman Mao and the Party had exercised "timely and correct leadership" and had overcome such "shortcomings and mistakes" in rural work as the "underestimation of the people's socialist initiative" and the setting of unduly modest targets for "social transformation" and production increase. But Li also noted the reappearance of the "deviation" of "making haste and going ahead adventurously" and Teng warned that the principle of voluntariness had been ignored and that production plans were not being based on "concrete circumstances."⁶⁷ At the end of the month a

⁵⁹ Chang Nai-chi, "The Food Situation in China" (Report to the third session of the First NPC.) NCNA, Peking, June 26, 1956; translated in *CB*, No. 407, Aug. 17, 1956, pp. 25-26.

⁶⁰ "Ministry of Agriculture Calls for Increased Production of Late Crops," NCNA, Peking, Aug. 17, 1956; translated in *SCMP*, No. 1360, Aug. 29, 1956, p. 9.

⁶¹ "Central Relief Committee Spokesman on Current Famine Situation," NCNA, Peking, Sept. 3, 1956; translated in *SCMP*, No. 1372, Sept. 18, 1956, pp. 3-4.

⁶² "CCP Central Committee and State Council Directive on Present Sale of Grain and After-Autumn Unified Procurement and Marketing of Grain," *JMJP*, Oct. 14, 1956; translated in *SCMP*, No. 1400, Oct. 30 1956, pp. 10-12.

⁶³ "Take a Correct View of the Improved Grain Situation in Our Country," (editorial), *JMJP*, Oct. 14, 1956; translated in *SCMP*, No. 1400, Oct. 30, 1956, p. 12.

⁶⁴ "State Council Directive on Relaxation of Rural Market Control," NCNA, Peking, Oct. 24, 1956; translated in *SCMP*, No. 1408, Nov. 9, 1956, p. 11.

⁶⁵ "Bring Grain Sales Rapidly Under Control" (editorial), *JMJP*, Nov. 24, 1956; translated in *SCMP*, No. 1421, Nov. 30, 1956, p. 6.

⁶⁶ Su Hsiu-lin, "Is There Enough Grain for People To Eat This Year?" *Shih-shih shou-t'ie* (*Current Events*) No. 20, Oct. 25, 1956; translated in *ECMM*, No. 61, Dec. 17, 1956, pp. 27 and 29.

⁶⁷ Li Fu-ch'un, "The Situation Relating to the Implementation of the First Five-Year Plan," NCNA, Peking, June 18, 1956; translated in *CB*, No. 393, June 28, 1956, p. 4; and Teng Tzu-hui, "Development of Agricultural Cooperation in the Past Year," NCNA, Peking, June 19, 1956; translated in *CB*, No. 393, June 28, 1956, pp. 22 and 26.

People's Daily editorial complained that the "work style of compulsion and commandism" had once again been exhibited by the local cadres, who set targets with "blind optimism" and threatened with disciplinary action anyone who resisted or failed to fulfill the plans.⁶⁸ The same cadres, who had been charged by Mao with underestimating the revolutionary enthusiasm of the masses for cooperativization were now charged with the very opposite:

In the midst of the high tide of agricultural cooperation, some comrades, affected by the enthusiasm of the masses, overestimate the degree of awakening on the part of the masses, and underestimate the reasonable demands of the masses, so that very often consciously and unconsciously (they) overemphasize collective interests and inappropriately neglect the individual interests of the members . . . arousing the dissatisfaction of the members.⁶⁹

These problems continued throughout the summer, yet the pressure for completion of cooperativization was not relaxed. In November it was admitted that the fundamental cause of "commandism" among lower level cadres was the arbitrariness of plans and targets imposed on them by higher level cadres who charged them with "disobedience to State plans" if they did not carry out their assignments.⁷⁰ After cooperation, Mao had said, production miracles were possible, and the cadres in the rural areas, seeking the miracles expected of them, had resorted to measures that were "technically incorrect," resulting in losses in production⁷¹ and damage to the "enthusiasm" of the peasants.⁷² Caught in the contradiction between the "subjective" demands of higher levels and the limitations of the "objective" conditions in the cooperatives, the lower level cadres had made the "mistake of getting divorced from reality."⁷³

Planting the "Hundred Flowers"

To reduce the danger that peasant alienation would damage agricultural production, the Party leaders called for "democratic"⁷⁴ management in the cooperatives. At the same time, they began to encourage a certain amount of relatively free exchange of ideas and criticisms within intellectual circles, and the policy was subsequently extended to other segments of society. It became known as the "hundred flowers" policy because of the classical saying that served as its slogan: "Let a hundred flowers bloom and a hundred schools of thought contend." The policy was announced by Lu Ting-yi, chief of the Party Central Committee's Propaganda Department, in a speech to a gathering of social scientists, doctors, writers, and artists on May 26, 1956, though the ideas were reportedly first advanced by Mao in his address to the Supreme State Conference on May 2, the text of which is not available. Lu made it clear that the new freedom was available only to certain groups of intellectuals and that it would not include the freedom to challenge fundamental tenets of the Party, though it

⁶⁸ "Cooperatives Cannot Be Properly Run with Methods of Compulsion and Commandism" (editorial), *JMJP*, June 27, 1956; translated in *SCMP*, No. 1326, July 11, 1956, pp. 5-7.

⁶⁹ "Build Up the New Socialist Countryside" (editorial), *JMJP*, July 2, 1956; translated in *CB*, No. 399, July 13, 1956, p. 32.

⁷⁰ "Overcome Obstacles to Democratic Management of APC's" (editorial), *JMJP*, Nov. 28, 1956; translated in *SCMP*, no. 1428, Nov. 11, 1956, p. 16.

⁷¹ "Is Planning Still Needed for the Cooperatives?" (editorial), *JMJP* Sept. 7, 1956; translated in *SCMP*, no. 1482, Oct. 3, 1956, p. 9.

⁷² "Directive of CCP Central Committee and State Council on Strengthening Production Leadership and Organizational Construction in Agricultural Producer Cooperatives," *NCNA*, Peking, Sept. 12, 1956; translated in *SCMP*, no. 1382, Oct. 3, 1956, p. 16.

⁷³ "Overall Solution of the New Problems Arising After Agricultural Cooperativization" (editorial), *JMJP*, Sept. 13, 1956; translated in *SCMP*, no. 1382, Oct. 3, 1956, p. 16.

would permit criticism of the shortcomings of individual Party members.⁷⁴ By November the application of the new policy had been broadened to include the relationships between peasants and cadres in the cooperatives. The cadres were to listen to the dissenting views advanced by the peasants. To encourage the peasants to express themselves, the cadres were to call meetings during the fall and winter in which they would publicly conduct self-criticism and submit humbly to criticism by the peasants.⁷⁵

To set an example for the cadres in the cooperatives, the *hsien* level cadres were directed to criticize their own errors in leadership,⁷⁶ and as the new pattern of ritual self-flagellation became general practice, a glum mood fastened on the junior cadres. The young comrades, wearied by incessant meetings and drives, discouraged by poor harvests and low living levels, and now obliged to accept personal criticism for doing what a few months earlier had been demanded of them by higher authorities, were beginning to doubt the prospects not only of the cooperatives but of their own careers.⁷⁷ The same doubts apparently troubled some of Mao's senior colleagues. They did not openly challenge Mao's leadership, and option that would not have been open to them, but the tone and substance of the highly defensive official statements about agriculture indicate the prominence of the doubters and the nature of their doubts.

In essence, the Party leadership claimed that, though the difficulties in agriculture were real and severe, these were exceptions to the general rule that Party policies had been successful. Where the policies had miscarried, the leaders maintained, it was always due to defective implementation at lower levels. In February 1957, Teng Tzu-hui, who was directly responsible for the Party's management of rural affairs, remarked that "there are those who warn us that the broad masses are not satisfied with the cooperatives" (evidently a monument of understatement). This was a timely and helpful warning, he said, because it pointed up "mistakes" that needed correcting, but he added that it was "obviously wrong to exaggerate some of the defects and allow ourselves to become suspicious and apprehensive and even to negate the superiority of the cooperative system."⁷⁸ The next day, the *People's Daily* admitted in an editorial that the peasants had been "thrown from their seats" by the sudden turn of cooperativization and that it would take a long period of "education in collectivism" before they could be persuaded to identify their own individual interests with those of the cooperatives. The editorial asserted that, "beyond any shadow of doubt," "the key to strengthening the agricultural producer cooperatives lies in increased production and increased earnings of members."⁷⁹ But doubts were mounting in official circles as to whether or not this key lay within the Party's grasp.

⁷⁴ Lu Ting-yi, "Let All Flowers Bloom Together, Let Diverse Schools of Thought Contend," *JMJP* June 13, 1956; translated in *CB*, no. 406, Aug. 15, 1956, pp. 3-18.

⁷⁵ "Don't Be Afraid of Opposing Views" (editorial), *JMJP*, Oct. 9, 1956; translated in *SCMP*, No. 1397, Oct. 25, 1956, pp. 5-7.

⁷⁶ "CCP Central Committee and State Council Directive on Questions of APC Distribution of Autumn Harvests," NCNA, Peking, Nov. 25, 1956; translated in *SCMP*, no. 1428, December 11, 1956, pp. 11-12.

⁷⁷ "Comrades, Are You Disappointed?" (editorial), *CKCNP*, Dec. 19, 1956; translated in *SCMP*, no. 1447, Jan. 10, 1957, pp. 9-12.

⁷⁸ Teng Tzu-hui, "Report to the National Conference of Agricultural Labor Models," NCNA, Peking, Feb. 21, 1957; translated in *SCMP*, no. 1482, Mar. 5, 1957, p. 20. The moderate tone of Teng's response to the unnamed critics and his use of the first person plural in discussing their doubts and apprehensions shows that their numbers and standing were such that they could not be dismissed peremptorily.

⁷⁹ "Inculcate Collectivism in the Peasants," *JMJP*, Feb. 22, 1957; translated in *SCMP*, no. 1482, Mar. 5, 1957, pp. 7-9.

The Revival of Birth Control

The growing doubts about the Party's policies in food and agriculture coincided with the resolution of doubts about policies in regard to population and birth control. In June 1956, Madame Li Teh-ch'uan, Minister of Public Health, acknowledged in a report to the NPC that the Ministry's work on birth control had been inadequate:

We have not taken up enough propaganda on the question of birth control, which affects the health of women and children, the education of children, and the prosperity of the nation. From now on there must be further developed propaganda and education and the strengthening of technical guidance in the matter under the leadership of the Party and the government and in conjunction with other relevant units.⁸⁰

In these two brief sentences, which came toward the end of her report, there was little to suggest that a new urgency was about to be attached to the matter. A few days later, however, Shao Li-tzu quoted Li's words in his own address to the Congress, as if to underline her commitment, and professed himself happy with her "frank" admission of the Ministry's past negligence. He commended her, somewhat gratuitously, for having "correctly evaluated the importance of the problem of birth control" and said that he was "fully satisfied" with her report. To show that he was not satisfied at all, he pressed the Ministry on several other aspects of its birth control work and expressed the hope that the other deputies to the congress would "notice this report and join me in paying close attention to the practical measures to be adopted in future by the Ministry in regard to birth control."⁸¹

Shao must have had reason to suppose that surveillance by the normally acquiescent Congress could force a central government organ to act against its own inclinations, an expectation scarcely justified by precedent. In any case, he was not disappointed this time. Within 2 weeks apparently, a firm decision was taken in support of a national birth control campaign. The first indication of what was pending was an authoritatively worded editorial in a Peking paper on August 3 which took the health departments and other agencies to task for not conducting effective propaganda or maintaining an adequate supply of contraceptives. The editorial asserted that the "voice of the masses demanding contraceptive knowledge is now heard far and wide" and declared that dissemination of birth control in the countryside was "the order of the day."⁸² On August 6, the Ministry of Public Health issued a directive to all local health departments ordering them to set up birth control clinics, train cadres in birth control guidance, improve the supply of contraceptives, and exert the leadership necessary to accomplish the job.⁸³ The first birth control campaign in the PRC was at last really launched.

Chinese Marxist Malthusianism

As the campaign gathered momentum, it was justified by a theoretical rationale that included increasingly pessimistic views of China's

⁸⁰ Li Teh-ch'uan, "New Tasks for the Protection of Public Health," NCNA, Peking, June 18, 1956; translated in *CB*, No. 405, July 26, 1956, p. 15.

⁸¹ Shao Li-tzu, "The Problem of Birth Control," pp. 16-17.

⁸² "For Active Dissemination of Contraception Knowledge" (editorial), *KMJP*, Aug. 3, 1956; translated in *SCMP*, No. 1352, Aug. 17, 1956, pp. 2-4.

⁸³ "Wei-sheng-pu fa-ch'u kuan-yü pi-yün kung-tso chih-shih" ("Ministry of Public Health Issues Directive Concerning Contraceptive Work"), *KMJP*, Aug. 13, 1956.

demographic prospects. In August 1956, Chou En-lai told a delegation of agricultural specialists from India that India and China were alike in having "too many people on too little land."⁸⁴ In September, he gave a brief but significant endorsement of birth control in his report on the drafting of the Second Five-Year Plan:

To protect women and children and bring up and educate our younger generation in a way conducive to the health and prosperity of the nation, we agree that a due measure of birth control is desirable. Health departments should, in cooperation with other institutions concerned, carry out intelligent propaganda and adopt effective measures toward this end.⁸⁵

Chou was speaking on behalf of the Party Central Committee. His remarks on birth control were warmly endorsed by Ts'ai Ch'ang, First Secretary of the Committee's Commission in Charge of Work Among Women, who explained the campaign as a response to "the desire of large numbers of men and women cadres and the masses of the people for birth control." Referring back to the Party's decision of March 1955, Ts'ai Ch'ang stated her unequivocal opinion that the decision should be "firmly put into practice."⁸⁶ In November the Ministry of Public Health convened a national forum of women's and children's health workers in Peking at which implementation of the Ministry's August directive was the focus of discussion.⁸⁷ Thereafter the press began to report the formation of birth control guidance committees by local health offices under the supervision of local Party leaders.

The greatest single push given the birth control campaign came from Mao himself in a speech to the 1,800 members of the Supreme State Conference on February 27, 1957, on the subject of "contradictions among the people." This phrase was used by Mao to denote all kinds of conflicting tendencies and forces in Chinese society and culture, including the "contradiction" between population growth and economic development. Mao spoke for 4 hours without a prepared text, and the tapes of his address were subsequently replayed before other gatherings throughout the country, but no one outside China knows exactly what he said. A businessman who heard the recorded speech in the auditorium of the Shanghai Party Committee in April 1957 and later defected to the West says that the audience was told that the speech was to be kept secret for the time being and that no one was to take notes on it or discuss it.⁸⁸ In any case, although the speech caused great excitement in Party, government, and "intellectual" circles in China and was often referred to in publications, it was never quoted directly, a remarkable departure from the usual practice of quoting Mao verbatim to the point of suffusion. A text of the speech, said to have been revised by the author, was finally released on June 15, 1957. It is obviously much shorter than Mao's original discourse and much altered in content and spirit. There is little in this text that would explain the excitement so widely reported after February 27.

Among those most exhilarated by the speech were the advocates of birth control. What Mao had to say on the subject may be infer-

⁸⁴ Government of India, Ministry of Food and Agriculture, *Report of the Indian Delegation to China on Agricultural Planning and Techniques*, Delhi: Government of India Press, 1956, p. 22.

⁸⁵ Chou En-lai, "Report on the Second Five-Year Plan" (presented before the Eighth National Congress of the Chinese Communist Party on Sept. 16, 1956), NCNA, Peking, Sept. 20, 1956; translated in *CB*, No. 413, Oct. 5, 1956, p. 30.

⁸⁶ "Speech by Comrade Ts'ai Ch'ang," pp. 285-286.

⁸⁷ "National Forum of Women and Children Health Workers Discusses Practice of Contraception," NCNA, Peking, Nov. 25, 1956; translated in *SCMP*, No. 1430, Dec. 13, 1956, pp. 18-19.

⁸⁸ Robert Loh, *Escape from Red China*, New York: Coward-McCann, Inc., 1964, pp. 288-289.

red from the comments of some of the people who heard him. One was a Peking doctor, who said:

The wise directive of Chairman Mao concerning the need for planned birth control to regulate the population of China is deeply touching to all the intellectuals in the medical and public health circles. This highly creative directive is of great political, economic, historical and international significance. We medical workers must respond warmly to the call of Chairman Mao along with all the people of the country. We must take action so that this glorious and great task can be well carried out. . . . There can be no doubt that under the leadership of the Party and Chairman Mao the Chinese people will have both the determination and confidence in their ability to carry out the glorious task of first class political significance entrusted to us by Chairman Mao. . . . The wise directive of Chairman Mao in this connection is exactly what all the people in China want because it conforms to the highest interests of the Chinese people.⁸⁹

Shao Li-tzu, who also heard Mao's speech, added:

When making a report on the problem of handling the internal contradictions among the people at the meeting of the Supreme State Conference, Chairman Mao also said that birth control should be promoted in order to control the population in a planned way. Since backward production forces and the rapid rise in the population increase rate is one of the principal contradictions at present, the advocacy of contraception is a correct way of handling the problem.⁹⁰

Another of Mao's listeners recalled that Mao had attached high priority to the birth control effort:

At present the construction of our country is being carried out in a planned way and with leadership, but the birth of children is without plan and without leadership. It is very obvious that this is not suitable. Chairman Mao has criticized this situation and pointed out that a great effort should be made to promote birth control from now on.⁹¹

A report from sources in Warsaw later in the year claimed that Mao's remarks included a statement that the large number of births were a sign of medical progress but that:

this figure must also be of great concern to us all . . . The increase in grain harvest for the last two years has been 10,000,000 tons a year. This is barely sufficient to cover the needs of our growing population . . . It is estimated that at present 40 percent of our youth have not been placed in primary schools. Steps must therefore be taken to keep our population for a long time at a stable level, say, of 600,000,000. A wide campaign of explanation and proper help must be undertaken to achieve this aim.⁹²

A delegate to a provincial people's congress, in an apparent breach of confidentiality, said that Mao had warned the Supreme State Conference that when the population of China reached 6 billion it would hasten its own extinction,⁹³ and another person, who cited this figure

⁸⁹ Chung Hui-lan, "Population and Birth Control" (speech to the Third Session of the Second CPPCC National Committee, Mar. 14, 1957), *JMJP*, Mar. 17, 1957; translated in *CB*, No. 445, Apr. 5, 1957, pp. 14-21.

⁹⁰ Shao Li-tzu, "Ho chih-kung t'ung-chih-men t'an 'chi-hua sheng-yu'" ("Talking about 'Planned Births' with Worker and Employee Comrades"), *KJJP*, Peking, May 21, 1957. One of Mao's listeners who was opposed to the active promotion of birth control attempted to read the message of Mao's speech differently. Addressing the Liaoning Provincial People's Congress, he said: "In the speech delivered by Chairman Mao at the Supreme State Conference concerning overall planning, all-around consideration, and proper arrangements, he mentioned that man lives to produce and propagate. Because of too many births, the promotion of birth control may be studied. These words are worth our deep thought and careful study. The Chairman did not say that a large population is terrifying and he did not say that birth control is good. The Soviet Union encourages births. Those who have many children are rewarded. Those who should have children but are without them are taxed. Why do we not learn from the Soviet Union about encouraging births, instead of learning from Malthus about promoting contraception?" (Wang Feng-chang, "Wei-hu chung-hua min-t's'u fa-chai chen-chung yen-chiu pi-yün wen-t'i" ("Protect the Development of the Chinese People; Study the Problem of Contraception Carefully"), *Liao-ning jih-pao*, Shenyang, May 18, 1957.) Wang's interpretation seems to have been a minority view.

⁹¹ Chou Chih-chung, "Ying chia-ch'iang chieh-yü hsüan-ch'uan ho pi-yün chih-tao" ("Birth Control Propaganda and Contraceptive Guidance Should Be Strengthened"), *Hsin Hu-nan pao*, Changsha, May 31, 1957.

⁹² Quoted in "Communist China—the Population Problem," *Current Notes on International Affairs*, Canberra, vol. 29, No. 11, Nov. 1958, p. 717.

⁹³ K'ung Hsi-wu, "Chien-i chao-k'ai chieh-yü kung-tso hui-i" ("Birth Control Work Conference Proposed"), *Hei-lung-chiang jih-pao* Harbin, June 11, 1957.

in a letter without attribution to Mao, indicated that it was to be reached in "another 50 years."⁹⁴ Demographically, Mao's statements are implausible, but they indicate clearly that Mao had assumed an essentially Malthusian view of China's population problems. He may, in fact, have been the first and thus far the only head of a national government to advocate "zero population growth."

That Mao's position was understood to be Malthusian by his colleagues is further attested by the frequency of Malthusian statements by other prominent leaders during the year following his speech. On March 7, Madame Li Teh-ch'uan told the CPPCC that:

our country is a large, populous country, and . . . in the course of our Socialist construction various undertakings are being developed in a planned manner. If our population growth is not in accordance with planned childbirth, it will prevent our country from quickly ridding itself of poverty and becoming prosperous and powerful. . . . With such a high rate of population growth, the increase in our industrial and agricultural production, however rapid, will certainly fail to satisfy adequately the requirements of the increased population . . .

Our birth rate is really very high. . . . Illness caused by malnutrition is serious. . . . Although the State, under the present circumstances, can give some relief to such families, they remain in great want and are unable to look after and bring up their children satisfactorily.⁹⁵

Vice-Premier T'an Chen-lin said that China's "basic difficulty" was a large population on limited land.⁹⁶ The chief agricultural planner of the State Planning Commission, Wang Kuang-wei, said that the large population and the "relatively small" amount of farmland was "the main feature of our backward agricultural country."⁹⁷ Yang Po, an authoritative writer on economic subjects at that time, listed "populousness, inherent impoverishment, and backwardness" as "some dominating features" of the Chinese economy.⁹⁸

The Non-Communist Academicians Join the Campaign

Meanwhile, encouraged by the somber realism of Mao's "contradictions" speech and by the opportunities afforded by the "hundred flowers" policy, a number of Western trained social scientists gave enthusiastic support to the birth control campaign. Some began to take a new interest in the study of population problems and population theory to explain China's current demographic situation and prospects. Marx's prediction that each social system followed its own inherent "law" of population seemed to invite would-be theoreticians to discover and set forth the particulars of the "law" of population under socialism and to show how it differed from the Malthusian thesis. The first academician to deal with the question in a systematic way was Wang Ya-nan, president of Amoy University. In a book published in December 1956, Wang took note of the fact that the census results had

⁹⁴ "T'i-ch'ang chieh-yü shih-pu-shih p'a mei-yü ch'in-te?" ("Is the Advocacy of Birth Control Based on Fear of Not Having Enough Food?"), *Yün-nan jih-pao*, Kunming, June 4, 1957.

⁹⁵ Li Teh-ch'uan, "Birth Control and Planned Families," *JMJP*, Mar. 8, 1957; translated in *CB* No. 445, Apr. 5, 1967, pp. 2-3. In the first line of the quote, the word "populous" has been substituted for the word "overpopulated" which appears in the *CB* translation, because "populous" is closer to the literal meaning of the Chinese expression "jen-k'ou-tung-tuo-te" used by Madame Li.

⁹⁶ T'an Chen-lin, "A Preliminary Study of the Income and Living Standard of the Peasants of China," *JMJP*, May 5, 1957; translated in *SCMP*, No. 1555, June 21, 1957, p. 32.

⁹⁷ Wang Kuang-wei, "How to Organize Agricultural Labor Power," *Ch'i-hua ching-chi (Planned Economy)*, No. 8, Aug. 9, 1957; translated in *ECMM*, No. 100, Sept. 23, 1957, p. 11.

⁹⁸ Yang Po, "A Study of Distribution of China's National Income," *Ching-chi yen-chiu (Economic Research)*, No. 6, Dec. 17, 1957; translated in *ECMM*, No. 122, Mar. 10, 1958, p. 12. Here again the translation cited uses "overpopulation" to render the Chinese expression "jen-k'ou-to." Though the idea toward which all these writers were tending was that China's population was not merely large but too large, none of them actually used any of the several Chinese expressions that clearly mean "overpopulation." Some of the non-Communist academicians were, however, less cautious.

caused many people to worry that the size of China's population and its high rate of increase would complicate the problems of surplus labor in urban and rural areas, low levels of living, and persistent famines and undernutrition. Pinning his hopes on the "socialist upsurge" in agriculture, Wang tried to assure the doubters that the promise of Marxism would be fulfilled, that poverty and backwardness would soon be eliminated in China as in the Soviet Union, and that China's large population was no cause for anxiety but a guarantee of a happy future.⁹⁹

Wang was the unfortunate victim of an accident of bad timing, for only 2 months after his book appeared, Mao's turn toward Malthusianism opened up a public debate on the issue of Marxist versus Malthusian views of population in which the defenders of the Marxist position soon got the worst of it. They were at a considerable disadvantage, since they were less knowledgeable about population than many of the non-Communist academicians who opposed them, and their obligation to relate the need for birth control to Marxist dogmas while maintaining a polar distance from Malthus severely limited their freedom of argument. On top of this, they faced an increasingly skeptical public without the unequivocal support of the Party leadership that had been available to apologists for the official line in the past.

In March 1957, the internationally known sociologist Wu Ching-ch'ao published an article setting forth his own population theory. Wu began with the assumption that the basic task of socialism in China was to transform an economically backward country into a modern industrial nation. This required an increase in production, which could be achieved either by increasing the size of the labor force or by increasing its productivity. The latter was preferable, as Soviet experience had shown, but to increase the productivity of labor it was necessary to invest in a higher level of technology, which China could not do quickly without first slowing the rate of population growth. The current rate was, he said, incompatible with the "basic law of socialism." As a parting thought, he reminded his readers that under present circumstances, mechanization was bound to displace a great deal of surplus labor, a problem for which, he added disarmingly, he had no solution to offer.¹⁰⁰

Wu's article was so tightly reasoned that official spokesmen had great difficulty in attacking it on logical grounds. However, they accused him of malice aforethought in posing a problem without a solution and claimed that his true intent was to show that the necessary conditions for socialism did not exist in China and that attempts to establish it were therefore futile.¹⁰¹ There is some reason to suspect that this was in fact Wu's objective, for, although he included the standard protestations of confidence that the regime would succeed in lowering the birth rates and thus in easing "the present tension," he also pointed out that "this of course cannot be accomplished overnight."¹⁰²

⁹⁹ Wang Ya-nan, *Marxist Population Theory and China's Population*, Scientific Publishing House, Peking, December 1956; concluding chapter translated in *ECMM*, No. 84, May 27, 1957, pp. 1-12.

¹⁰⁰ Wu Ching-ch'ao, "A New Treatise on the Problem of China's Population," *Hsin chien-she (New Construction)*, No. 3, Mar. 3, 1957; translated in *ECMM*, No. 78, Apr. 15, 1957, pp. 1-6.

¹⁰¹ Chu Pao-yi, "Refutation of Wu Ching-ch'ao's Slanderous Remarks Against the Chinese People on the Population Issue," *Tsai-ching yen-chiu (Finance and Economics)*, No. 1, Feb. 15, 1958; translated in *ECMM*, No. 128, May 12, 1958, pp. 17-21; and Wang Tso and Tai Yuan-chen, "Criticism and Appraisal of the 'New Theory of Population,'" *Ching-chi yen-chiu (Economic Research)*, No. 2, Feb. 17, 1958; translated in *ECMM*, No. 128, May 12, 1958, p. 7.

¹⁰² Wu Ching-ch'ao, *op. cit.*, pp. 12 and 16.

How long it might take, Wu did not say, but another sociologist internationally known as a specialist in the population of China, Ch'en Ta, writing in the same journal in May 1957, offered to look into the matter. Demographic data for China were not adequate to answer the question, Ch'en said, but the experience of other countries suggested that to lower the birth rate from 37 per thousand population per year to 17, as Wu and others had been suggesting, had taken a minimum of 28 years among socialist countries and 20 years in capitalist countries. With the advantage of a State-sponsored program, China might be able to reduce somewhat the time required for this process, but because the population was largely uneducated and so many areas relatively inaccessible, no visible reduction of the birth rate was to be expected very soon.¹⁰³ The combination of Ch'en's rather discouraging view of demographic prospects with Wu's equally unpromising outlook in regard to manpower tended to cast doubt on the future of economic development and the wisdom of the Party's development strategies.

An even more forceful argument on the disadvantages of a rapidly growing population was advanced by the noted economist and president of Peking University, Ma Yin-ch'ü. He had been thinking about the subject for some time, and had presented a paper on it to a meeting of NPC members in Chekiang Province in 1955, most of whom dissented, some on the grounds that his views were Malthusian. After hearing Mao's talk to the Supreme State Conference, which "mentioned definitely the population problem in China," Ma presented a brief summary of his old manuscript to the Conference.¹⁰⁴ What response it received he does not say, but he repeated his presentation at the inaugural meeting of the Birth Control Technical Guidance Committee on March 31,¹⁰⁵ and on April 27 he gave a talk on population problems and scientific research to the entire staff and student body of Peking University.¹⁰⁶ On July 3, 1957, after the end of the "hundred flowers," Ma circulated a revised paper setting forth his population theories at the fourth session of the first NPC. Though it was not among the speeches delivered at the Congress, Ma's paper was printed in full in the *People's Daily* on July 5.

The paper begins by noting that what Chairman Mao had called the chief "contradiction" in Chinese society—the choice between the "capitalist road" and the "socialist road" in agriculture—had been resolved by the peasants when they joined the cooperatives. Now, however a new one had taken its place—the "contradiction" between the limited supply of capital available for investment and the condition of overpopulation in rural areas.¹⁰⁷ To resolve the latter "contradiction," China must expand production, which required the diversion of capital from consumption into investment. Since a large and rapidly growing population would consume a major proportion of the needed surplus capital, it was a "stumbling block" to industrialization, which, as Lenin had said, was essential to the realization of socialism. Yet to

¹⁰³ Ch'en Ta, "Wan-hun chieh-yü hsin Chung-kuo jen-k'ou wen-t'i" ("Late Marriage, Birth Control, and the Population Problem of New China"), *Hsin chien-she (New Construction)*, No. 5, May 3, 1957 (supplement) pp. 1-15.

¹⁰⁴ Ma Yin-ch'ü, "A New Theory of Population," *JMJP*, July 5, 1957; translated in *CB*, No. 469, July 25, 1957, pp. 3-4.

¹⁰⁵ Yang Lin, "Shou-tu chuan-chia-men t'an chieh-yü pi-yün wen-t'i" ("Specialists in the Capital Talk about Birth Control and Contraception"), *KMJP*, Apr. 3, 1957.

¹⁰⁶ Chiang Chia, "Ma Yin-ch'ü tsai Pei-ta t'an jen-k'ou ho k'o-hsieh yen-chiu wen-t'i" ("Ma Yin-ch'ü Talks About Population and Scientific Research Problems at Peking University"), *KMJP*, Apr. 28, 1957.

¹⁰⁷ The Chinese expression used by Ma, *jen-k'ou-t'ai-to*, literally "too many people," clearly means "overpopulation."

neglect the needs of the population in favor of investment would cause disaffection among the peasants and raise the threat of a Hungarian-type revolt in China. Ma called for energetic implementation of the birth control campaign and another census in 1958 or 1963.¹⁰⁸

Other non-Communist academicians joined in what quickly became a heated public debate on population and other social and economic problems. The campaign for family limitation was identified with the "hundred flowers" in the minds of many people, perhaps because both reached full bloom at the same time. As one writer remarked, birth control, once regarded as "a Malthusian type of weed," was now "recognized as a scented flower."¹⁰⁹ The "hundred flowers" also became associated with an effort by Ch'en Ta and other non-Communist academicians to encourage demographic research. There were even some indications that Malthus himself was about to be rehabilitated, with or without the Party's blessing. Chung Hui-lan, while granting that Malthus was "wrong and reactionary" in general, felt that he was correct in saying that population increases geometrically. Dr. Chung cited projections of the Chinese population at 2, 3, and 4 percent per year to show the implications of this fact.¹¹⁰ This set off a round of estimating by amateur demographers who projected populations of 770, 800, 840, or 980 million in 15 years, 1,200 million in less than 30 years, and 2,600 million in 50 years.¹¹¹ Ma Yin-ch'u told the meeting of the China Medical Association's Technical Guidance Committee on Birth Control that Malthus was correct about the geometrical increase of population.¹¹² Soon other scholars began to espouse part or all of Malthusian theory.¹¹³ Fei Hsiao-t'ung noted that fear of being denounced as Malthusian had previously prevented people from discussing population problems but that avoidance of the subject would not eliminate the problems. It only resulted in nonscientific approaches to population, which he blamed on "those blind men" who obstructed population study.¹¹⁴

The "Rectification" of the Scholars

The arguments of the academicians apparently had a considerable appeal for Chinese intellectual circles and particularly for the young. More than a year after the end of the "hundred flowers," an article in the *People's Daily* warned that:

At the present, the most influential fallacy among youth is the theory that population increases in geometric progression, but the materials for subsistence increase in arithmetic progression. The materials for subsistence can never catch up with the rate of growth of the population.¹¹⁵

¹⁰⁸ Ma Yin-ch'u, "A New Theory of Population," pp. 1-17.

¹⁰⁹ Hsiao Teh, "Why Should We Boldly Bloom?" *CKCN*, no. 9, May 1, 1957; translated in *ECMM*, no. 95, 1957, p. 16.

¹¹⁰ Chung Hui-lan, *op. cit.*, pp. 15-16 and 18.

¹¹¹ Hu Huan-yung, "The Population Problem as Seen from the Density of the Population in Kiangsu Province," *Wen-hui pao*, Shanghai, Mar. 21, 1957; translated in *SCMP*, No. 1509, Apr. 11, 1957, p. 5; Sun Pen-wen, "Pa-i shih o-kuo tsui shih-i te jen-k'ou shu-liang" ("A Population of 800 Million Is the Most Suitable for Our Country"), *Wen-hui pao*, Shanghai, May 11, 1957; Yang Shih-ying, "T'i-ch'ang chieh-yü ti keng-chü pu shih Ma-erh-sa-su-chu-i" ("The Birth Control Campaign Is Not Malthusianism"), *Hsüeh-hsi (Study)*, No. 7, July 1957; Chang P'ei-kang, Mao Kang, and Hu Chun-chieh, "She-hui-chu-i ti jen-k'ou kwei-lü yü Chung-kuo jen-k'ou wen-t'i" ("The Law of Population Under Socialism and the Population Problems of China"), *Ching-chi yen-chiu (Economic Research)*, No. 4, Aug. 17, 1957; and Yang Lin, *loc. cit.*

¹¹² Yang Lin, *loc. cit.*

¹¹³ For example, see Kao Ch'ung-min, "Kuan-yü wo-kuò jen-k'ou wen-t'i—wen-t'i ti k'an-fa ho t'i-fa" ("The Population Problem of China—How to View and State the Problem"), *KMJF*, Apr. 23, 1957.

¹¹⁴ Fei Hsiao-t'ung, "Kuan-yü she-hui-hsiieh shuo chi-chü hua" ("A Few Words About Sociology"), *Wen-hui pao*, Shanghai, Feb. 20, 1957.

¹¹⁵ Liu Jui-lung, "The Bourgeois Theory of Agricultural Economics Must Be Thoroughly Criticized," *JMJP*, Oct. 7, 1958; translated in *SCMP*, No. 1883, Oct. 28, 1958, p. 29.

Presumably Malthusianism made sense of conditions in China that Marxism could not satisfactorily explain. In any case, the danger that the views of Malthus, whom the Chinese Communists regarded as an apostle of capitalism, might supplant those of Marx on the crucial issue of food and population in China was undoubtedly intolerable to the Party leaders. By the second week of June 1957, they had become thoroughly disillusioned with the "hundred flowers" movement, which had unleashed an unexpectedly violent outburst of criticism against the Party. Some university students had physically attacked their local Party cadres and were calling for the overthrow of the CCP and the substitution of Western-style democracy, and there were signs of mass discontent among urban workers. After some ominous warnings that "noxious weeds" had appeared among the flowers, the Party began a purge of its critics. Among those selected to undergo ideological "rectification" were some of the staunchest supporters of birth control. Over the next several years, the Party mounted a sustained attack in the press against the Malthusian ideas of "rightists" scholars.

Most of the scholars submitted to "rectification" with abject humility, accusing themselves and their lifelong friends of all sorts of ideological crimes and conspiracies. A singular exception was Ma Yin-ch'u, who persisted in defending his unorthodox theories on population and economics into the spring of 1960. In 1958 alone, Ma was attacked by "over 200 critics," at first anonymously but later by name and with mounting ferocity. Ma said that "when the polemics became violent," several close friends advised him to "retreat and admit error so as to close the matter," warning that otherwise his political position would be jeopardized, but he insisted that it was more important to set an example for his students by remaining faithful to the truth and accepting the consequences at whatever personal cost. Chou En-lai, whom Ma counted as a friend, also urged him to capitulate, but he would not.¹¹⁶ Whereupon the protection afforded him by past association with Chou was withdrawn, and the Party theoreticians closed for the kill. Coming at the old men in relays, they charged him with the "murder of Marxism"¹¹⁷ with "maliciously" obliterating the difference between socialism and capitalism,¹¹⁸ and with being a "full-fledged neo-Malthusian."¹¹⁹ Ma's spirited replies to his critics were no longer published after January 1960, and, in April 1960, the 78-year-old university president was dismissed from his post.

Despite the strident anti-Malthusian line of the Party theoreticians and the attacks on "rightists," official support for birth control was not withdrawn after June 1957. Press coverage declined, discussions of the theoretical rationale behind the campaign emphasized mainly the need to control population growth for the welfare of families and to

¹¹⁶ Ma Yin-ch'u, "My Philosophical Thinking and Economic Theory," *Hsin chien-she (New Construction)*, No. 11, Nov. 7, 1959; translated in *ECMM*, No. 195, Jan. 11, 1960, p. 46. At the end of the article, Ma tendered his thanks and apologies to Chou, whom he refers to only as "another good friend of mine" who had helped him when he was "in trouble in Chungking" and had invited him to return to China from Hong Kong in 1949. "For all this," Ma wrote, "I am very grateful. I still bear it in mind. But over the academic problem this time I did not accept his sincere advice. I am exceedingly unhappy. As I have confidence in my theory, I cannot but adhere to it and uphold the intellectual integrity. I have to refuse to submit myself to criticism. It is hoped that my friend will have an open mind and will not regard this refusal to make self-criticism as an act of resistance."

¹¹⁷ Wang Ya-nan, "More on Ma Yin-ch'u's New Philosophy and Economic Theories," *Hsin chien-she (New Construction)*, No. 2, Feb. 7, 1960; translated in *ECMM*, No. 208, Apr. 18, 1960, p. 14.

¹¹⁸ Li Lin-ku, "The Mode of Social Production and the Problem of Population—A Refutation of Ma Yin-ch'u's 'New Theory of Population,'" *Hsin chien-she (New Construction)*, No. 4, Apr. 7, 1960; translated in *ECMM*, No. 214, June 20, 1960, p. 8.

¹¹⁹ Wu Ta-kuan, "A Criticism of the Neo-Malthusian Theory," *Hsin chien-she (New Construction)*, No. 5, May 5, 1960; translated in *ECMM*, No. 219, July 25, 1960, p. 3.

speed national economic development, and there were no new high level endorsements, yet birth control work seemed to gather momentum and reach new areas during the remainder of 1957 and the first 5 months of 1958. Whatever their embarrassment over the upsurge of Malthusianism during the "hundred flowers," the Party leaders were evidently firm in their conviction that the birth rate must come down.

Conduct of the Campaign

The record of the first birth control campaign is particularly revealing because, at the time when it was being conducted, the press was used as a major channel of communication from the central and provincial authorities to the functionaries down in the ranks, and the coverage given to the strategies, tactics, successes, and failures of the campaign was extensive and fairly candid. The power of the central authorities to impose unpopular policies had just been demonstrated in the socialization movement, yet, despite all attempts to weaken it, the power of the Chinese family was also still very much intact. The confrontation of policy and tradition over the issue of birth control was a unique test of how far an authoritarian system could go in forcing a revolution in personal values on a reluctant population by means of a propaganda campaign. The campaign proceeded on four fronts: contraception, abortion, sterilization, and late marriage. The effort to promote contraception was developed first and was most consistently supported. Abortion and sterilization were not officially endorsed until the campaign had reached maximum intensity, and late marriage was the last to be adopted.

Organization.—The Ministry of Public Health directive of August, 1956 was not followed immediately by any great upsurge in birth control propaganda. At a national forum for workers in women's and children's health held in Peking, November 19–25, 1956, the authorities admitted that the effort "was not proceeding in a balanced manner" and that "there were still some questions."¹²⁰ What was needed to correct this situation was not indicated, but thereafter the press began to carry accounts of a great many conferences at provincial and municipal levels, indicating that the word had been passed to health organs to get organized.

At this stage, the program had three principal objectives: developing mass propaganda, instituting contraceptive guidance services and providing the necessary supplies, and conducting scientific tests of new contraceptives and contraceptive formulas from Chinese traditional medicine. Setting up guidance centers and testing contraceptives were clearly in the province of the health agencies. The distribution of contraceptives was the duty of the pharmaceutical companies and the supply and marketing cooperatives. Although the responsibility for propaganda was apparently to be shared by many different agencies, there was no overall supervision and coordination of this function, and it was generally either neglected or done badly throughout the fall and winter of 1956 and the spring of 1957. The health agencies were already fully occupied in attempting to meet the increasing requirements for basic health services. For the most part, health personnel know little about birth control. They had to be given special training before they

¹²⁰ "National Forum of Women and Children Health Workers Discusses Practice of Contraception," p. 18.

could staff the guidance clinics in hospitals, maternal and child health centers, and midwifery stations, and conduct the public exhibits, lectures, slide presentations, and group discussions which were to be their contribution to the propaganda effort.

Press propaganda could be developed more quickly, since it involved only the application of reporting skills to a new subject. The local papers could join the campaign by observing their usual practice of copying the Peking papers and the national magazines. Sometimes press propaganda was started before the local health agencies and pharmacies were ready to supply the services and contraceptives promised. However, some reporters and editors were reluctant to pay much attention to the birth-control campaign, either because they were uncertain of its true priority or because they themselves had inhibitions about discussing such matters. Some had to be reprimanded for failing to give the campaign proper publicity.

The aim of press propaganda was to notify readers of the availability of birth control clinics, exhibits, lectures, and other public services and to persuade those not inclined toward birth control to give it consideration. The effectiveness of the press as a mobilizer of the masses was limited by the fact that many people did not have regular access to newspapers, not all those who did have access could read, and not all those who could read would read willingly about such matters as contraception and abortion. The press often carried reports of the numbers of persons attending the public presentations on birth control, but, initially at least, the numbers were not very large. At length it became apparent that the mass organizations, and especially the local branches of the Women's Federation, the trade unions, and the Youth League, would have to assume responsibility for bringing the people to the exhibits and lectures and conducting the necessary followup. Since talking about birth control was embarrassing even to many of the mass organization leaders, it was necessary to place them under the direct supervision of the local Party leaders.

The role of the Party was seen as the critical ingredient in this as in most other mass campaigns. Party secretaries were often named as chairmen of the local birth control guidance committees. Party and government cadres were reassigned to birth control work in fairly large numbers. Some were to serve as "backbone" cadres among the personnel from the various agencies involved in order to stiffen their resolve. Even among the Party cadres, however, the enthusiasm for birth control work was not uniformly high. Because of the value conflicts over birth control, the success of birth control work depended upon the development of a strong organization capable of meting out rewards and punishments and thus sustaining the motivation of those engaged in the effort. Available evidence suggests that this was never achieved.

In spite of the high priority attached by the Party Central Committee to birth control work, there seems to have been no recognition of the need to place it under a single central agency with the authority to impose effective supervision and direction. In March 1957, it was reported that Mao himself had mentioned plans to set up a "special organization to study the problem and give guidance." It was "hoped" that responsibility for this organization would be shared by the Propaganda Department of the Party Central Committee, the All-China Federation of Trade Unions, the Youth League,

the Federation of Democratic Youth, the Students' Federation, the Association for the Dissemination of Scientific Knowledge, the All-China Federation of Democratic Women, the China Medical Association, the Chinese Red Cross, and the ministries of Finance, Health, Commerce, and Light Industry.¹²¹ Mao's remarks as quoted give no indication that this agency was to have administrative as well as advisory functions. In general, the leadership seems to have been hesitant to delegate extensive administrative authority to interagency bodies, as was evident in the case of the 1953 census organization. As a result, cooperative undertakings have usually been poorly coordinated.

There is no evidence in available sources that a central birth control organization was ever established. It has been said that a central "birth control office" was set up directly under the State Council in 1956 to coordinate the work of the various agencies involved,¹²² but all the evidence suggests that coordination was poor both between and within the cooperating units. Even the national committee for research on contraception set up in March 1957 by the China Medical Association with the well known Dr. Khati Lim as chairman,¹²³ does not seem to have been successful in coordinating contraception research at provincial and municipal levels.

Without central political leadership and an effective administrative substructure, there was little chance that the power of the regime could be brought to bear fully on the birth control campaign. After the initial round of setting up birth control guidance committees and clinics in the spring of 1957, not much seems to have happened at the local level during the remainder of the year. The local guidance committees met and made plans, but their reports said little about implementation. One of the birth control planning slogans of the time, "first in the cities and towns, then the rural areas; first the cadres, then the masses"¹²⁴ was used in some areas as an excuse to delay the mass stages of the effort. Even some of the more optimistic local progress reports made much of the fact that the effort was moving "gradually" toward the rural areas.¹²⁵ In December 1957 there were still some provinces in which rural propaganda work had only reached the stage of establishing "experimental points," holding preliminary meetings, and setting up guidance committees. In Hopeh Province, where the work was supposedly more advanced, it was just beginning in the rural areas by the end of January 1958, and some of the county and municipal health departments had done very little.¹²⁶ Elsewhere the

¹²¹ Li Chien-sheng, "Do Not Perform Artificial Abortion Unless Absolutely Necessary," *JMJP*, Mar. 9, 1957 (Speech to the Third Session of the CPPCC Second National Committee on Mar. 8, 1957); translated in *CB*, No. 445, Apr. 5, 1957, p. 7.

¹²² Huang Yü-ch'uan, *Chung-kung chieh-yü yün-tung (Birth Control in Communist China)*, Union Research Institute, Hong Kong, November 1967, pp. 77-78. The sources for Huang's statement are given as "newspaper clippings of recent years on the mainland birth control movement." With such indefinite attribution, it is not possible to determine the extent to which his conclusions may be based on inference.

¹²³ "National Committee Will Guide Research in Birth Control," *NCNA (English)*, Peking, March 31, 1957; translated in *SCMP*, No. 1503, April 3, 1957, p. 9.

¹²⁴ "Hsiang-hsiang-hsien chieh-yü hsüan-ch'uan shen-ju nung-ts'un ch'ün-chung p'o-ch'ieh ao-ch'iu shih-hsing yü chi-hua te sheng-yü" ("Birth Control Propaganda Penetrated Deep into the Rural Areas of Hsiang-hsiang Hsien; the Masses Urgently Demand Planned Births"), *Hsin Hu-nan pao*, Ch'ang-sha, September 3, 1957.

¹²⁵ "Pa chieh-yü te hsüan-ch'uan ho chih-tao kung-tso shen ju hsia-ch'ü" ("Take Birth Control Propaganda and Guidance Work Down Deep Everywhere"), *An-hui jih-pao*, Hefei, September 3, 1957; "Pen-shih chu-pu chan-k'ai chieh-yü hsüan-ch'uan" ("Birth Control Propaganda Carried Out Gradually in This Municipality"), *Hang-chow jih-pao*, Hanchow, October 12, 1957; and "Chin i-pu k'ai-chan chieh-chih sheng-yü kung-tso" ("Carry Out Birth Control Work Further"), *JMJP*, December 28, 1957.

¹²⁶ "Pi-yün chih-tao kung-tso shen-ju nung-ts'un" ("Contraceptive Work Carried Deep into Rural Areas"), *KMJP*, January 30, 1958.

ineffectiveness of the work explained as due to the lack of "unified control."¹²⁷ Among the more delinquent units were some of the major municipalities. Wuhsi did not even get around to establishing a birth control guidance committee until late January 1958,¹²⁸ and the propaganda activities in Foochow only started in April 1958.¹²⁹ For all its vaunted reputation for organization and discipline, the Party seemed unable to give effective leadership and administration to the program.

Propaganda tactics.—The initial propaganda approach to birth control was through newspaper articles explaining the rationale for the campaign, the advantages of birth control for the individual, the family, and the State, and the conventional contraceptive methods. Next came the exhibits, at which birth control devices were displayed and their application demonstrated on explicit anatomical models. Public lectures and discussions were also offered by birth control specialists, sometimes illustrated by photographs and lantern slides. A 20-minute motion picture on birth control, prepared by the Ministry of Public Health and widely distributed to municipal movie houses in the second quarter of 1957, discussed the "significance" of contraception, described the reproductive organs and processes for both sexes; and explained how the various contraceptive devices then available were used.¹³⁰ Some cities opened birth control propaganda centers, where visitors could see wall posters showing the superiority of the planned family, obtain books and pamphlets describing contraceptive techniques, and receive individual counseling.

During 1957 and the first 5 months of 1958, propaganda tactics became more aggressive. Birth control propaganda blared from loudspeakers; traveling propaganda teams dramatized the message with flower-drum songs; and the press presented intimate "case histories" illustrating the bad effects of unplanned fertility, the happy results of family limitation, and the trials and tribulations of young women whose families harassed them for postponing marriage. Guidance workers began to make personal calls on individuals in their homes and at their places of work. The employees in particular institutions and the residents of particular communities were subjected to "blitz" attacks. Local political leaders were pitted against one another in "contests" to register the most spectacular progress in birth control work. In 1958, women factory workers in some cities were obliged to commit themselves to "birth plans," in which those with two or more children promised to have no more during the Second Five-Year Plan period (1958-1962), those with one child declared they would have only one more during the period, and those with none pledged to have not more than one.¹³¹ In some places the plans were written down on forms and signed as "guarantees," and those workers who refused to sign were threatened with denunciation by wall poster.¹³² In May and June 1958 some areas began to implement a new policy of carrying out birth control propaganda work with "great fanfare," others strove for

¹²⁷ I Hsiang-su, "T'ui-hsing ch'in-chien ch'ih-chia ho chieh-yü kung-tso" ("Promote Diligence and Frugality in Running Households and Birth Control Work"), *Hsin Hu-nan pao*, Changsha, December 8, 1957.

¹²⁸ "Wu-shi-shih ch'eng-li chieh-yü wei-yuan-hui" ("Wuhsi Municipality Establishes Birth Control Committee"), *Hsin Hua jih-pao*, Nanking, February 7, 1958.

¹²⁹ "Chi-hua sheng-yü hao-ch'u to" ("Planned Childbirth Has Many Advantages"). *Fu-chien jih-pao*, Foochow, April 19, 1958.

¹³⁰ "Pi-yün K'o-hsieh tien-ying tuan-p'ien chih-ch'eng" ("A Short Science Film on Contraception Made"), *Chien-k'ang pao*, Peking, Apr. 2, 1957.

¹³¹ "Contraception and Planned Childbirth Must Be Practiced," *Wen-hui-pao*, Shanghai, January 23, 1958; translated in *SCMP*, No. 1721, February 23, 1958, p. 7.

¹³² "Pu yao pa hao-shih pan-ch'eng huai-shih" ("We Don't Want to Turn a Good Thing Into a Bad Thing"), *CKFN*, No. 104, June 1, 1958.

a "leap forward" in birth control, and others for a "high tide" and a drive to rush "through the barricades."¹³³ Even though not all of these tactics had the approval of the central authorities, they were consistent with the urgency of central demands that local authorities intensify their efforts.

As in previous mass campaigns, the Party leaders had little compunction about using pressure to secure public conformity. The authorities early assumed the position that in endorsing family limitation they were merely responding to a demand that originated with the "masses." The idea was first broached in an article by Chou O-fen in February 1955, in which the anomaly of saying that the "masses" were demanding what very few wanted and many resisted was already apparent. Dr. Chou admitted that the requests for contraception came only from "some comrades" who did not want large families and that "only a small number of people . . . desire to practice contraception at the moment," yet he argued that it was "only natural that the masses should request" contraceptive knowledge and that "we should not oppose the demand of the masses."¹³⁴ In April 1955, an article in the magazine *Women of New China* claimed that birth control was "the urgent demand of the masses"; the only supporting evidence consisted of letters from women cadres.¹³⁵ Thereafter the press took up the refrain, insisting that contraception had "the warm support of the masses," that it was "welcomed by the broad masses," that "parents generally are putting forth a demand for birth control," that "all the cadres, employees, workers, and peasants urgently ask" for it, and that it had "become the universal demand of the masses today."¹³⁶

Since birth control was the demand of the masses and so obviously consistent with their best interests, adoption of the practice was initially supposed to be a purely voluntary matter. In December 1954, Shao Li-tzu had said that the decision would be "entirely up to individuals" and that there would be no promotional effort aside from making contraceptive knowledge available.¹³⁷ Newspaper articles in 1955, maintained that "nobody is at liberty to interfere with or coerce its practice" and that it was for "individual couples to decide."¹³⁸

When the voluntary adoption of birth control failed to materialize, the officials concluded with evident irritation that the people were inhibited by "outworn and erroneous thinking," "stupid ideas," "all kinds of mental blocks," "all kinds of reservations," "superstitious thoughts," "insufficient understanding and fears," "suspicious and doubts," a "feudal mentality," and "backward, conservative think-

¹³³ "Chin i-pu k'ai-chan nung-ts'un chieh-yü kung-tso" ("Carry Out Rural Birth Control Work a Step Further"), *KMJJP*, May 20, 1958; "Liaoning Provincial People's Council Issues Directive on Strengthening Leadership over Birth Control Work and Disseminating Knowledge About Birth Control," *Liao-ning jih-pao*, Shenyang, March 26, 1953; translated in *SCMP*, No. 1770, May 27, 1953, p. 35; and "Nan-ch'ung-shih chieh-chih sheng-yü hsing-ch'eng feng-ch'i" ("Birth Control Becomes a Fashion in Nan-ch'ung municipality"), *Nan-ch'ung jih-pao*, Nan-ch'ung, May 21, 1953.

¹³⁴ Chou O-fen, "How to Treat the Question of Contraception," *loc. cit.*

¹³⁵ "How to Approach the Problem of Birth Control," p. 8.

¹³⁶ "Shao Li-tzu on Contraception at Hangchow," *Hang-chow jih-pao*, Dec. 21, 1956; translated in *SCMP*, no. 1455, January 25, 1957, p. 7; "Shantung Provincial People's Council Directive on Scientific Contraception," *Ta-chung jih-pao*, Tsinan, February 14, 1957; translated in *SCMP*, no. 1487, March 12, 1957, p. 13; "Exercise Appropriate Birth Control," p. 6; Yuan An-ch'uan and Yang Chen-kuo, "To fang-mien lu-li ta tao chieh-chih sheng-yü te mu-ti" ("Many-Sided Efforts to Achieve the Objective of Birth Control"), *JMJJP*, March 24, 1957; and Wang Tso and Tai Yuan-chen, *loc. cit.* The term "broad" is often used in the press of the PRC as an understated qualifier meaning "in general, though there are exceptions."

¹³⁷ Shao Li-tzu, "Concerning the Problem of Dissemination of Knowledge About Contraception," p. 29.

¹³⁸ Chou O-fen, "How to Treat the Question of Contraception," p. 32; and "How to Approach the Problem of Birth Control," p. 9.

ing."¹³⁹ These outmoded attitudes made it necessary to convince the people that contraception accorded with their own needs and interests, that it was for their benefit, that it was "necessary and rational," and that it was their "privilege" and "democratic right."¹⁴⁰

The people remained skeptical. In official circles there was apparently a growing recognition that purely personal reasons would not suffice to motivate the people to practice birth control on a large scale. At any rate, in the arguments for birth control put forward in the press, the emphasis began to shift away from the previous insistence that birth control was primarily for protection of the health of mothers and children¹⁴¹ toward the idea that birth control was essential to meet the economic needs of the State. The latter was the key argument in the *People's Daily* editorial of March 5, 1957,¹⁴² and in Li Teh-ch'uan's speech to the CPPCC on March 7.¹⁴³ On March 8, Li Chien-sheng, Vice Minister of Public Health, added that propaganda should deal not only with the interests of individuals but also with the long-term advantages to the country as a whole.¹⁴⁴

The new emphasis was to help people understand the significance of birth control for economic development, the "building of socialism," the accumulation of national income, the general prosperity, and the solution of problems relating to employment, education, housing, wages, and welfare,¹⁴⁵ In fact, they must be made to recognize that birth control was "an indispensable link in making better arrangements for the production and livelihood of the 600 million people. . . ."¹⁴⁶

¹³⁹ "Shantung Provincial People's Council Directive on Scientific Contraception," *loc. cit.*; "Chieh-yü pi-yün chi ch'i-t'a" ("Birth Control, Contraception, and Other Matters") *Ta-kung pao*, Hong Kong, March 17, 1957; "Shih wei-sheng-chü chao-k'ai chieh-yü tso-t'an-hui ch'ieh-ting chia-ch'lang pi-yün te hsian-ch'uan ho chih-tao" ("Municipal Public Health Bureau Holds Birth Control Symposium and Decides To Strengthen Contraceptive Propaganda and Guidance"), *Ch'i-ch'i-ha-erh jih-pao*, Tsitsihar, March 26, 1957; "Chieh-yü hsian-ch'uan hsiü-yao kuang-fan chin-hsing" ("Birth Control Propaganda Needs To Be Carried Out Extensively"), *Hsin Hua-nan pao*, Ch'angsha, March 19, 1957; "Shen-ju k'ai-chan pi-yün hsian-ch'uan kung-tso" ("Carry Out Contraceptive Propaganda Work Thoroughly"), *Ha-er-pin jih-pao*, Harbin, March 19, 1957; "K'ai-chan wo-kuo jen-k'ou wen-t'i te t'ao-lun" ("Open the Discussion of the Population Problems of Our Country"), *Wen-hui-pao*, Shanghai, April 27, 1957; Wang I-chih, "Wo-men shih che-yang k'ai-chan pi-yün hsian-ch'uan te" ("This is How We Carried Out Contraceptive Propaganda"), *Hsin Hua jih-pao*, Nanking, February 15, 1958; and "Further Develop Birth Control Work in Rural Areas," *KMJP*, May 20, 1958; translated in *SCMP*, no. 1830, August 12, 1958, p. 7.

¹⁴⁰ Sun Ching-hsia, "Present Problems in the Work of Propaganda on Contraception and in its Technical Guidance," *KMJP*, December 9, 1956; translated in *SCMP*, no. 1452, January 17, 1957, p. 9; "Further Develop Birth Control Work in Rural Areas," p. 7; Li Tsung-chou, "K'ai-chan chieh-yü kung-tso pao-hu fu-nü erh-t'ung chien-k'ang" ("Carry Out Birth Control Work and Protect the Health of Women and Children"), *Ho-pei jih-pao*, Tientsin, January 29, 1957; "Hopes Completes Plan for Contraception in 1957," *Chen-k'ang pao*, Peking, January 29, 1957; translated in *SCMP*, no. 1430, March 1, 1957, p. 14; and Wang Li-keng, *et al.*, "Kuang-fan hsian-ch'uan ch'ih-hun ho chi-hua sheng-yü" ("Extensively Publicize Late Marriage and Planned Births"), *JMJP* March 15, 1957.

¹⁴¹ Chou O-fen, "How to Treat the Question of Contraception," p. 29; "How to Approach the Problem of Birth Control," p. 8; "For Active Dissemination of Contraception Knowledge," p. 2; and Fu Lien-chang, "Correct Attitude to the Question of Contraception and Artificial Abortion," *CKCNP*, Aug. 19, 1956; translated in *SCMP*, No. 1365, Sept. 7, 1956, p. 7.

¹⁴² "Exercise Appropriate Birth Control," p. 6.

¹⁴³ Li Teh-ch'uan, "Birth Control and Planned Families," p. 2.

¹⁴⁴ Li Chien-sheng, *loc. cit.*

¹⁴⁵ Li Teh-ch'uan, "Birth Control and Planned Families," p. 2; Chung Hui-lan, *op. cit.*, p. 21; Women Workers Department, Wuhan Federation of Trade Unions, "Educate Workers and Employees in Birth Control," *KJJP*, Dec. 30, 1957; translated in *SCMP*, No. 1693, Jan. 17, 1958, p. 5; Pao Sheng, "Hui-pu-hui hsiao-jo kuo-chia te li-liang" ("Will It Weaken the Strength of the Country?"), *Kuang-hsi jih-pao*, Nanning, Mar. 29, 1957; Li Tzu-p'ing and Wang Hsiang-chieh, "Kuan-hsin chün-chung chieh-yü yao-ch'ü chi-chi ling-tao chieh-yü kung-tso" ("Show Concern for the Demand of the Masses for Birth Control and Actively Lead Birth Control Work"), *Hsin Hua-nan pao*, Changsha, Sept. 3, 1957; "Ts'ung chu-chai ho kung-tzu wen-t'i k'an chieh-yü te pi-yao" ("The Necessity of Birth Control as Seen From the Problem of Housing and Wages"), *JMJP*, Oct. 9, 1957; and Wang Cho, "Way to Solve Population Problem in China," *JMJP*, Feb. 1, 1958; translated in *SCMP*, No. 1721, Feb. 28, 1958, p. 3; Wang Yi-hsien, "Shanghai's Birth Rate to Be Brought Down to 2 Percent," *Wen-hui pao*, Shanghai, Jan. 23, 1958; translated in *SCMP*, No. 1721, Feb. 28, 1958, p. 11.

¹⁴⁶ "Chung-kung Liao-ning sheng-wei Liao-ning-sheng jen-miu wei-yüan-hui kuan-yü chi-chi k'ai-chan chieh-chih sheng-yü kung-tso te lien-ho t'ung-chih" ("Joint Notice of the Liaoning Provincial Committee of the Chinese Communist Party and the Liaoning Provincial People's Committee Concerning the Active Carrying Out of Birth Control Work"), *Liao-ning jih-pao*, Shenyang, June 9, 1958.

Given the State's interest in birth control, the "conservative tendency" among the people was regarded as a "social problem" which "must be solved by . . . applying the force of society."¹⁴⁷ Health Minister Li urged that birth control work be intensified with the aim of "breaking down all obstacles caused by misunderstandings about it."¹⁴⁸ Chung Hui-lan said that "feudal thoughts" on this subject "must be smashed at all costs."¹⁴⁹ The people must not view birth control as "a private affair of both sexes" but rather as "an important thing" that concerned the welfare of the whole country and was therefore the "affair of the State."¹⁵⁰ Because the "prosperity of the nation" and the "happiness of the people" were involved in birth control, "the Party and the government cannot help interfering."¹⁵¹ If birth control was not the demand of the masses, it was certainly the demand of the Party.

The problem for the local cadres charged with responsibility for birth control propaganda was how to practice coercion while maintaining enough pretense of voluntariness to avoid the public reaction that would result in their being accused of "commandism." They were, as usual, in the position where they could neither act nor fail to act without being blamed for the inevitable consequences. They had been given repeated warnings that contraception was "not to be forced on anybody,"¹⁵² that it was not to be promoted by "pressure and commands,"¹⁵³ that "acts of compulsion" must be avoided, that "simple, crude, compulsory orders" must not be used, and that coercive tactics "will not be tolerated."¹⁵⁴ Yet the contrary effects of administrative pressures are reflected in the reports of excesses of zeal leading to various forms of intimidation and repression. In one area, women who had married early and had many children were subjected to "ridicule and sarcasm" in public places and even refused seats on buses.¹⁵⁵ In another area, a childless woman who had sought treatment for infertility was attacked for "promoting" childbearing.¹⁵⁶ In still another area, maladroit propaganda led to neglect of pregnant women and a revival of infanticide.¹⁵⁷ The coercive impact of the propaganda may be inferred from the fact that in some places people were led to ask "whether birth control is compulsory."¹⁵⁸ Throughout the first campaign the problem of how to promote birth control effectively without compulsion was never resolved.

Popular resistance.—The main problem, for both the Party leaders and the local cadres, was the fact that popular opposition to birth control was rooted in fundamental values and traditions. Ordinary peas-

¹⁴⁷ "For Active Dissemination of Contraception Knowledge," p. 2.

¹⁴⁸ Li Teh-ch'uan, "Birth Control and Planned Families," p. 5.

¹⁴⁹ Chung Hui-lan, *op. cit.*, p. 20.

¹⁵⁰ "For Active Dissemination of Contraception Knowledge," p. 2; "Chieh-yü hsüan-ch'uan yao tsai hung-ts'un kuang-fan shen-ju-ti k'ai-chan"; and "Chi-chi hsüan-ch'uan yü k'ai-chan chieh-yü kung-tso" ("Publicize and Carry Out Birth Control Work Actively"), *Hei-tung-chiang jih-pao*, Harbin, June 6, 1957.

¹⁵¹ "Further Develop Birth Control Work in Rural Areas," p. 7.

¹⁵² Sun Ching-hsia, *op. cit.*, p. 10.

¹⁵³ Lu Shu-t'ien, "Jen-chen tso hao pi-yün kung-tso" ("Conscientiously Do a Good Job of Contraception"), *Hei-tung-chiang jih-pao*, Harbin, Jan. 7, 1957.

¹⁵⁴ "Shantung Provincial People's Council Directive on Scientific Contraception," *loc. cit.*; "Chung-kung Liao-ning sheng-wei Liao-ning-sheng jen-min wei-yüan-hui kuan-yü ch'i-chi k'ai-chan chieh-chih sheng-yü kung-tso te lien-ho t'ung-chih," *loc. cit.*; and "Exercise Appropriate Birth Control," p. 8.

¹⁵⁵ "Hsüan-ch'uan chieh-yü yao fang-chih p'ien-mien-hsing" ("Prevent One-sidedness in Publicizing Birth Control"), *Nan-ching jih-pao*, Nanking, Apr. 8, 1957.

¹⁵⁶ "Sheng hai-tzu shih lo-hou-ma?" ("Is Having Children Backward?"), *Ta-kung pao*, Peking, Apr. 13, 1957.

¹⁵⁷ "Tso-hao chieh-chih sheng-yüe hsüan-ch'uan kung-tso" ("Do a Good Job of Birth Control Propaganda Work"), *Che-chiang jih-pao*, Hangchow, Apr. 23, 1957.

¹⁵⁸ "Ta-li k'ai-chan chieh-yü kung-tso tseng-ch'ang min-tzu chien-k'ang ho fan-jung" ("Carry Out Birth Control Work with Great Efforts to Improve the Health and Prosperity of the Nation"), *Liao-ning jih-pao*, Shenyang, June 9, 1955.

ants and workers had no opportunity to register their dissent through the press, but their attitudes are revealed in the comments and reactions attributed to them in articles written to advise the propagandists on how to overcome their resistance.

A major obstacle was the weight of tradition favoring early marriage and large families. The Confucian ideal of "numerous descendants" as an aspect of filial piety was still very much alive, and found expression in popular sayings identifying happiness with "a room full of children" and "crowding the hall with sons." Fecundity was said to be a "blessing" and a source of security in old age. In one rural area this idea was compactly expressed in the aphorism "Early sowing, early harvest; early fatherhood, early retirement."¹⁵⁹

Some people took a fatalistic attitude toward childbearing. According to one proverb, "No matter whether you have enough children, you go on giving birth until age 46." Another said that women are like flowering trees; the numbers of blossoms and seeds are determined by fate. Others said that contraception could be of no help against fate.¹⁶⁰ Others were afraid that the use of contraceptives would cause sterility, interfere with the transmission of health-giving emanations between husband and wife, result in various forms of illness, reduce sexual pleasure, or cause the couple to lose their love for each other. Some believed it would provoke a wrathful "heaven" into taking the lives of the children already born.¹⁶¹

Other people questioned the need to control the numbers of births. They argued that they had never done so in the past and no great hardship had befallen them, that they were able to support all the children they produced, and that the trade unions and the Government would help them if the burden became too great.¹⁶² Some women workers liked to have a child every year to take advantage of their allotted 56 days' paid maternity leave.¹⁶³ Other people asked why a country as large and rich in resources as China should discourage childbearing while the Soviet Union still encouraged it.¹⁶⁴

Many people felt that birth control was immoral. Some thought that it encouraged illicit sex relations, others that it would blunt the moral sense of the people, and still others that it was "shameful," "contrary to moral virtue," and equivalent to homicide.¹⁶⁵ Some found the public propaganda offensive and in bad taste. Members of the Women's Federation branch in a rural community who were required by their leaders to view pictures on contraception turned red in the face and refused to take the propaganda back to the "masses" in their village.¹⁶⁶

¹⁵⁹ "Shuangching Agricultural Producer Cooperative in Szechwan Achieves Much in Debating Birth-Control," *NCNA*, Chengtu, Oct. 30, 1957; translated in *SCMP*, No. 1650, Nov. 13, 1957, p. 40.

¹⁶⁰ Sun Ching-hsia, "Pi-yün hsüan-ch'uan lai tao nung-ts'un" ("Contraceptive Propaganda Reaches the Village"), *KMJF*, Apr. 2, 1957; Hsieh Chih-ch'eng, "Sheng-yü kuo-mi ying-hsiang mu-tzu t'i-chih ho sheng-huo shui-p'ing" ("Short Intervals Between Births Affect the Health of Both Mother and Child and the Level of Living"), *Wen-hui pao*, Shanghai, Apr. 9, 1957; and "Hsüan-ch'uan pi-yün chih-tao pi-yün" ("Publicize Contraception and Give Guidance to Contraception"), *Lü-ta jih-pao*, Lüta, Mar. 18, 1957.

¹⁶¹ Wang Chin-shih, "On the Problem of Birth Control," *Shih-shih shou-tz'e (Current Events)*, No. 24, Dec. 25, 1956; translated in *ECMM*, No. 72, Mar. 4, 1957, p. 30; Women Workers Department, Wuhan Federation of Trade Unions, *loc. cit.*; Chou Chih-chung, *loc. cit.*; Yuan An-chüan and Yang Chen-kuo, *loc. cit.*; and Chou O-fen, "'Tsai tan pi-yün wen-t'i'" (A Further Discussion of the Contraception Question"), *KJJP*, Feb. 23, 1957.

¹⁶² Shao Li-tzu, "Concerning the Problem of Dissemination of Knowledge About Contraception," p. 28; I Hsiang-su, *loc. cit.*; and Women Workers Department, Wuhan Federation of Trade Unions, *loc. cit.*

¹⁶³ Wang Yi-hsien, *op. cit.*, p. 9.

¹⁶⁴ "K'ai-chan wo-kuo jen-k'ou wen-t'i te t'ao-lun," *loc. cit.*; Chou O-fen, "How to Treat the Question of Contraception," p. 30.

¹⁶⁵ Liu Lien-ju, "Wei-shen-ma yao k'ai-chan pi-yün hsüan-ch'uan ho chih-tao kung-tso?" (Why Should Contraceptive Propaganda and Guidance Work Be Conducted?), *Ho-pai jih-pao*, Tientsin, Feb. 6, 1957; Chou O-fen, "'Tsai t'an pi-yün wen-t'i'" and Wang I-chün, *loc. cit.*

¹⁶⁶ "Chi-hua sheng-yü te hao-ch'u shuo pu-wan" ("There Are Untold Benefits to Planned Childbirth"), *PCJP*, June 8, 1958.

Elsewhere, women were too shy to attend contraceptive lectures and refused contraceptive guidance. Some women who showed a willingness to practice contraception were ridiculed by those who disapproved, scolded or beaten by their husbands, harassed by mothers-in-law, or otherwise intimidated. Instances of strained marital relations over this issue were also reported.¹⁶⁷

Some people directed their resentment at the cadres and at the government, a course of action fraught with some risk and therefore a mark of the intensity of their feeling. They charged that the government was interfering with childbearing to reduce the population, that the powers of the government were too broad when it even attempted to control the number of their children, and that the cadres were meddling because they had nothing else to do or because the government was short of food and wanted to "economize" on people. Cadres who sold condoms were labelled "cut off posterity cadres."¹⁶⁸

Doubts and fears persisted in spite of all efforts by medical personnel and propaganda workers to provide reassurances. There was much discussion in birth control committees in various areas about how to overcome the "three fears"—fear of embarrassment, fear of the "bother" of contraception, and fear of the danger to health—which were said to be prevalent among the "masses." Some people did not believe contraception could be effective or were so uncertain of its worth that they would not give it a fair trial.¹⁶⁹

To alter values that had been central to Chinese culture for millennia, it was necessary to conduct a sustained campaign of mass re-education with persistence, patience, conviction, skill, and sensitivity. Few cadres possessed the necessary qualities. Many of them were as inhibited by tradition as the rest of the population. The health cadres were described as "conservative" in outlook and ignorant about birth control. Hospital staffs saw birth control work as an "extra burden" and paid it little attention. Other cadres thought contraception "sinful" and were afraid that hostile public reaction would "cause trouble." They also worried about becoming too closely identified with a matter that had been officially disapproved in the past and might be again if policy changed. In any case, they thought it "better to be involved with one thing less than with one thing more." In general, the cadres were more inclined to take formal actions, such as issuing directives, setting up committees, or holding forums, than to maintain active

¹⁶⁷ "Ta-p'o ch'ün-chung ssu-hsiang ku-lü chieh-yü pi-yün hsüan-ch'uan hsiü shen-ju chin-hsing" ("Birth Control and Contraceptive Propaganda Should Be Promoted Thoroughly to Break Down the Apprehensions of the Masses"), *Hsia-men jih-pao*, Amoy, Mar. 20, 1957; "Achievements and Experience Gained in Birth Control Propaganda by Textile Mills in Shanghai," *KJJP*, Dec. 31, 1957; translated in *SCMP*, No. 1693, January 1958, p. 6; I Hsiang-su, *loc. cit.*; "Chia-ch'iang pi-yün chiao-yü" ("Strengthen Education on Contraception"), *Wen-hui pao*, Shanghai, Mar. 1, 1957; Chou O-fen, "Tsai tan pi-yün wen-t'i," *loc. cit.*; "Planned Birth and Birth Control in Amoy," *Hsia-men jih-pao*, Amoy, Feb. 26, 1957; translated in *SCMP*, No. 1759, Apr. 28, 1958, p. 27; and Sun Ching-hsia, "Present Problems in the Work of Propaganda on Contraception and in its Technical Guidance," p. 10.

¹⁶⁸ Tuan Hui-hsüan, "Chiu-cheng ch'üeh-ting tso-hao pi-yün te hsüan-ch'uan ho chih-tao kung-tso" ("Correct Defects and Do a Good Job of Publicizing Contraception and Guidance Work"), *Ho-pei jih-pao*, Tientsin, Feb. 21, 1957; "Pa chieh-yü te hsüan-ch'uan ho chih-tao kung-tso shen-ju hsia-ch'u"; "Shuangching Agricultural Producer Cooperative in Szechwan Achieves Much in Debating Birth Control," p. 40; and Chou Chin-chung, *loc. cit.*

¹⁶⁹ "Chin-i-pu k'ai-chan pi-yün hsüan-ch'uan kung-tso; mei-tui fu-ch'i' yu san-ke hai-tzu k'e suan shih-tang" ("Carry Out Further Propaganda on Contraception; 3 Children Per Couple Can Be Considered Appropriate") *Kuang-chow jih-pao*, Canton, Apr. 27, 1957; "Shen wei-sheng-t'ing teng tan-wei tso-t'an ta-li k'ai-chan pi-yün h'üan-ch'uan ho chih-tao kung-tso" ("Provincial Public Health Department and Other Units Hold Symposium on Carrying Out Contraceptive Propaganda and Guidance Work with Great Efforts") *Fu-chien jih-pao*, Foochow, Mar. 20, 1957; Yuan An-chuan and Yang Chen-kuo, *loc. cit.*; and Chang Kuei-jen, "Ta-li chia-ch'iang pi-yün hsüan-ch'uan kao hao ai-kuo wei-sheng kung-tso" ("Strengthen Propaganda on Contraception With Great Efforts; Do a Good Job of Patriotic Public Health Work"), *Hsi-an jih-pao*, Sian June 2, 1957.

supervision and to carry out inspections.¹⁷⁰ Thus, the amount of administrative power the cadres were willing to exercise in support of birth control was probably far less than that of which the system was capable when no conflict with traditional values was involved.

Methods of Contraception

Conventional Western methods.—The methods of contraception most commonly used in the PRC during the first birth control campaign were the condom, the diaphragm, and a variety of spermicidal jellies, creams, foam powders, and suppositories. The spermicides were usually recommended for use in conjunction with condoms and diaphragms. During the early stages of the campaign, the condom was regarded as the simplest and most convenient method and the diaphragm as the most reliable. There was some effort to popularize the rhythm method and coitus interruptus through the Peking youth newspaper *China Youth Daily*,¹⁷¹ and in Shanghai these methods were to have been promoted "vigorously" in 1958.¹⁷² Other methods mentioned in the press but not recommended because of their ineffectiveness were reliance on lactation and postcoital urination.

The main obstacles to the popularization of conventional contraceptives among people willing to practice birth control were the inconvenience of the necessary preparations and the persistent problems of supply, cost, and quality. To many Chinese the deliberate and careful contraceptive procedures required before intercourse were offensive and tended to reduce the pleasure of sex. Probably most Chinese would have been either unable or disinclined to follow the elaborate directions given for the cleaning, conditioning, and storage of diaphragms and condoms after use and for checking against defects prior to reuse.¹⁷³

Supply of contraceptives was a continuing problem throughout the first campaign. Ironically, its first manifestation was in the form of oversupply. In 1954, Shao Li-tzu expected an initial period of shortages but insisted that there be no large-scale imports because of the need to conserve foreign exchange.¹⁷⁴ Apparently Chinese pharmaceutical and rubber goods factories were ordered to engage in large-scale production at once to meet the anticipated demand. However, the relapse of the campaign between the spring of 1955 and the summer of 1956 left the China Pharmaceutical Company with a large stock of contraceptives for which there were no buyers, and so production was discontinued at some plants. In August 1956, when the Ministry of Public Health reactivated the campaign, some cities still had a surplus. As the new campaign got underway, shortages became the rule,

¹⁷⁰ "Kuan-yü pi-yün" ("On Contraception"), *Wen-hui pao*, Shanghai, Jan. 22, 1957; "Sheng wei-sheng-t'ing yao-ch'ing i-sheng chu-ch'ih hui ch'iang k'ai-pan pi-yün ch'iang-tso" ("Provincial Public Health Department Invites Physicians to Hold Lectures on Contraception Soon in Canton"), *Ta-kung pao*, Hong Kong, Mar. 17, 1957; Hung Ming-kuai, "I-yuan ying chi-chi k'ai-pan chieh-yü kung-tso" ("Hospitals Should Actively Carry Out Birth Control Work"), *Chien-k'ang pao*, Peking, Apr. 2, 1957; Lu Shu-tien, *loc. cit.*; Yeh P'ei, "Wei-sheng kung-tso-che ying chi-chi wei chieh-yü fu-wu" ("Public Health Workers Should Actively Serve Birth Control"), *Kuang-hsi jih-pao*, Nan-ning, Apr. 14, 1957; and Liu Yen-fu, "Ta-li k'ai-pan chieh-chih cheng-yü te kung-tso" ("Carry Out Birth Control Work With Great Efforts"), *Ch'ang-sha jih-pao*, Changsha, Dec. 28, 1957.

¹⁷¹ "Propagate Contraception Properly," *KCCNP*, Nov. 2, 1957; translated in *SCMP*, No. 1653, Nov. 18, 1957, p. 8.

¹⁷² Wang Yi-hsien, *op. cit.*, p. 10.

¹⁷³ Chou O-fen, "How to Treat the Question of Contraception," pp. 31-32; and "Correct Attitude to the Question of Contraception and Artificial Abortion," p. 8. The re-use of condoms was due in part to short supply and in part to cost, which was high by Chinese standards.

¹⁷⁴ Shao Li-tzu, "Concerning the Problem of Dissemination of Knowledge About Contraception," p. 30.

and pressure was brought to bear on the pharmaceutical companies to increase output and improve quality.¹⁷⁵

A detailed explanation of the supply problems in Shensi Province provides some insight into what was happening during 1956. Readers of the local newspaper had noted a shortage of contraceptives in their province and asked for an explanation. The newspaper replied that it was true that contraceptives had been unavailable during the second half of 1956. The provincial pharmaceutical company had begun to sell contraceptives in 1954, mainly in the large and medium sized cities, but sales volume was very low, and most of the contraceptives remained unsold. After some time the spermicidal creams and suppositories developed mildew and a large quantity had to be destroyed. This caused the pharmacies to stock less in succeeding years. The planned volume for 1956 was 10 percent less than that for 1955. After one of the provincial papers began a birth control propaganda campaign in the latter half of 1956, the demand for contraceptives rose and the supply was exhausted in several cities. To expedite the ordering of new supplies, the local companies placed orders directly with central government supply stations in Shanghai and Tientsin, and were able to supply even the smaller cities.¹⁷⁶ Elsewhere, the supply problems continued serious, with periodic shortages in the cities and almost total nonavailability at *hsien* levels.

There were frequent complaints about price and quality as well. In her important speech of March 7, 1957, Health Minister Li Teh-ch'uan said that "in future" the prices of contraceptives would have to be lowered,¹⁷⁷ and Chung Hui-lan charged that the diaphragm was priced "beyond the means of most people" because of profiteering by the China Pharmaceutical Company.¹⁷⁸ Prices were lowered immediately in some areas. It was announced on March 12 that the price of suppositories in Shansi Province had already been reduced from 1.10 *yüan* to 0.90 *yüan* per box and the prices of diaphragms and condoms had been reduced by 28 percent.¹⁷⁹ Toward the end of March 1957, the Ministries of Commerce and Public Health and the All China Federation of Supply and Marketing Cooperatives announced jointly that, as of April 1, the price of domestically made condoms was to drop from 0.12 to 0.05 *yüan* each and the price of diaphragms from 1.50 to 1.00 *yüan* each. Prices of other contraceptives were also to be reduced and the new prices were to be uniform throughout the country.¹⁸⁰ But the complaints about prices continued.¹⁸¹

Statements about the quality of contraceptives were often too generalized to indicate clearly what problems had been encountered and which types of contraceptives were involved. Shao Li-tzu had insisted in December 1954 that health agencies make sure that the contraceptives provided to the public were "free from poisons, germs, will cause no irritation to the human body, and are actually

¹⁷⁵ "Hunan Provincial Public Health Bureau Holds Talks on Birth Control." *Hsin Hu-nan pao*, Changsha, Dec. 8, 1956; translated in *SCMP*, No. 1445, Jan. 8, 1956, p. 22; Sun Ching-hsia. "Present Problems in the Work of Propaganda on Contraception and Its Technical Guidance," p. 10; "Shao Li-tzu on Contraception at Hangchow"; and "Chi-chi chia-ch'ang chieh-yü te hsüan-ch'uan ho chih-tao," ("Actively Strengthen Birth Control Propaganda and Guidance"), *CKCNP*, Feb. 23, 1957.

¹⁷⁶ "Pi-yün yao-hsieh chin-nien chiang tseng-chia kung-ying chiang-ti she-chia" ("The Supply of Contraceptive Drugs and Materials Will Be Increased This Year at Reduced Prices"), *Shen-hsi jih-pao*, Sian, Mar. 12, 1957.

¹⁷⁷ Li Teh-ch'uan, "Birth Control and Planned Families," p. 4.

¹⁷⁸ Chung Hui-lan, "Population and Birth Control," p. 21.

¹⁷⁹ "Pi-yün yao-hsieh chin-nien chiang tseng-chia kung-ying chiang-ti she-chia," *loc. cit.*

¹⁸⁰ "Ministries of Commerce and Public Health Decide to Augment Supply and Reduce Prices of Contraceptives," *NCNA*, Peking, Mar. 28, 1957; translated in *SCMP*, No. 1510, Apr. 15, 1957, p. 4.

¹⁸¹ "Pa chieh-yü te hsüan-ch'uan ho chih-tao kung-tso shen-ju hsia-ch'ü"; and Wang Yi-hsien, *op. cit.*, p. 11.

effective for contraception purposes,"¹⁸² and a key article in *China Youth* in 1955 said that contraceptives must be "nontoxic and nonstimulative."¹⁸³ But in 1956 and the early part of 1957 there were repeated complaints that some of the contraceptives on the market were of inferior quality. One of the few press items that dealt in specifics claimed that contraceptive drugs (presumably spermicides) were irritating and that rubber contraceptive devices were easily torn. It recommended relaxing import restrictions if domestic mass production was encountering difficulties.¹⁸⁴ Another item noted that some contraceptive drugs and devices were of such inferior quality that the women who used them derived no benefit from them.¹⁸⁵ Some of the complaints may have been caused by the sale of contraceptives which had been too long in stock during the 1955 interlude and had deteriorated, but the fact that they could deteriorate so quickly suggest defects in materials or manufacture. One source conceded that the "unstable efficacy" of contraceptive jelly had resulted in production limitations during 1956.¹⁸⁶

In April 1957, Canton's rubber factory No. 11 disclosed that, beginning in May, it would produce the greater part of the contraceptive devices manufactured in the entire country and, significantly, that it would try to improve their quality.¹⁸⁷ By the latter part of the year it was said that the quality of contraceptives produced in China had been improved and that some had reached international standards.¹⁸⁸

Whatever the quality, the supply of contraceptives seems to have increased quite rapidly between 1954 and 1957, with the volume of sales rising in proportion. Official figures for production of the three principal contraceptives are as follows:¹⁸⁹

Year	Condoms	Diaphragms	Tubes of jelly
1954.....	100,000	6,000	150,000
1955.....	3,000,000	-----	-----
1956.....	9,000,000	258,000	-----
1957.....	45,000,000	300,000	1,950,000

Reports of the numbers of outlets and the volume of their sales also suggest rapid development of distribution and use of contraceptives during 1957. In March it was announced that the China Pharmaceutical Company was planning to market six times the quantity of contraceptives supplied in 1956 and that sales places were to be set up in supply and marketing cooperatives. Hospitals, public health clinics, and midwives were also to be involved in the sales.¹⁹⁰ In 1955, there were 78 shops in Tientsin and nine in all the rest of Hopeh Province

¹⁸² Shao Li-tzu, "Concerning the Problem of Dissemination of Knowledge about Contraception," p. 30.

¹⁸³ Chou O-fen, "How to Treat the Question of Contraception," p. 31.

¹⁸⁴ Yen Jen-yang, "Jen-kung liu-ch'an hsi-t'iao shih-tang hsien-chih," ("Abortion Should Be Properly Restricted"), *JMJP*, Mar. 25, 1957; and Chin Wu, "Ta-li kung-yang pi-yün yao-hsieh" ("Make Great Efforts to Supply Contraceptives"), *JMJP*, Mar. 26, 1957.

¹⁸⁵ "Sheng wei-sheng-t'ing chao-k'ai pi-yün wen-t'i tso-t'an-hui," *loc. cit.*

¹⁸⁶ "Contraceptive Propaganda Spreads in Countryside," *Wen-hui pao*, Shanghai; translated in *SCMP*, No. 1679, Dec. 27, 1957, p. 2.

¹⁸⁷ "Pang-chu fu-fu-men yu-chi-hua sheng-hai-tzu kuo-ying shih-t'ing shiang-chiao-ch'ang ta-liang sheng-ch'an pi-yün yung-chü" ("To help couples practice planned births, state-owned rubber factory No. 11 produces large quantity of contraceptives"), *Nan-fang jih-pao*, Canton, Apr. 17, 1957.

¹⁸⁸ "People Take Serious View of Contraception," *KMJP*, Oct. 25 1957; translated in *SCMP*, No. 1647, Nov. 7, 1957, p. 7; and "Contraceptive Propaganda Spreads in Countryside," *loc. cit.*

¹⁸⁹ "People Take Serious View of Contraception," *loc. cit.*; and "Contraceptive Propaganda Spreads in Countryside," *loc. cit.*

¹⁹⁰ "More Contraceptives on Sale," *NCNA-English*, Peking, Mar. 29, 1957; in *SCMP*, No. 1503, Apr. 3, 1957, p. 9.

that sold contraceptives; by the latter part of 1957 there were 257 such shops in Tientsin and 3,500 in the rest of the province.¹⁹¹ A number of news items reported the expansion of sales places in rural areas.

Sales figures cited in the press suggest a considerable increase in the use of contraceptives. According to national figures, sales of diaphragms were up 100 percent between 1955 and 1956, suppositories up 300 percent, and condoms up 400 percent.¹⁹² Local reports told a similar story.¹⁹³ Not all provinces and municipalities were heard from, and some areas, like Wanhsien in Szechwan Province, admitted that only a small number of persons had tried contraception and that some who did soon gave it up.¹⁹⁴ Still, the national figures indicate that sales of contraceptives were on the increase.

Intrauterine devices.—Intrauterine devices were seldom mentioned in the press during the first campaign, presumably because they could not be made available in sufficient quantity for general public use. The first published reference to IUD's was an article in the Peking Daily Worker in February 1957, which gave no details.¹⁹⁵ A second press item from Harbin in March disclosed that the municipal pharmaceutical company in that city had sold 1,095 rings in the fourth quarter of 1956 alone, exceeding the number of diaphragms sold in the same period.¹⁹⁶ In August, it was reported that over 6,000 rings had been sold in the first half of 1957 in Sian Municipality, or three times the number of diaphragms sold in the same period.¹⁹⁷ Over 200 women were fitted with rings within one month in Foochow in the spring of 1958,¹⁹⁸ 1,000 contraceptive rings and contraceptive "forks" were to have been allotted to Ch'ang-chou Municipality for use in "keypoint" experiments,¹⁹⁹ and the Nan-ch'ang branch of the Chinese Association for Obstetrics and Gynecology began experimentation with contraceptive rings on a sample population of 1,000 women in the summer of 1958.²⁰⁰ The rings used seem to have been mainly of stainless steel or plastic and were either imported from Japan or manufactured in China in imitation of Japanese models. There was some experimentation with rings of gold and platinum as well.²⁰¹

¹⁹¹ "People Take Serious View of Contraception," *loc. cit.*

¹⁹² "Contraceptive Propaganda Spreads in Countryside," *loc. cit.*

¹⁹³ The Fukien Pharmaceutical Company reported that it had sold 77,000 contraceptives in the first quarter of 1957, 180,000 in the second quarter, and 300,000 in the third. In Shantung, contraceptives sold in 1956 were three times the number sold in 1955. The Hopei Medical Supplies Company reported that in February and March 1958, 1,620,000 condoms were sold in the province, which was 1.2 times the number sold in the whole of 1957. In Hunan Province, 440,000 condoms were sold in the first half of 1957, compared with 130,000 in the whole of 1956. In Suchow Municipality, 50,032 condoms and diaphragms were sold between October 1956 and June 1957, almost five times as many as in the corresponding period a year earlier. "Spread Birth Control Propaganda to All Corners," *Wen-hui pao*, Shanghai, Jan. 5, 1958; translated in *SCMP*, No. 1699, Jan. 27, 1958, p. 15; "Birth Control Propaganda Spreads Far and Wide in Hopei Province," *Ho-pei jih-pao*, Paoting, Apr. 12, 1958; translated in *SCMP*, No. 1779, May 27, 1958, p. 32; "Pen sheng chieh-yu king-tso ch'ü-te hsien-chu ch'eng-ch'i" ("Birth Control Work of This Province Achieved and Significant Results"), *Hsin Hu-nan pao*, Changsha, Aug. 12, 1957; and Wang I-chih, *loc. cit.*

¹⁹⁴ "Chieh-yu wen-t'i yao kuang wei hsuan-ch'uan" (Birth Control Should Be Publicized Extensively"), *Wan-hsien pao*, Wanhsien, Mar. 17, 1958; and "To hsiang ch'ün-chung chiang-chieh pi-yün chih-shih" ("Give the Masses More Oral Explanations About Contraception"), *Wan-hsien pao*, Wan hsien, May 11, 1958.

¹⁹⁵ Chou O-fen, "Tsai t'än pi-yün wen-t'i," *loc. cit.*

¹⁹⁶ "Pen-shih k'ai-chan pi-yün hsuan-ch'uan kung-tso huo ch'eng-hsiao" ("Propaganda on Contraception in Our Municipality Gains Results"), *Ha-erh-pin jih pao*, Harbin, Mar. 19, 1957.

¹⁹⁷ Maternal and Children's Division, Sian Municipal Public Health Bureau, "Wei-sheng-pu-men ta-li k'ai-chan pi-yün hsuan-ch'uan chih-tao" ("Public Health Departments Carry Out Contraceptive Propaganda and Guidance With Great Efforts"), *Hsi-an-jih-pao*, Sian, Aug. 8, 1957.

¹⁹⁸ "Chi-hua sheng-yu hao-ch'ü to," *loc. cit.*

¹⁹⁹ "Pen-shih k'ai-chan pi-yün hsuan-ch'uan t'ui-kuang" ("Sales of Contraceptive Rings To Be Expanded"), *Ch'ang-chou jih-pao*, Ch'ang-chou, Apr. 21, 1957. The meaning of contraceptive "forks" (*chieh-yü ch'a*) is not clear, but the term seems to refer to an alternate intrauterine device that is not ringshaped.

²⁰⁰ "Hui-wu hsiao-hsi" ("News of Association Affairs"), *Chung-hua fu-ch'an-k'o' ta-ch'ih* (*Chinese Journal of Obstetrics and Gynecology*, vol. 6, No. 4, Aug. 3, 1958, p. 424).

²⁰¹ Shu Ming-yen, "Several Contraceptives Recommended for General Use," *KJJP*, July 24, 1962; translated in *SCMP*, No. 2795, Aug. 9, 1962, p. 16; and Wang Wen-pin, "Will Contraception Affect Health?" *KJJP*, Sept. 4, 1962; translated in *SCMP*, No. 2829, Oct. 1, 1962, p. 11.

Other experimental contraceptives.—Another Japanese import tested in China in the spring of 1957 was a plastic sponge shaped "like an eggplant" which was saturated with spermicide and placed in the vagina so that it covered the mouth of the uterus. It was said that Japanese investigators had found it 100 percent effective, but it was being tested at the Tientsin Rubber Research Institute before being turned over to the Canton No. 11 Rubber Factory for mass production.²⁰² A little later the Shantung Public Health Bureau gave its endorsement to a more dubious device that could be made at home from materials accessible to any rural household. At a public symposium, a spokesman stated that a sponge of cotton batten or gauze about the size of a silver dollar dipped in a solution of diluted vinegar, peanut oil, or soapy water had been shown to be 60 to 70 percent effective.²⁰³ The penchant for cheap, homemade contraceptives was carried a step further in November 1957. A medical professor told a forum on contraception in Peking that peasants had recently tried using a paste made by boiling a mixture of salt and starch which, he asserted, was as effective as the contraceptive jelly sold in the pharmacies and very economical. Besides, it could be exposed to the air without developing harmful bacteria. He did not indicate how its efficacy had been demonstrated.²⁰⁴

Many workers and peasants who complained about the bother of conventional contraceptives hoped for a drug that could be taken orally or by injection and that would be effective for a longer period. For a time in the summer of 1957, interest centered on a drug extracted from an Indian herb, a quantity of which was obtained from India, processed by the Research Institute of the Shanghai Pharmaceutical Co., and tested on animals by the Peking Union Medical College. The results of the tests were not made public. The news item reporting the experiment said that a British group had tried the drug on 800 women and found it nonpoisonous.²⁰⁵ A later report said that it was still under trial and hence not generally available but added that it could "prevent pregnancy for 2 or 3 months when taken twice before ovulation."²⁰⁶ Nothing further was heard of the Indian drug.

Traditional medicine contraceptives.—Some of the most bizarre aspects of the first birth control campaign relate to the quest for contraceptives based on China's traditional medicine. Given the shortage, cost, and inconvenience of Western contraceptives, the search for an herbal formula that might be more available, cheaper, and less likely to encounter cultural resistance on the part of the masses was understandable. However, the interest of the Party leaders in traditional medicine formulas was not merely pragmatic but was an almost fanatic compulsion. The preference for traditional medicine brought the Party into direct conflict with the Western trained doctors of the China Medical Association.

This conflict was precipitated by the now famous tadpole formula first publicized by Shao Li-tzu in a speech to the third session of the

²⁰² "Pang-chu fu-fu-men yu-chi-hua sheng-hai-tzu kuo-ying shih-i hsiang-chiao-ch'ang ta-liang sheng-ch'an pi-yün yung-chu," *loc. cit.*

²⁰³ "Tsal nung-ts'un chung t'ui-hsing na-hsieh pi-yün, fang-fa?" ("What Contraceptive Methods Are To Be Promoted in the Villages?"), *Ta-chung jih-pao*, Tsinan, May 14, 1957.

²⁰⁴ "Propagate Contraception Properly," *loc. cit.*

²⁰⁵ "K'ou-fu pi-yün-yao ch'u-pu chih-ch'eng" ("Preliminary Success in Making Oral Contraceptives"), *Wen-hui pao*, Shanghai, May 28, 1957.

²⁰⁶ "Hsien wei-sheng-yuan fu-ch'an-k'o k'ai-chan pi-yün chi-shu chih-tao kung-tso'" ("The Gynecological Department of the Hsien Public Health Hospital Started Contraceptive Techniques Guidance Work") *T'ien-men pao*, (Hopen) June 16, 1957.

First NPC in June 1956. In endorsing the decision of the Ministry of Public Health to collect and study Chinese herbal prescriptions of all kinds, Shao mentioned that during the session a fellow deputy, Yeh Hsi-chun, who was an herbalist, told him of a contraceptive formula that consisted of swallowing 14 live tadpoles on the third day after menstruation and 10 more on the fourth. The result was said to be total sterility for 5 years. If the formula were repeated twice after that, sterilization would be permanent. Deputy Yeh claimed that the formula was effective, safe, and inexpensive; its one major disadvantage was that tadpoles could only be found in the spring. Shao hoped the Ministry of Public Health would include this formula in its reasearch program.²⁰⁷

Shao's speech was made public by the New China News Agency 3 days later, and the tadpole formula began to appear in the press all over China. It was repeated in the official mass organ of the Ministry of Public Health, *Chien-k'ang pao*, on July 13, and at least one provincial health bureau began to recommend it because of the fact that it had appeared in many newspapers.²⁰⁸ Herbalist Yeh was interviewed by a reporter for the *Peking Daily* early in July, and the interview was carried in other papers elsewhere in the country. In the interview, Yeh repeated the formula as he had given it to Shao but added that it required a particular species of frog tadpole, that the numbers of tadpoles he had previously specified were minimum dosages, and that no harm would result if larger numbers were swallowed at more frequent intervals. He insisted that the formula has been known to him for over 50 years, that "more than 110" of his own relatives and friends had tried it, and that he could say "with confidence" that it had been effective in over 95 percent of the cases.²⁰⁹

The publication of the formula brought a mixed reaction. By September the *Chekiang Daily* had upped the prescription to close to 100 tadpoles,²¹⁰ and the stage seemed to be set for an all-out assault on the amphibian population of China the following spring. In medical circles and among some other groups as well there were rising doubts and concerns, though many people hesitated to attack the excesses of the Party-sponsored herbalist revival for fear of being obliged to wear "big hats" with the labels "anti-Chinese medicine" and "corrupt capitalist thinking."²¹¹ Several writers urged the *People's Daily* to take a more responsible position and warn people against the dangers of individual experimentation with untested herbalist formulas. One writer pointed out that a river in Chekiang from which women workers were taking tadpoles contained "filthy and stinking" water in which liver fluke, hookworm, and ascaris were to be found, and he asked whether these parasites were carried by or could be swallowed along with the tadpoles. As long as this possibility had not been checked on, how, he asked, could it be asserted that the tadpole formula was "safe and reliable?"²¹² Another writer, a spare-time research worker in

²⁰⁷ Shao Li-tzu, "The Problem of Birth Control," p. 18.

²⁰⁸ Cheng Feng, "Is Tadpole Really Efficacious for Contraception?" *JMJP*, Aug. 28, 1956; translated in *SCMP*, No. 1373, Sept. 20, 1956, p. 17.

²⁰⁹ Ku Hsing, "K'o-tou ho chieh-yii" ("Tadpoles and Birth Control"), *Ha-erh-pin jih-pao*, Harbin, July 6, 1956. Reprinted with "slight corrections" from the *Peking Daily*, where it had appeared earlier.

²¹⁰ Yün Lin, "Tan-fang mi" ("Blind Belief in Chinese Prescriptions"), *JMJP*, Sept. 8, 1956. Yün pointed out that the Chekiang paper had given the formula in a regular column headed "Science Window," which seemed to imply that it had been scientifically tested and approved, which was not true.

²¹¹ *Ibid.*

²¹² Cheng Feng, *loc. cit.*

traditional medicine, challenged Yeh's claims and advised against the use of tadpoles, snails, planorbis, and other forms of animal life on the grounds that the theory of traditional medicine itself cast doubt on their validity and that traditional medicine records showed that use of some of these methods had had fatal results. He said that even publicizing such formulas as part of a call for further research, as Shao had done, could "do more harm than good," since the publicity inevitably encouraged some people to try them before they had been properly tested.²¹³ An article in an influential Peking paper in December 1956 said that the "reckless promotion of Chinese contraceptives" had added to the "chaos" in which contraceptive guidance was floundering and specifically pointed out that the failure of the public health departments and experts to express an opinion on the tadpole formula had left the masses confused as to what to do. The writer cited other instances in which traditional contraceptives had resulted in cases of "poisoning" without preventing conception. Noting that some people entertain a "superstitious belief in unauthorized prescriptions," he particularly scored the Ministry of Public Health for permitting its own official organ to advertise such prescriptions.²¹⁴

Herbalist Yeh, caught in the crossfire, began to look for a way out. He said that if he had known Shao was going to broadcast his formula in a public speech he would not have talked about it until it had been studied further. Questioned about his own promotion of the formula in press interviews, Yeh said that his "more than 110" persons was only a "rough estimate," that he did not know whether all of these had tried tadpoles, and that the effectiveness of tadpoles was 70 to 80 percent, not 95 percent.²¹⁵ However, at a symposium on contraception held in Hangchow in December 1956, which Yeh and Shao attended, the tadpole formula was again proposed, apparently without caution as to its hazards. At the symposium, Yeh agreed to a plan to conduct research into the effects of tadpoles on animal fertility.²¹⁶

Meanwhile, the shortage of Western contraceptives²¹⁷ and their inconvenience reportedly led many people to adopt traditional prescriptions instead.²¹⁸ Admonitions began to appear in the press against carelessly or blindly taking untested contraceptive formulas.²¹⁹ Chung Hui-lan criticized the premature publicity given to exaggerated claims for such prescriptions as the tadpole formula.²²⁰ A Kirin newspaper reported that investigations by a provincial hospital had found that over 80 percent of persons who relied on Chinese contraceptive methods had become pregnant.²²¹ Still, there were those who defended the traditional medicine prescriptions on the grounds that, since they were specific to the individual, the failure of those taken without directions from an herbalist should be discounted,²²² and that it was

²¹³ Chang Tsun-shih, "The Question of Swallowing Tadpoles to Prevent Conception" *JMJP* Aug. 28, 1956; translated in *SCMP* No. 1373, Sept. 20, 1956, pp. 17-18.

²¹⁴ Sun Ching-hsia, "Present Problems in the Work of Propaganda on Contraception and its Technical Guidance," p. 10.

²¹⁵ Cheng Feng, *loc. cit.*

²¹⁶ "Shao Li-tzu on Contraception at Hangchow," *loc. cit.*

²¹⁷ *Ibid.*

²¹⁸ Wang Chin-shih, *op. cit.*, p. 30.

²¹⁹ "Kuan-yü pi-yün," *loc. cit.*; Chou O-fen, "Tsai t'an pi-yün wen-t'i," *loc. cit.*; "Hsüan-ch'uan pi-yün yao chia-yü hu-hsiao" ("Publicize Contraception and Take It to Every Household"), *Hsia-wen jih-pao* Shanghai, Mar. 2, 1957; "Hang-chou ch'eng-li chieh-yü chi-shu chih-tao wei-yuan-hui" ("Hangchow Establishes Birth Control Technical Guidance Committee"), *Che-chiang jih-pao*, Apr. 24, 1957; and "Tsai nung-ts'un chung t'ui-hsing na-hsieh pi-yün fang-fa?" *loc. cit.*

²²⁰ Chung Hui-lan, *op. cit.*, p. 21.

²²¹ Chao Huan-chang and Sui Kuei-ying, "Hsieh-chi pi-yün te jen-men" ("To Those Who Are Practicing Contraception"), *Chi-tin jih-pao*, Ch'ang-ch'un, Mar. 11, 1957.

²²² Yeh Che-chün, "Chung-yao pi-yün yen-fang yu-mei-yü pi-yün hsiao-ko?" ("Are Chinese Contraceptive Prescriptions Effective?"), *Hsia-men jih-pao*, Amoy, Jan. 15, 1957.

not fair to talk about the ineffectiveness of Chinese contraceptives without noting how many failures there were with the condom.²²³ The quest for new formulas and promotion of those already popular continued.²²⁴

Toward the end of March 1957, it was announced that the Chekiang Institute of Chinese Medicine was about to undertake an investigation of Yeh's tadpole formula, first on cats and later on women. The women taking part in the experiment were to be assured that, if they became pregnant, they would receive abortions free of charge.²²⁵ In May, the Kwangsi Medical College revealed that it had also begun to experiment with the tadpole formula using two different kinds of tadpoles on a small sample of mice. Initial results had been somewhat indecisive.²²⁶ Finally, in April 1958, the *People's Daily* published the results of the Chekiang investigation. Of 15 mice given the tadpole formula, 12 had become pregnant and two of the remaining three were found to have defective ovaries. Some 65 women took part in the human phase of the experiment, but when 18 of a contingent of 42 participants from one factory became pregnant, most of the rest turned to other contraceptives. The Institute also discovered that tadpoles taken from ponds and brooks in suburban Hangchow carried in their intestines the eggs of ascaris and other parasites.²²⁷ Tadpoles were not mentioned again during the first campaign.

Acupuncture.—In August 1956, the *China Youth Daily* published an article describing an interview with an acupuncture specialist in Peking who had reputedly had much success in using acupuncture and cauterization on women to secure infertility. The specialist claimed to have performed the operation successfully on his own wife after their fourth child and, several years later, when she wanted a fifth child, applied acupuncture in an equally successful attempt to reverse the effect.²²⁸ In March 1957, experiments in the use of acupuncture for contraceptive purposes were under way in several localities. Two hospitals in Peking had begun "observations" of acupuncture treatment,²²⁹ a doctor was assigned to study the possibilities by a hospital in Tientsin,²³⁰ and the acupuncture department of the Hospital of Chinese Medicine in Amoy offered assistance to the birth control campaign in that city.²³¹ Chung Hui-lan cautioned against premature publicity in the press and in mass meetings about contraception by acupuncture,²³² but in April 1957 it was announced that acupuncture was represented among the specialists on the newly created birth

²²³ Ts'ung pu hsiang-hsin chung-yao t'an ch'i' ("Talk About Starting with the Disbelief in Chinese Medicine"), *Ha-erh-pin jih-pao*, Harbin, Mar. 26, 1957.

²²⁴ Ch'en Yü-chieh, "Ch'in-chien ch'i'ch-chia chieh-chih sheng-yü" ("Run the Household with Diligence and Frugality and Control Births"), *Chang-sha jih-pao*, Changsha, Dec. 28, 1957; and "Han-tan-shih fu-yu pao-chien-chan chi-pan pi-yün t'u-p'ien chan-lan" ("Hantan Municipality Women's and Children's Health Center Holds Exhibition of Contraceptive Pictures"), *Ho-pei jih-pao*, Tientsin, Mar. 15, 1957. For a tabular presentation of contraceptive formulas proposed by herbalists during the first campaign, see H. Yuan Tien, "Sterilization. Oral Contraception, and Population Control in China," *Population Studies*, vol. xviii, No. 3, pp. 228-230.

²²⁵ Yen-chiu k'o-tou pi-yün-fa Che-chiang chung-i yen-chiu-so chiang chin-hsing liang-chung shih-yen' ("The Chekiang Institute of Chinese Medicine Will Carry Out Two Kinds of Experiments to Study the Tadpole Contraceptive Method"), *Wen-hui pao*, Shanghai, Mar. 30, 1957.

²²⁶ "Kuang-hsi i-hsieh-yuan yen-chiu k'o-tou pi-yün" ("Kwangsi Medical College Investigates Tadpole Contraceptive"), *Chien-k'ang pao*, Peking, May 7, 1957.

²²⁷ "Test of Chekiang Research Institute of Chinese Medicine Proves that Tadpoles are Useless for Contraceptive Purposes," *JMJP*, Apr. 14, 1957; translated in *SCMP*, No. 1759, Apr. 28, 1958, p. 17.

²²⁸ Wang Yün, "Chen-chiu ta-fu t'an pi-yün" ("A Doctor of Acupuncture Talks about Contraception"), *CKCNP*, Aug. 10, 1956.

²²⁹ "Pei-ching-shih chi-chi k'ai-chan pi-yün hsüan-ch'uan chih-tao kung-tso i-pai-to-ko i-liao chi-kou she pi-yün men-chen" ("Peking Municipality Actively Carries Out Contraceptive Propaganda and Guidance Work; and Over 100 Medical Organizations Set Up Contraceptive Clinics"), *KMJP*, Mar. 8, 1957.

²³⁰ Liu Lien-ju, "Ke-ti chan-k'ai chieh-yü hsüan-chuan chih-tao kung-tso" ("Birth Control Propaganda and Guidance Work Started in All Areas"), *Ho-pei jih-pao*, Tientsin, Mar. 11, 1957.

²³¹ "Ta-p'o ch'ün-chung ssu-hsiang ku-lü chieh-yü pi-yün hsüan-ch'uan hsiü shen-ju chin-hsing," *loc. cit.*

²³² Chung Hui-lan, *op. cit.*, p. 21.

control guidance committee in Hangchow,²³³ and in 1958 a Shanghai paper mentioned further experimentation by a rural health unit.²³⁴ Acupuncture has not since been suggested as a method of birth control, even during its current renaissance.

Abortion

One of the most controversial aspects of the first campaign was official policy on abortion. Not only was there a strong aversion to abortion within intellectual circles in China, but the entire medical profession seems to have been united in resisting any change that would make abortion easier to obtain. At the outset the opposition to abortion was almost universal. Shao Li-tzu dismissed the subject in his initial speech on birth control in September 1954 with the remark that "in China, the question of abortion can be left alone . . .,"²³⁵ and in his article for a Peking paper in December 1954, he said that abortion was generally prohibited in China. In view of the danger to maternal health, he felt the official regulations on abortion were "quite adequate." He quoted the regulations as follows:

Abortion is allowed in cases where continued pregnancy is medically considered undesirable, where the spacing of childbirth is already too close, and where a mother with her baby only 4 months old has become pregnant again and experiences difficulty of breast-feeding. The operation may be done upon the joint application of the couple, the certification of a doctor, and the approval of the responsible organization to which they belong. If the reason is special work or too heavy work (or study), any request for the operation must first be certified and endorsed by the key personnel of the responsible organization and also approved by a medical organization.²³⁶

For the next year and a half, the subject of abortion received almost no attention in the press. Then, in August 1956, Vice Minister of Public Health Fu Lien-chang revealed that the press had been receiving a number of letters complaining that hospitals were too strict and inflexible in enforcing restrictions on abortion and asking that women with no children or only one child be permitted to have an abortion if in poor health. Fu agreed with the complainants and argued that since the regulations on abortion were for the protection of the health of women, they could be relaxed where necessary to serve the same objective. At the same time, she made a strong point that the proposals to relax restrictions, which she said were then under consideration by the Ministry, "must not be taken as permission to procure artificial abortion at will." She also pointed to the dangers of abortion and urged that couples not treat the matter lightly or take abortion as a simple substitute for contraception.²³⁷ Most press articles on the subject continued to emphasize the dangers of abortion and regarded it as a "negative" or even a "foolish" approach to family planning.²³⁸ A symposium of "medical experts" convened in Peking by the China Medical association in February 1957 to discuss the question of birth control issued the same warnings.²³⁹

²³³ "Hang-chou ch'eng-li chieh-yü chi-shu chih-tao wei-yuan-hui," *loc. cit.*

²³⁴ "Spread Birth Control Propaganda to All Corners," p. 15.

²³⁵ Shao Li-tzu, "Deputy Shao Li-tzu Speaks on Birth Control at National People's Congress," p. 4.

²³⁶ Shao Li-tzu, "Concerning the Problem of Dissemination of Knowledge about Contraception," pp. 30-31.

²³⁷ Fu Lien-chang, *op. cit.*, pp. 8-9.

²³⁸ Yang Ta-wang, "T'i-ch'ang chih-hua sheng-yü pi-mien jen-kung liu-ch'an" ("Promote Planned Birth and Avoid Abortion"), *KMJP*, May 7, 1956; "Harbin Municipal Public Health Bureau Studies and Develops Guidance on Contraception," *Ha-erh-p'in jih-pao*, Harbin, Nov. 29, 1956; translated in *SCMP*, No. 1445, Jan. 8, 1957, p. 13; Wang Chin-shih, *op. cit.*, p. 30; "Hopei Completes Plan for Contraception in 1957," p. 15; and "Pen-pao chao-k'ai ch'ih-hün chieh-yü wen-t'i tso-'an-hui" ("This Newspaper Holds Symposium on the Problem of Delayed Marriage and Birth Control"), *CKCP*, Feb. 23, 1957.

²³⁹ An Chung-huang, "Medical Experts Discuss Late Marriage and Contraception in Capital," *NCNA*, Peking, Feb. 21, 1957; translated in *SCMP*, No. 1487, Mar. 12, 1957, p. 12.

Nevertheless, at the CPPCC meeting in Peking on March 7, 1957, Health Minister Li Teh-ch'uan announced that "with the greatest reluctance" ²⁴⁰ the health authorities were going to change the strict rules on abortion and that "henceforth" the decision in specific cases would be made "mainly on the basis of the wish of the individuals, and limitations on its discretion should be abolished." She hastened to point out that the changes did not signify an effort to promote abortion, which she said was not only harmful to health but could not achieve the purpose of birth control.²⁴¹ Madame Li's announcement evoked a storm of opposition at the CPPCC meetings. Madame Li Chien-sheng, vice director of the Peking Public Health Bureau and a member of the executive committee of the All-China Democratic Women's Federation, told the CPPCC the following day that abortion and sterilization should be allowed only in cases of absolute necessity. She pointed out the high costs to the State of the 1,593 abortions in the 24 Peking hospitals during the second half of 1956 and the serious complications reported afterward by patients from one of these hospitals.²⁴² Ma Yin-ch'u concurred with Li Chien-sheng, and added that it was a homicidal act to destroy a fetus.²⁴³ In a speech to the CPPCC on March 14, Chung Hui-lan said that curettage and tubal ligations and resections unfairly placed the burden of birth control on women, whereas vasectomy and the condom obliged men to share the responsibility.²⁴⁴ On March 18, Shao Li-tzu joined the debate with the charge that Li Chien-sheng had given the "one-sided" view of doctors obliged to work harder because of the demand for abortions but had taken no account of the harm to women who are unable to obtain a clinical abortion and try to abort themselves by means of quinine, cholera medicine, liquor, or physical strain. He said that he could not understand the limitation of abortion to women who are seriously ill on the grounds that abortion was too dangerous; if it were not dangerous to the seriously ill, how could it be dangerous to healthy women? He supported the relaxation of restrictions announced by Li Teh-ch'uan.²⁴⁵

It soon became apparent that the opposition to the Ministry's new policy was not confined, as Shao had implied, to a few Peking doctors. Even before Shao's speech, the 19 members of the CPPCC's Health Committee issued a statement expressing their dissent.²⁴⁶ Elsewhere, many doctors attacked the change in articles in the press. The Ministry seems to have been awed by the opposition. Although some localities reported as early as March that they were relaxing their restrictions "in the spirit of the directive of the central government," ²⁴⁷ there were many others that seemed to be avoiding any

²⁴⁰ "Health Minister on Birth Control," NCNA-English, Peking, Mar. 7, 1957; in *SCMP*, No. 1487, Mar. 12, 1957, p. 9. Curiously, there is no reference to reluctance in the text of Madam Li's speech printed the next day in the *People's Daily*.

²⁴¹ Li Teh-ch'uan, "Birth Control and Planned Families," p. 4.

²⁴² Li Chien-sheng, "Do Not Perform Artificial Abortion Unless Absolutely Necessary," pp. 6-8.

²⁴³ "Chieh-yü te pien-lun" ("Debate on Birth Control"), Peking dispatch to an unknown mainland newspaper, Mar. 10, 1957.

²⁴⁴ Chung Hui-lan, *op. cit.*, p. 21.

²⁴⁵ Shao Li-tzu, "Planned Parenthood," *JMJP*, Mar. 20, 1957; translated in *CB*, No. 445, Apr. 5, 1957, pp. 10-11.

²⁴⁶ Wang Li-keng, *et al.*, *loc. cit.*

²⁴⁷ "Kuang-chou ke pao-chien-chan chih-tao pi-yün fang-fa" ("Health Organs in Canton Give Guidance to Contraception"), *Wen-hui pao*, Hong Kong, Mar. 20, 1957; and "Sheng wei-sheng-t'ing chao-k'ai 'pi-yün wen-t'i' tso-f'an-hui" ("Provincial Public Health Department Holds Symposium on 'Problems of Contraception'"), *Ch'ing-hai jih-pao*, Hsi-ning, Mar. 20, 1957. It is possible that compliance in "spirit" here means an evasion of complete compliance with the new policy.

mention of abortion in their progress reports. The Ministry of Public Health's newspaper, *Chien-k'ang pao*, carried an article in April 1957 in which it was conceded that some doctors are unwilling to perform abortions, evidently something of an understatement.²⁴⁸ About the same time, a local paper revealed that the government had not yet abolished the restrictions on abortion and that the question of whether or not they should be abolished was still being "discussed by various circles."²⁴⁹ An article in a Peking paper said that "the views of medical circles at present are . . . not uniform."²⁵⁰

On April 11, more than a month after Madame Li Teh-ch'uan's announcement to the CPPCC, the Ministry of Public Health issued a new "notice" on sterilization and abortion. The actual text was not published, nor was there any reference to it in the *People's Daily*. According to a news item in a Shanghai paper, the "notice" said that from that day onward abortions and sterilizations must be granted without restrictions in regard to the age of the applicant or the number of her children and without the requirement of special approval procedures. The notice warned, however, that abortion was dangerous, could not be performed on a given patient oftener than once a year, must take place within the first 10 weeks of pregnancy, and was limited to patients who were "healthy." It specified that sterilization must have the agreement of both husband and wife but apparently made no such stipulation for abortion.²⁵¹

The new regulations were not uniformly observed by provincial and municipal public health agencies. On the very day that the Shanghai paper published its report, a Canton paper reported that, in accordance with the views of participants at a local symposium on sterilization and abortion, a notice had been drafted requiring applicants for abortion to have agreement of husband and wife and permission from the place of employment or street committee.²⁵² Subsequently, the Canton Municipal Political Consultative Conference objected to the relaxation of restrictions on abortion,²⁵³ the Liaoning Provincial Political Consultative Conference, ignoring the Ministry's position, advocated "strict control of abortions,"²⁵⁴ and members of the Hangchow birth control guidance committee expressed the view that abortion should be granted only in cases of absolute necessity.²⁵⁵ However, the Swatow Municipal Bureau of Public Health adopted the Ministry's regulations as of June 1, adding only the stipulation requiring the consent of both husband and wife.²⁵⁶

²⁴⁸ Hung Ming-kuei, *loc. cit.*

²⁴⁹ Wu-chou Municipal Public Health Department, "T'an jen-kung liu-ch'an yü pi-yün" ("Talk about Abortion and Contraception"), *Wu-chou jih-pao*, Wu-chou, Apr. 6, 1957.

²⁵⁰ Yang Lin, "Shou-tu chuan-chia-men t'an chieh-yü pi-yün wen-t'i," *loc. cit.*

²⁵¹ "Wei-sheng-pu fa-ch'u t'ung-chin chüeh-yü ho liu-ch'an chou-shu pou-shou hsien-chih" ("Public Health Ministry Notice on Sterilization and Abortion Without Restriction"), *Wen-hui pao*, Shanghai, Apr. 12, 1957.

²⁵² "Tsen-yang pan-li ch'ih-chiu pi-yün chou-shu chou-hsi" ("How to Carry Out the Procedure for Undergoing Sterilization"), *Kuang-chou jih-pao*, Canton Apr. 12, 1957.

²⁵³ "Chieh-chih cheng-yü hao-ch'u to jen-kung liu-ch'an hai-ch'u ta" ("Birth Control's Good Points Are Many; Abortion's Bad Points Are Great"), *Kuang-chou jih-pao*, Canton, Apr. 20, 1957.

²⁵⁴ "Sheng cheng-hsieh ti-san-tz'u ch'üan-t'i hui-i fen-tsu t'ao-lun ta-chia chiu tang yü fei-tang kuan-hsi chieh-chih sheng-yü tsun-lao chia-yü teng wen-t'i je-lieh fa-yen ho tien-lun" ("The Third Plenary Session of the Provincial Political Consultative Conference Holds Group Discussions, Speeches and Heated Debates Held on Problems of Party and Non-Party Relationships, Birth Control, Respect for Elders, and Education of the Young"), *Liao-ning jih-pao*, Shenyang, May 1, 1957.

²⁵⁵ "Jen-kung liu-ch'an yü wei-hsien" ("There Are Dangers in Abortion"), *Che-chiang jih-pao*, Hangchow, May 5, 1957.

²⁵⁶ "Shih wei-sheng-chü chüeh-ting-t'ai-tz'u fang-k'uan shih-hsing chüeh-yü shou-shu ho jen-kung liu-ch'an hsien-chih" ("Municipal Public Health Bureau Again Decides to Relax Restrictions on Sterilization and Abortion"), *Shan-t'ou pao*, Swatow, May 14, 1957. The meaning of "again" in this title is not clarified by the article itself, nor is the reason for the delay of 2 weeks in the effective date of the decision.

The reaction from medical circles was immediate. The day after Li Teh-ch'uan's announcement of April 11, the China Medical Association's Technical Guidance Committee on Birth Control called a conference of specialists to discuss the subject, and on April 17 a copy of the minutes was sent to the Ministry of Public Health. The conference warned of the physical aftereffects of abortion, the insufficiency of personnel and facilities for abortion in rural areas, the inadequacy of abortion as a birth control method, the danger that easy abortion would discourage contraception, the inconsistency of abortion with the ideal of equality of the sexes, and the need for education to discourage self-induced abortions. The participants at the conference wanted to know why the authorities emphasized the dangers of self-induced abortion but gave the public so little warning about the dangers of clinical abortion. They also felt that abortion and birth control were becoming confused in the public mind because the two subjects had not been kept separate. They demanded that the Ministry explain its decision to relax controls. They asked that applicants for abortion be required to obtain prior approval from the local medical association, that applications from women who had borne no children be denied, and that the costs be borne by the applicant, not by the State.²⁵⁷ Medical people charged that the April 11 announcement was a "violation of the principle of health," that it was "an extremely undisciplined mistake,"²⁵⁸ that abortion has "hundreds of ills but not one benefit," that it was hypocritical to object to infanticide but permit abortion,²⁵⁹ and that the decision as to whether or an abortion should be performed should be left to the judgment of the doctor.²⁶⁰

On May 15, the Ministry of Health issued another notice on abortion which allowed a woman who had "special reasons" for wishing to terminate her pregnancy to have an abortion provided (1) that she presented a doctor's certificate stating that she was still within the first trimester of the pregnancy and that no complications would result from the abortion, and (2) that she had not a clinical abortion within the previous 12 months. Women applying for abortions were to be advised of the dangers involved and given counseling so that they would not again become pregnant immediately afterward.²⁶¹

There was little in this notice that could be construed as a concession to the concerns of the medical profession. Abortion restrictions were being relaxed, and this fact was clear to medical personnel and the public alike. Some hospitals reported being swamped with requests for abortions the day after the press notice was issued.²⁶² The China Medical Association's Technical Advisory Committee said that the Ministry's new policy was "inappropriate from the medical

²⁵⁷ "Chinese Medical Association Opposes Relaxed Control of Artificial Expulsion," NCNA, Peking, May 29, 1957; translated in *SCMP*, No. 1546, June 7, 1957, pp. 8-9.

²⁵⁸ "Jen-kung liu-ch'an wei-fan pao-chien yüan-tse" ("Artificial Abortion Violates the Principle of Health"), *Wen-hui pao*, Shanghai, Apr. 20, 1957. The editors gratefully acknowledged the criticism of their paper for publishing the April 11 notice, issued a "correction" on Apr. 14, and promised to improve their "work style."

²⁵⁹ "Chi-hua sheng-yü' sheng-yü 'chieh-chih sheng-yü'" ("Planned Birth' Is Better Than 'Birth Control'"), *Che-chiang-jih-pao*, Hangchow, May 12, 1957.

²⁶⁰ "Tsen-yang k'ai-tai jen-kung liu-ch'an. Shao Li-tzu t'ung fu-ch'an-k'o ta-fu i-chien fen-chi'" ("How To Look at Abortion; Shao Li-tzu Differs With Gynecologists"), *PCJP*, May 12, 1957.

²⁶¹ "Public Health Ministry Issues Notification on Abortion and Sterilization," NCNA, Peking, May 18, 1957; translated in *SCMP*, No. 1539, May 28, 1957, pp. 2-3.

²⁶² Swatow Municipal Public Health Bureau, "Jen-jung liu-ch'an ying chu-i te chi-ke wen-t'i" ("Problems Which Need Attention in Regard to Abortion"), *Shan-t'ou pao*, Swatow, May 23, 1957; and Teng Jen-ai, "Tui jen-kung liu-ch'an t'iao-li te shang-ch'üeh'" ("Deliberation Concerning the Regulations on Abortion"), *Tsing-tao jih-pao*, Tsingtao, June 8, 1957.

point of view" and asked that it be reconsidered.²⁶³ Word spread that the Ministry had taken action without consulting either the China Medical Association or the Women's Federation.²⁶⁴ But Li Teh-ch'uan, after belatedly conferring with the Women's Federation on June 3, insisted that the China Medical Association had been consulted.²⁶⁵ Madame Li indicated that most of the applicants for abortion were women cadres, and she urged the Federation to "conduct education" among its members. Tsai Chang, national chairman of the Federation, said that the Federation was not prepared to announce its "attitude" on the subject until it had conferred with experts in the public health departments.²⁶⁶ Presumably it was the female Party cadres who provided most of the pressure for relaxation of the restrictions on abortion.

The only public spokesman for easy abortion in China was Shao Li-tzu, which made him the target of attack by many physicians. In his self-defense, Shao asserted that, contrary to what some of his critics charged, he was neither in favor of abortion nor unaware of its dangers. He noted, however, that, as Soviet experience had shown, clinical abortion was much safer than self-induced abortion (the Moscow City Hospital had performed 50,000 abortions in 1929 without a single "unfortunate" case, he said) and thus a relative good. It was unreasonable, Shao argued, to insist that couples must have four children before they could begin to have abortions, and he saw a fundamental inequity in allowing abortions freely to actresses going abroad and to women cadres who joined the Party before 1948 but not to ordinary citizens. As for the doctors' complaint that they lacked the trained personnel to cope with abortion on a large scale, he said that China could not wait until the quality of its medical personnel rose to the world standard and that medical personnel needed to be more sympathetic to the plight of pregnant women. Shao's tone was devastatingly sarcastic.²⁶⁷

In the end, the Party had its way so far as the regulations were concerned, but the medical people had their way so far as implementation was concerned. Throughout the rest of the first birth control campaign, they fought a rearguard action against unrestricted abortion with some assistance from the newspapers. A Chungking paper said that only "a small number of women" were asking for abortion at a local hospital. The paper also cited the case of a midwife who performed 11 abortions with a piece of rubber tubing, causing severe hemorrhaging to three of the women, and another case of a woman whose clinical abortion resulted in complications that ran up a hospital bill of 200 yüan and almost took her life.²⁶⁸ A Shanghai paper carried an article by a doctor who insisted that abortion should be permitted only when absolutely necessary to protect the health of a pregnant woman, and incidentally answered Shao's argument about Soviet abortions by saying that

²⁶³ "Chinese Medical Association Opposes Relaxed Control of Artificial Expulsion," p. 8.

²⁶⁴ Chiang Hsiao-ya, "Tan-yüan fu-lien shih wo-men te ch'in-liang fan-tui fang-k'uan jen-kung liu-ch'an hsiên-chih" ("We Hope the Women's Federation Is Our True Mother and Oppose the Relaxation of Restrictions on Abortion"), *T'ing-tao jih-pao*, Tsingtao, June 6, 1957.

²⁶⁵ "Minister Li Teh-ch'uan of Public Health Says Ministry Does Not Encourage Artificial Expulsion," *KMJP*, June 4, 1957; translated in *SCMP*, No. 1554, June 20, 1957, p. 4.

²⁶⁶ *Ibid.* A provincial clinic in Foochow had reported in March that of 275 abortions performed there during 1956, 128 were for women cadres. "Jen-kung liu-ch'an hai to i shao" ("Abortion Has More Disadvantages Than Advantages"), *Fu-chien jih-pao*, Foochow, Mar. 31, 1957.

²⁶⁷ Shao Li-tzu, "Ch'eng-ch'üeh-ti k'an-tai jen-kung liu-ch'an wen-t'i" ("Look at the Abortion Question Correctly"), *KMJP*, May 4, 1957.

²⁶⁸ "Jen-kung liu-ch'an ying-hsiang fu-nü shen-t'i chlen-k'ang" ("Artificial Abortion Affects the Health of Women"), *Ch'ung-ch'ing jih-pao*, Chungking, Sept. 15, 1957.

Soviet medical circles have long observed the unfavorable aftereffects of abortion and that "the majority of our gynecologists have had the same experience." While she commended the good intentions of those who advocated removing restrictions, she also pointed out that there is no way of knowing whether a woman has had a previous abortion within the prior 12 months and that no doctor can certify that there will be no complications from an operation as dangerous as abortion. This stipulation, she said, had never been clarified by the Ministry of Public Health. She also confirmed the charge that most abortion applicants were women cadres and that there had been a rush of applicants after the Ministry's notice. She advocated that the "proposal" to "abolish all restrictions" be given "careful consideration," which would seem to imply that the new policy was not actually in effect 7 months after its promulgation.²⁶⁹ In an article carried by the *People's Daily* in December, another doctor warned that too many women cadres were asking for abortion because they found contraception too bothersome and because they did not realize the danger of abortion. Indirectly criticizing the official policy, she warned that "the gain from abortion is not worth the loss."²⁷⁰ Under the circumstances, it is unlikely that abortions were freely available to women who were not Party members residing in major municipalities.

Sterilization

Sterilization and abortion were often linked in official policy statements and press releases, and apparently many people in China found both equally opprobrious, but the opposition to sterilization was not as strong, and official prohibitions against sterilization began to be relaxed earlier. In March 1956, before the Ministry of Public Health had given its official blessing to the birth control campaign, it had already decided to modify the requirements for sterilization by reducing from six to four the number of healthy surviving children applicants must have.²⁷¹ Three months later, Shao Li-tzu, in applauding the Ministry's decision, noted that the limitations were still "numerous." He objected particularly to official stipulations that "the woman must be in poor health, over 30 years of age, busy with her studies, and in financial difficulties." Instead he recommended that sterilization be granted to couples with "three or four" children if both husband and wife agreed.²⁷² In March 1957, an unnamed Ministry spokesman said that persons who had too many children should be given such operations on request, but he did not define "too many" nor indicate whether this statement constituted official policy.²⁷³ The *People's Daily* editorial of March 5, 1957, argued that, so long as there was no impairment to health, sterilization should be granted to "persons who have too many children" if they "voluntarily choose" this method. The editorial declared that the Ministry had placed "too heavy restrictions" on sterilization in the past.²⁷⁴

²⁶⁹ Kung Nai-ch'üan, "Chi-chi t'i-ch'ang chieh-chih sheng-yü yen-ke chang-wu jen-kung liu-ch'an te shih-hsing" ("Promote Birth Control Actively; Strictly Control the Practice of Abortion"), *Wen-hui pao*, Shanghai, Nov. 29, 1957.

²⁷⁰ Sung Hung-chao, "Jen-kung liu-ch'an hai-ch'u to" ("Abortion Has Many Bad Points"), *JMJP*, Dec. 8, 1957.

²⁷¹ Chou O-fen, "Chieh-cha shu-lüan-kuan ho shu-ching-kuan" ("The Ligation of the Fallopian Tubes and Spermatic Ducts"), *KJJP*, Jan. 13, 1957.

²⁷² Shao Li-tzu, "The Problem of Birth Control," p. 18. Shao had previously insisted that tubal ligations be done strictly according to the advice of the doctor and then only when "medically necessary." Shao, "Concerning the Problem of Dissemination of Knowledge About Contraception," p. 30.

²⁷³ "Ministry of Public Health Official Talks on Conditions of Contraception," NCNA, Peking, Mar. 2, 1957; translated in *SCMP*, No. 1487, Mar. 12, 1957, p. 11.

²⁷⁴ "Exercise Appropriate Birth Control," p. 8.

Two days later, Madame Li Teh-ch'uan announced the end of restrictions on both sterilization and abortion.²⁷⁵ However, the next day Li Chien-sheng from the Women's Federation, while conceding that too rigorous restriction was undesirable, warned that to perform sterilization "at random" was dangerous.²⁷⁶ On April 11, restrictions relating to age and number of children were abolished for both sterilization and abortion,²⁷⁷ but it was some time before the new regulations were put in practice. On April 17, a Peking newspaper reported the case of a cadre with three children who was told by a municipal hospital that he could not have a vasectomy because he was not "eligible" until he had four children. The cadre pointed out that his application had been signed by his supervisor and that his wife had agreed. A hospital official replied: "We don't care whether your supervisor agrees or not. We only know to go by the regulations decided upon last year."²⁷⁸

The Ministry's notice of May 15 said that physicians could perform sterilization for all couples requesting the operation if no contraindicative diseases were found upon examination. It insisted that applicants be told plainly before the operation that it would cause permanent sterility and that they should continue using contraceptives for another month after sterilization to be sure that all sperm cells in the seminal vesicle had been expelled.²⁷⁹ In an article for the English language magazine *People's China*, Chou O-fen, of the Ministry's Women's and Children's Health Bureau, said that sterilization was "a method to be used sparingly and only in exceptional circumstances" and then only with the "unqualified agreement" of both husband and wife.²⁸⁰ Chou may have been expressing the attitude of her profession rather than the official policy. There is no doubt that the Party leaders wished to encourage sterilization as much as possible.

To do so, the Party had to overcome resistance among the medical profession and the general public. Some doctors were concerned that the operation might be performed on individuals who were not fully aware of the implications and who would later regret it. The medical committee of the CPPCC, though it approved the operation if the couple agreed they wanted no more children, advised applicants to give the matter "serious consideration" and not make hasty decisions that could lead to regrets later on.²⁸¹ Health authorities in Hangchow suggested that young couples in the early stages of childbearing defer having sterilization until they had at least three children. Because it was irreversible, they felt the operation was not a good method of birth control. In addition to the agreement of husband and wife, they required applicants to have a certificate of approval from their "pertinent organizations."²⁸² A doctor in Liu-chou Municipality advised couples to wait until they had four children as a guarantee against future regrets, and he also told them they must obtain a signed authorization

²⁷⁵ Li Teh ch'uan, "Birth Control and Planned Families," p. 4.

²⁷⁶ Li Chien-sheng, "Do Not Perform Artificial Abortion Unless Absolutely Necessary," p. 8.

²⁷⁷ "Wei-sheng-pu fa-ch'i u t'ung-chih chieh-yü ho liu-ch'an shou-shu pu-shou hsien-chih," *loc. cit.*

²⁷⁸ "Chieh-cha chu-ching-kuan te hsien-chih t'ai yen" ("Restrictions on Vasectomy Are Too Strict"), *PCJP*, Apr. 17, 1957.

²⁷⁹ "Wei-sheng-pu t'ung-chih chi-chi t'i-ch'ang pi-yün" ("Notice of Public Health Ministry Actively Promotes Contraception"), *JMJP*, May 23, 1957.

²⁸⁰ Chou O-fen, "Birth Control in China," *People's China*, No. 11, June 1, 1957, pp. 28-29.

²⁸¹ Wang Li-keng, *et al.*, *loc. cit.*

²⁸² "Hang-shih wei-cheng-chü teng tan-wei yao-ch'ing t-shih chü-hsing tso-t'an-hui yen-chiu jen-kung liu-ch'an chieh-yü shou-shu wen-t'i" ("Hangchow Municipal Public Health Bureau Invites Physicians to Symposium to Study the Question of Abortion and Sterilization"), *Che-chiang jih-pao*, Hangchow, June 9 1957.

from their place of work.²⁸³ In both instances, advice and instructions that were contrary to official policy were being disseminated by health agencies through the newspapers.

Many people were afraid that sterilization would have an adverse effect on their sexuality and general health. At a symposium in Peking in February 1957, medical specialists sought to allay these anxieties, which were said to be a matter of "great concern" among the people. One urologist said that vasectomy was painless and would not affect sex life, and another said the operation could be performed at an outdoor clinic by an experienced doctor in a little over 10 minutes. An endocrinologist said that cases of "fluctuation in sexual desire" reported by some patients after the operation was due to psychological reactions. However, an obstetrician disclosed that some women had found "changes in their bodies" after tubal ligation which were caused by "poor techniques" in the operation,²⁸⁴ a Shanghai man persuaded by his wife to apply for a vasectomy was told at the hospital that it would affect his health, which "frightened him away,"²⁸⁵ and a gynecologist in Lüta mentioned cases in the medical literature in which vasectomy was followed by "withering of the testicles" and loss of sexual function.²⁸⁶ To many "male comrades," this was further proof of what they already feared. If there was to be a sterilization in the family, they wanted their wives to "take the knife," arguing that this was part of the women's share of the division of labor between the sexes.²⁸⁷ Such attitudes were denounced as "feudal thinking" by the Party and some medical personnel, who pointed out that vasectomy was a much simpler operation than salpingotomy and that it was pure selfishness on the part of men to make women take all the risks.²⁸⁸

There were also some people who objected to sterilization on ethical grounds. The demographer Ch'en Ta argued that it was "inhuman" and a violation of "the law of natural development." Although he was in favor of birth control, he opposed performing sterilization "blindly."²⁸⁹ However, official support for sterilization, and especially for vasectomy, was firm. On April 17, 1957, a leading Chinese urologist told a meeting of over 200 doctors in Peking that vasectomy would become the most frequent surgical operation in China.²⁹⁰ However, despite many assurances in the press that vasectomy was simple, safe, and without ill effects, the numbers of vasectomies reported by vari-

²⁸³ "Nan-tzu chieh-cha shu-ching-kuan hsü-yao shen-ma t'iao-chien ho shou-hsü?" ("What Conditions and Procedures Are Required for Men to Undergo Vasectomy?"), *Liu-chou jih-pao*, Liu-chou, Jan. 31, 1958.

²⁸⁴ An Chung-huang, *op. cit.*, pp. 11-12.

²⁸⁵ Hsüan-ch'uan pi-yün yao chia-yü hu-hsiao," *loc. cit.*

²⁸⁶ "Sheng cheng-hsieh ti-san-tz'u ch'üan-t'i hui-i fen-tsu t'ao-lun ta-chia chiu tang yü fei-tang kuan-hsi chieh-chih sheng-yü tsun-lao chiao-yü teng wen-t'i je-lieh fa-yen ho pien-lun," *loc. cit.*

²⁸⁷ "Chi-hua sheng-yü sheng-yü chieh-chih sheng-yü," *loc. cit.*

²⁸⁸ Chung Hui-lan, *op. cit.*, p. 21; and Feng Lan-hsiang, "Shou-shu chieh-yü wen-t'i" ("The Question of Sterilization"), *JMJP*, Mar. 18, 1957.

²⁸⁹ Ho Ping-jan, "Ch'en Ta chiao-shou t'an t'i-ch'ang chieh-yü jen-wei hsüan-ch'uan ying-kai shen-jung-ts'un" ("Professor Ch'en Ta Talks about the Promotion of Birth Control. Believes that Birth Control Propaganda Should Be Carried Deep into the Rural Areas"), *KMJP*, Mar. 14, 1957.

²⁹⁰ "Wu Chieh-p'ing t'an shu-ching-kuan chieh-cha shou-shu ts'ung li-lun shang fen-hsi shou-shu pu ying-hsiang cheng-ch'ang sheng-li" ("Wu Chieh-p'ing Talks about Vasectomy; From the Point of View of Theoretical Analysis, the Operation Has No Effect on Normal Physiological Processes"), *PCJP*, Apr. 21, 1957.

ous urban hospitals during the first birth control campaign tended to be very small.²⁹¹

Late Marriage

The effort to promote a later age at marriage for young people, which became the second major prong of the birth control drive, had an inauspicious beginning. Shao Li-tzu, in his article of December 1954, unequivocally denounced late marriage as an unnatural, ridiculous, Malthusian idea that had been rendered completely unnecessary by the availability of contraception. Sex, he said, was essential to the "minimum happiness of life," and the failure of young people to get married "would very likely affect their character and health, thus reducing the actual efficiency of their work and study." He hoped that the knowledge of contraception would enable "grown-ups" to get married without fear of having too many children and thus "turn all the lovers into couples."²⁹²

Shao must have had the approval of the Party leaders for this position as for his stand on contraception, and it is doubtless significant that for the next 2½ years the press had nothing to say about a later age for marriage. The subject was raised again on February 20, 1957, when Shao and 30 "well-known medical experts" discussed late marriage and contraception at a symposium convened in Peking by the China Medical Association. What Shao said at the symposium was not revealed, but it was obvious that by then the decision had already been made to encourage later age at marriage. The symposium began with a discussion of the physiological effects of late marriage which concluded, apparently unanimously, that "marriage at the age 20 to 25 for women and 30 to 35 for men should not be considered late." Some participants refuted the popular notion that after age 25 a first birth is likely to be accompanied by difficult labor. In summing up, the chairman of the symposium, Fu Lien-chang of the China Medical Association, said that publicity should promote the idea that the proper age for marriage was around 25 for women and 30 for men.²⁹³

The next day the Youth League's newspaper, *China Youth Daily*, held another symposium of "over 20 responsible persons, experts, and professors" representing the Women's Federation, the Peking Labor

²⁹¹ A Shanghai hospital reported doing 18 vasectomies in February and 30 in March 1957. A Peking hospital reported 30 during February 1957. A hospital in Kuei-lin had done only 30 from the start of the birth control campaign until April 1957. The Chengchow municipal birth control committee reported 92 sterilizations for both sexes done in its six hospitals during the first quarter of 1957. Amoy reported a total of 185 men and 26 women sterilized between the start of the local birth control effort in 1957 and the time of the report in February 1958. See "Chieh-cha-shu-ching-kuan-che tseng-to; shou-shu pien-li wu fu-tso-yung" ("Persons Undergoing Vasectomy Increase; The Operation Is Simple and There Are No Aftereffects"), *Hsin-wen jih-pao*, Shanghai, Mar. 5, 1957; "Pei-ching-shih chi-chi K'ai-chan pi-yün hsüan-ch'uan chih-tao kung-tso; i-pai-to-ko i-liao chi-kou she pi-yün men-chen," *loc. cit.*; "Shih wei-cheng-k'o chao-chi chung-hsi-i tso-t'an chia-ch'iang pi-yün chih-tao kung-tso," *loc. cit.*; "Pen-shih ch'eng-li chieh-yü kung-tso wei-yüan-hui" ("Birth Control Work Committee Established in This Municipality"), *Chen-chow jih-pao*, Chengchow, July 12, 1957; and "Planned Birth and Birth Control in Amoy," *loc. cit.*

²⁹² Shao Li-tzu, "Concerning the Problem of Dissemination of Knowledge About Contraception," pp. 28-29.

²⁹³ An Chung-huang, *op. cit.*, pp. 11-12.

Cadre School, the Association for the Dissemination of Science, and an assortment of health institutions on the question of delayed marriage and birth control, including Shao, Ch'en Ta, and Professor Yeh Kung-shao of the Peking Medical School. Everyone unanimously agreed that young people should not marry too early.²⁹⁴ Immediately, the press began to take up this new theme in conjunction with the birth control drive.²⁹⁵ One month later, Shao himself, in his speech to the CPPCC National Committee, indicated a complete turnabout in his own position. He declared that late marriage must be promoted along with birth control and also advocated that the minimum ages for marriage established by the Marriage Law of March 1950, 18 for women and 20 for men, be raised to 20 and 23 respectively.

The most compelling reason for the change in official views was the growing conviction that early marriage was a significant factor in China's high birth rate. Ch'en Ta pointed this out in a long article on the subject published in May 1957,²⁹⁶ and others noted that most first births occur to women 18 or 19 years old, that women 24 to 25 seen by hospitals already have four to five children,²⁹⁷ and that many women workers have three or four children by the time they are 23 or 24.²⁹⁸ But before these arguments appeared, the decision of the Party had been clearly stated in the *People's Daily* editorial of March 5, 1957:

. . . We must change the custom of early marriage. The earlier people get married, the more children they will have and the greater the difficulties imposed on young people. To control the rate of pregnancy, advocacy of late marriage will be necessary. . . . At present, many young men get married before 25 and even before 20, taking on themselves many difficulties in livelihood. Thus, it is necessary to launch strenuous education and publicity among the masses to destroy the bad custom of early marriage and to promote late marriage.²⁹⁹

The Party leaders seem to have had no illusions about the ease with which the custom of early marriage could be broken. It was as popular with cadres as with workers and peasants. Indeed, there was some evidence of a trend toward still earlier marriage with the improvement of urban living conditions during the First Five-Year Plan period. Cadres in hospitals and health organizations were as wedded to the custom as anybody else. Students won the admiration of their classmates by marrying early. Most urban women, according to one article, married at 18 or 19, but some used Chinese ages in registering for marriage so that they were able to marry at a chronological age of 16 or 17.³⁰⁰ In rural areas, some families added several years to the ages of their children when applying for marriage certificates so that the young people could marry in violation of the Marriage Law age limits and also receive the rations and employment opportunities that came with adulthood.³⁰¹ When word got about that Shao and other public figures were advocating increasing the minimum ages for marriage, a great rush to get married occurred in many parts of the

²⁹⁴ Hui Sheng, "Pen-pao chao-k'ai ch'ih-hün chieh-yü wen-t'i tso-t'an-hui" ("This Newspaper Holds Symposium on the Question of Delayed Marriage and Birth Control"), *CKCNP*, Feb. 23, 1957.

²⁹⁵ On the same day on which the report of the Feb. 2 symposium was reported in Peking, late marriage was incorporated into a birth control statement by a provincial health department spokesman in Tientsin. See Tuan Hui-hsün, *loc. cit.*

²⁹⁶ Ch'en Ta, *op. cit.*, pp. 1-15.

²⁹⁷ "Propagate Contraception Properly," *loc. cit.*

²⁹⁸ Women Workers Department, Wuhan Federation of Trade Unions, *op. cit.*, p. 3.

²⁹⁹ "Exercise Appropriate Birth Control," p. 8. (The English translation above is slightly different from that given in the American Consulate General publication.)

³⁰⁰ Wang Pao-ying, "Tsao-hun hui kei ch'ing-nien nan-nü tai-lai shen-ma pu-hao ying-hsiang" ("What III Effects Can Early Marriages Bring to Young Men and Women?"), *JMJP*, Mar. 14, 1957.

³⁰¹ Yeh Chiung, "Shen-mo nien-ling chieh-hun tsui-hao" ("What Are the Best Ages for Marriage?") *Chiang wei-sheng (Talk About Health)*, No. 7, July 13, 1958, p. 17.

country, accompanied by much falsification of ages among the applicants, so that the effect of this suggestion was exactly the opposite of what was intended.³⁰² Some indication of what Shao might have meant by his earlier remark about turning lovers into couples may be found in several references to the fact that some young people cohabited while waiting to reach the marriage law ages³⁰³ or claimed cohabitation to get a marriage certificate though still under the legal age.³⁰⁴

Under the circumstances, it is unlikely that any effort to raise the minimum ages for legal marriage would have had much chance of success. Perhaps for that reason, the numerous trial balloons floated in the press were allowed to drift away. Instead, an effort was made to disabuse young people of the notion that the existing legal minimum ages were the most desirable ages for marriage. Some people suggested that marriage be prohibited among college and middle school students and that those already married be denied admission to middle and higher education,³⁰⁵ but there is no indication that these suggestions were ever officially adopted and put in practice in the schools. Rather than attempt to change custom by law, the leadership seems to have preferred persuasion through propaganda.

The public rationale for late marriage included many of the same arguments as for contraception. Both were said to be advantageous to the individual, the family, and the State. For the individual, late marriage allowed more time to concentrate on study, career, and "tempering" oneself. For women less than 22 years old, it was an escape from the dangers of too early childbearing with its attendant risks of difficult labor, stunting of physical growth, depression, and premature enfeeblement. Instead of marrying young, China's youth were advised to spend their energies on mountain climbing, swimming, skating, and music appreciation.³⁰⁶ On the other hand, couples who married too early were sexually incontinent, practiced contraception ineffectively, produced unhealthy children, could not educate them properly, handled their family problems badly, became involved in extramarital affairs, and made excessive demands on state welfare services.³⁰⁷

There was no consensus as to the right age for marriage. Shao's recommendation of 20 for women and 23 for men turned out to be the most conservative.³⁰⁸ Others suggested 22 and 25, 23 and 25, 22-23

³⁰² "Hsuan-ch'uan chieh-yü yao fang-chih p'ien-mien-hsing," *loc. cit.*: "Küan-yü t'i-ch'ang wan-hun ho chieh-chih sheng-yü wen-t'i" ("Problems Concerning the Advocacy of Late Marriage and Birth Control"), *Nung-min pao*, Yung-ning (Kiangsi), Apr. 16, 1957; "Yao ch'üan-mien hsüan-ch'uan t'i-ch'ang wan-hun te hao-ch'u" ("Publicize the Good Points of Promoting Late Marriage Everywhere"), *Chang chia-k'ou jih-pao*, Kaigan, Apr. 23, 1957; Chou Chih-chung, *loc. cit.*; K'ung Hsi-wu, *loc. cit.*; and P'eng Ch'ing, "Kuang-fan shen-ju ti chün-hsing hsüan-ch'uan; ta-li k'ai-chan chieh-yü kung-tso" ("Carry Out Propaganda Extensively and Thoroughly; Develop Birth Control Work with Great Efforts"), *Ho-pei jih-pao*, Tientsin, Sept. 4, 1957.

³⁰³ Wang Pao-ying, *loc. cit.*

³⁰⁴ K'ung Hsi-wu, *loc. cit.*

³⁰⁵ For example, see Li Chien-sheng, *op. cit.*, p. 7; and "Jen-kung li-u-ch'an yü wei-hsien," *loc. cit.*

³⁰⁶ Chung Hui-lan, *op. cit.*, p. 19; Wang Li-keng, *et al.*, *loc. cit.*; Wan Pao-ying *loc. cit.*; and Hui Sheng *loc. cit.*

³⁰⁷ "Propagate Contraception Properly," *loc. cit.*; Wang Pao-ying, *loc. cit.*; Wang Li-keng, *et al.*, *loc. cit.* "Fu Lien-chang hui-chang t'an wan-hun wen-t'i" ("Chairman Fu Lien-chang Discusses the Problem of Delayed Marriage"), *Chiao-shih pao*, Peking, Mar. 5, 1957; and Chung Hui-lan, *op. cit.*, p. 20.

³⁰⁸ Shao later conceded that "if further delay is desired" couples could wait until 25 and 28, but he regarded this as "the latest." He also reversed himself on his former position that late marriage was Malthusian. It was definitely not Malthusian, he declared, and "we do not have to be afraid that Malthusianism will take the opportunity to burst in." Shao Li-tzu, "Ho chih-kung t'ung-chih-men t'an 'chi-hua cheng-yü', *loc. cit.*

and 25-26, 20 and 30, 24 and 26, 25-28 and 28-30, 25 and 30, and 25-30 and 30-35. The latter two combinations seemed to be the most frequently recommended.³⁰⁹

Press accounts credited the late marriage drive with a few spectacular successes here and there. For example, it was claimed that, as a result of an intensive campaign in a typical village in Hopei Province, 81 percent of the unmarried young men and women "made plans to defer their marriage."³¹⁰ What pressures were mounted to secure such mass planning is not indicated. In another locality, young couples who had married early were subjected to public harassment, though some tactics were ostensibly deplored by the authorities.³¹¹ Given the strength of the opposition to late marriage in all segments of the population, including cadres and Party members, it is extremely unlikely that many of young people were deterred from marrying at the traditional early ages by the press propaganda campaign.

Results of the Campaign

Without an effective vital registration system, there was no possibility of measuring the effects of the various efforts to lower fertility levels in China. Registration was instituted in a few cities as early as the spring of 1950, but the urban registers were not well maintained and had to be re-established every few years by a new field count of the population. The rural registers were not set up in most areas until 1955, and almost immediately they too began to suffer from progressive neglect by peasants and cadres alike.³¹² As a result, birth registration became less complete in 1956 and 1957, giving the impression that fertility was already declining. Another factor contributing to that illusion was the over registration in urban areas in 1954 following the imposition of rationing, which produced a sharp rise in the birth rates reported for that year. The birth rates for the next 2 years dropped back down to their prior levels. In March 1957, a Health Ministry spokesman attributed the reported decline in the birth rate in Peking from 43 per 1,000 population in 1954 to 39 per 1,000 in 1956 to the success of birth control.³¹³

However, a writer in a statistical journal says the State Statistical Bureau found that the 1954 birth rates reported from many localities had been inflated as parents who had not bothered to register children born in earlier years hastened to do so after the institution of grain and cloth rationing.³¹⁴ Further evidence that rationing distorted the 1954 birth rates is the fact that city death rates dropped in 1954 and rose again in 1955 before resuming their downward secular trend in 1956.

³⁰⁹ Yuan An-chuan and Yang Chen-kuo. *loc. cit.*; Ma Yin-ch'u, "A New Theory of Population," p. 14; Wang Pao-ying, *loc. cit.*; Chang Kuei-jen, *loc. cit.*; Li Yin-chou, "Pi-yun' i chieh-yü' liang-chung t'i-fa yü: p'ien-mien-hsing; nan-nü chieh-hun nien-ling ying t'ui-ch'ih erh-san-nien" ("Contraception and 'Birth Control' Are Two Expressions Which Show One-sidedness; Marriage Ages of Men and Women Should Be Delayed Two or Three Years"), *Hei-tung-chiang jih-pao*, Harbin, June 10, 1957; Ch'en Ta, *op. cit.*, p. 9; An Chung-huang, *loc. cit.*; Chung Hui-lan, *op. cit.*, p. 14; "Kuan-yü' t'i-ch'ang wan-hun ho chieh-chin sheng-yü wen-t'i," *loc. cit.*; "Yao ch'üan-mien hsüan-ch'uan t'i-ch'ang wan-hun te hao-ch'u," *loc. cit.*; and "Fu Lien-chang hui-chang t'an wan-hun wen-t'i," *loc. cit.*

³¹⁰ "Ho-chien-hsien shih tsen-yang p'u-chi chieh-yü' chih-shih te?" ("How Did Ho-chien Hsien Publicize Birth Control Information?"), *KMJP*, May 20, 1958.

³¹¹ "Hsuan-ch'uan chieh-yü' yao fang-chih p'ien-mien-hsing," *loc. cit.*

³¹² See John S. Aird, *The Size, Composition, and Growth of the Population of Mainland China*, International Population Statistics Reports, Series P-96, No. 15, U.S. Government Printing Office, Washington, D.C., 1961, pp. 31-51.

³¹³ "Birth Control Exhibition Opens," NCNA-English, Peking, Mar. 8, 1957; in *SCMP*, No. 1488, Mar. 13, 1957, p. 10.

³¹⁴ K'ang Chi-ch'in, "Fen-hsi jen-k'ou ch'u-sheng-lü pien-tung ch'ing-k'uang te chieh li ho ching-ven" ("Sample Analysis of Changes in the Birth Rate and the Lessons of Experience"), *T'ung-chi kung-tsoo* (Statistical Work), No. 6, Mar. 20, 1957, pp. 25-27.

Evidently significant numbers of families stopped reporting deaths in order to retain the ration allotments of deceased relatives. That the 1954 birth rates were atypical can be seen from the more complete data in the following table:³¹⁵

City	Birth rate (per thousand)					Death rate (per thousand)				
	1952	1953	1954	1955	1956	1952	1953	1954	1955	1956
Peking.....	35.0	39.6	43.1	43.2	39.3	9.3	9.3	7.7	8.1	6.7
Tientsin.....	27.1	39.5	44.9	43.9	40.2	6.0	8.6	7.6	8.4	6.6
Shanghai.....	38.0	40.4	52.6	41.4	40.3	12.4	9.9	7.6	8.1	6.7
Harbin.....	47.0	48.1	53.1	47.3	41.3	14.8	15.9	9.7	10.6	8.5
Sian.....	33.3	41.2	49.9	45.3	47.7	9.5	7.4	6.9	7.4	7.4
Hangchow.....	40.1	40.6	45.4	39.6	36.8	12.4	9.7	9.0	9.6	8.5
Canton.....	36.7	41.8	43.7	39.5	39.0	9.2	7.9	7.2	7.0	6.8

Hence, the official birth rates could not measure the effects of birth control efforts.

Other data of more limited scope were also frequently cited to show the results of the campaign. The Shanghai No. 9 Cotton Mill reported that the birth rate among its 2,500 women workers was "26.5 percent" in 1954 and "12 percent" in 1956.³¹⁶ In a small residential area of Shanghai, the number of births to 199 women in the childbearing ages dropped from 77 in 1956 to 44 in 1957.³¹⁷ A Shantung cooperative reported that its women bore 293 babies in 1956 and only 155 in 1957.³¹⁸ The birth rate in Chungking was reportedly 8.7 percent less in the first 6 months of 1957 than in the corresponding period of 1956.³¹⁹ The birth rate in Sian reportedly dropped from 61.13 per 1,000 in January to 48.57 in June 1957.³²⁰ Some of these reports may represent significant changes in fertility attributable to the birth control campaign but the claims are most spectacular for small populations and for short periods of time, for which even accurate fertility data tend to show great variability.

Moreover, not all the evidence pointed to lower fertility. In Taiyuan Municipality, "according to incomplete statistics," the birth rate was 34.5 per 1,000 in 1953 and 32.9 per 1,000 in 1956, and the preliminary figures for the first half of 1957 showed no reduction and perhaps even an increase.³²¹ Changsha reported that the number of infants born in the city in the first half of 1957 was larger by 1,312 than the number born in the corresponding period in 1956,³²² roughly equivalent to a 10-percent increase in the municipal rate. In Wuhan, the number of births in 1957 was 17 percent higher than in 1956.³²³ A cooperative in

³¹⁵ Roland Pressat, "La Population de la Chine et son Économie," *Population*, vol. 13, No. 4, Oct.-Dec. 1958, pp. 572-573.

³¹⁶ "Birth Control Exhibition Opens," *loc. cit.*

³¹⁷ Wang Hsing-nan, Hsieh Chih-ch'eng, and Wang Ching, "Yao sheng chiu sheng, yao pu-sheng chiu pu-sheng" ("Give Birth If You Want To, Don't Give Birth If You Don't Want To"), *Wen-hui pao*, Shanghai, Mar. 8, 1958.

³¹⁸ "Chi-hua sheng-yü hao-ch'ü to," *loc. cit.*

³¹⁹ "Pen-shih chieh-yü kung-tso ch'ü-te cheng-hsiao" ("Birth Control Work in This City Achieves Results"), *Ch'ung-ch'ing jih-pao*, Chungking, Oct. 30, 1957.

³²⁰ Maternal and Children's Health Section, Sian Municipal Public Health Bureau, *loc. cit.*

³²¹ Yü Tsai-chi, "Chieh-chih sheng-yü li-kuo li-chi" ("Birth Control Is Beneficial to the Country and to Oneself"), *Shan-hsi jih-pao*, Taiyuan, Sept. 6, 1957.

³²² Ch'en Yü-chieh, "Ch'in-chien ch'ihchia chieh-chih sheng-yü" ("Run the Household with Diligence and Frugality and Control Births"), *Ch'ang-sha jih-pao*, Changsha, Dec. 28, 1957.

³²³ "Cadres of Wuhan Municipal Public Health Bureau Lead in Birth Control," *Ch'ang-chiang jih-pao*, Wuhan, Mar. 14, 1958; translated in SCMP, No. 1751, May 1958, p. 38.

Hunan Province reported that its birth rate had risen year by year since 1950 and was expected to reach 53.1 per 1,000 population in 1957.³²⁴

Many jurisdictions were drawing up ambitious plans for the future. The Hunan cooperative committed itself to reach a birth rate of 9.2 per 1,000 population during the Second Five-Year Plan period and 10.5 per 1,000 during the Third.³²⁵ Another Hunan cooperative pledged to reduce its population increase rate from 40 per 1,000 to 18 per 1,000 in 5 years' time.³²⁶ Changsha planned to lower its birth rate from 40 per 1,000 population in 1956 to 30 per 1,000 in the Second Five-Year Plan period and 21 per 1,000 in the third.³²⁷ The Shanghai Municipal People's Congress announced that it had decided to call upon the people of the city to cut Shanghai's birth rate from 40 per 1,000 to 20 per 1,000 during the Second Five-Year Plan period.³²⁸ The residents on one road in Nanking, whose birth rate was 45 per 1,000 in 1957, and among whom 6 percent of the couples had had a sterilization and another 8 percent were "persisting" in contraception with "good results," estimated that they would bring their birth rate down by 15 per 1,000 in 1958.³²⁹ These promises may have been more a matter of outward conformity than of inward conviction.

In the spring of 1958, two news items suggested that the authorities themselves had few illusions about the success of the birth control campaign. The first was an editorial in a Peking paper in February saying that the supply of contraceptives then available was only sufficient to meet the needs of approximately 2.2 percent of all couples in the childbearing ages throughout the country and that the problem was related to the failure of leadership cadres in local areas to give enough attention to the work.³³⁰ Further pessimistic news was received at a conference of representatives from provincial level birth control work units convened in Peking by the Ministry of Public Health from March 8 through April 2. A brief news release summarizing the conference said that the local reports indicated a "unanimous understanding" that "the broad masses of laboring people have felt the urgent necessity of controlling births in a planned manner," and added that "at present the program for birth control has started and unfolded in many places under the leadership of local Party and government organs." Four *hsien* in four different provinces were named as places where the advantages of birth control had become "a household word." However, the release ended on a rather negative note:

. . . Judging from the reports handed in, the main obstacle blocking the progress of birth control stemmed primarily from the lack of understanding of the important meaning of this program and the benefits of birth control to home and country on the part of leadership cadres in some places as well as their disbelief in the possibility of extensively propagating birth control, with the result that this topic

³²⁴ "Hsiang-hsiang Yen-ching-she ting-ch'u shih-nein sheng-yü kuei-hua" ("Yen-ching Cooperative in Hsiang Hsiang Draws Up a 10-Year Birth Plan"), *Hsin Hu-nan pao*, Changsha, Dec. 7, 1957.

³²⁵ *Ibid.*

³²⁶ "Shuang-feng-hsien Kuang-ming nung-yeh-she chih-ting chieh-yü kuei-hua wu-nien nei chi-hua tseng-chia jen-k'ou 1.8 percent" ("Kuang-ming Agricultural Cooperative in Shuang-feng Hsien Makes Birth Control Plans and Plans To Bring Its Population Increase Rate Down to 1.8 Percent"), *Hsin Hu-nan pao*, Changsha, Dec. 28, 1957.

³²⁷ Ch'en Yü-chieh, *loc. cit.*

³²⁸ Wang Hsi-nan, Hsieh Chih-ch'eng, and Wang Ch'eng, *loc. cit.*

³²⁹ "Hu-pei-lu pi-yün kung-tso tso-te-hao" ("Contraceptive Work Done Well on Hu-pei Road"), *Nan-ching jih-pao*, Nanking, Feb. 14, 1958.

³³⁰ "Chia-ch'iang pi-yün yao-chü kung-ying kung-tso" ("Strengthen the Work of Supplying Contraceptives"), *Ta-kung pao*, Peking, Feb. 5, 1958.

had not been put on the agenda. Although many of the masses, including cadres, felt the need for controlling births, they thought that matters concerning both sexes should not be brought up for discussion in public. They therefore would not talk about contraceptives and birth control. Nor would they learn skills and buy devices. This tendency must be reversed³³¹

Thus, the conclusion tends to contradict the initial statement.

Under the circumstances, it appears that strong pressure for birth control could not be generated on a national scale or sustained long enough to have significant results. There is therefore no reason to believe that the efforts to promote birth control between August 1956 and June 1958 had any perceptible effect on the national birth rate.

III. THE "LEAP FORWARD" AND THE ENSUING FOOD CRISIS: 1958 TO 1962

There was never any official public notice that the first birth control campaign had come to an end nor was there any open repudiation of the arguments by which it had been justified. Yet it is apparent that a sharply different assessment of the relationship of population growth to national economic development was made in the spring of 1958, after which birth control work quickly lost its priority.

The most obvious sign of a change in policy was the disappearance of propaganda. The press campaign had reached a high point in March and April of 1957. Through the balance of 1957 and the spring of 1958, coverage had been tapering off gradually, but in content the propaganda had lost none of its urgency. On May 20, 1958, and again on June 8, several Peking papers carried articles calling for energetic development of birth control work in rural areas,³³² and the Chinese language version of the magazine *Women of China* was still giving advice on conducting propaganda in its issue of June 1, 1958.³³³ None of these items contained any warning that a change was pending.

However, the press virtually ceased to publish items on birth control after June 8. There is mention of a 5-year plan for research on birth control and the initiation of a project on contraceptive rings in the August issue of the *Chinese Journal of Obstetrics and Gynecology*,³³⁴ for which there would undoubtedly have been a considerable time interval between editing and publication. In September, a provincial newspaper urged that late marriage and contraception be linked to the "leap forward,"³³⁵ and a year later *Women of China* carried a letter of inquiry from a woman whose husband had told her that "contraception no longer appears to be necessary." The magazine's editor cited two contrasting case histories to show that the husband's view was "incorrect," but the argument lacked the conviction with which such queries had been answered earlier.³³⁶

Several other vestiges of the defunct campaign turned up during the next year. In April 1960, a revised version of the 1956-1967 national agricultural development plan was issued, following approval by the

³³¹ "Reports on Birth Control Work Submitted to Ministry of Public Health," NCNA, Peking, Apr. 11, 1958; translated in *SCMP*, No. 1758, Apr. 25, 1958, pp. 17-18.

³³² "Further Develop Birth Control Work in Rural Areas," pp. 6-7; and Wang Ming-fan, "Chi-hua sheng-yi te hao-ch'u shuo pu-wan" ("Planned Childbirth Has Untold Advantages"), *PCJP*, June 8, 1958.

³³³ "Pu-yao pa hao-shih pan-ch'eng huai-shih," *loc. cit.*

³³⁴ "Hui-wu hsiao-hsi," *loc. cit.*

³³⁵ Wang Chi, "Actively Promote Late Marriages and Contraception," *Kuang-hsi jih-pao*, Nanning, Sept. 21, 1958; translated in *SCMP*, No. 1902, Nov. 26, 1958, p. 26.

³³⁶ "Is Contraception Still Necessary?" *CKFN*, No. 14, July 16, 1959; translated in *ECMM*, No. 184, Sept. 21, 1959, pp. 18-19.

Second NPC, in which a statement about birth control from the 1957 version was retained:

With the exception of the minority nationalities areas, birth control should be publicized and popularized in all densely populated areas. Family planning should be promoted to prevent the development of too heavy burdens on families, and to enable children to receive better education and have better employment opportunities.³³⁷

In September 1960, Felix Greene asked Chou En-lai during a special interview why China was making less effort to publicize birth control than it had 3 years earlier and was told that "education on planned parenthood was and continues to be carried on in China mainly to protect the health of mothers and provide favorable conditions for bringing up children." Chou's answer was somewhat misleading.³³⁸ Despite occasional reports by foreign visitors that birth control devices had been seen in commune stores after June 1958,³³⁹ both devices and propaganda had become increasingly rare. Gilbert Etienne, who witnessed the waning phases of the campaign during his visit to China in 1958, found on a return visit in 1961 that no propaganda was being conducted in any of the 11 communes he toured.³⁴⁰ In later years, several Canton papers acknowledged that birth control guidance committees ceased to function and factories stopped producing contraceptives during 1958.³⁴¹ The end may not have come as abruptly as did the termination of the "hundred flowers" policy a year earlier, but it was sudden enough to be detected quickly by foreign observers.

Circumstantial evidence strongly suggests that the birth control campaign was one of the casualties of the "leap forward." In spirit and in ideological substance, the two policies were certainly poles apart. The birth control campaign was germinated in a period marked by a belief in economic determinism, administrative pragmatism, and concern over the balance of food and population. In contrast, the "leap forward" was the offspring of political voluntarism, administrative enthusiasm, and a manic confidence in the solubility of all problems. In the atmosphere produced by the "leap," birth control found little sustenance and could not survive.

Official Pessimism on the Eve of the "Leap"

Although the gloomier aspects of Mao's February 1957 contradictory speech had been expunged from the version published in mid-June, a mood of sobriety continued to pervade official thinking throughout the balance of 1957 and well into the spring of 1958. In August 1957, the *People's Daily* noted that the procurement of grain for the State reserves was less than in the previous year whereas grain sales were higher, an unfavorable state of affairs³⁴² that contin-

³³⁷ "National Agricultural Development Program (1956-67)," NCNA, Peking, Apr. 11, 1960; translated in *CB*, No. 616, Apr. 20, 1960, p. 14.

³³⁸ "Premier Chou En-lai's Television Interview With British Correspondent," NCNA-English, Peking, Nov. 4, 1960; in *SCMP*, No. 2376, Nov. 10, 1960, p. 6.

³³⁹ For example, a London *Daily Worker* reporter saw some in commune stores in Oct. 1958. See "Birth Control Propaganda," *East Europe*, vol. 8, No. 7, July 1959, p. 35.

³⁴⁰ Gilbert Etienne, "Difficulties of Chinese Economy," *Far Eastern Economic Review*, vol. XXXIV, No. 13, Dec. 28, 1961; "Quelques Données Recentes sur la Population en Chine," *Population*, No. 3, July-Sept. 1962, pp. 461-462.

³⁴¹ "Crying Out for Birth Control," *Yang-ch'eng wan-pao*, Canton, Aug. 17, 1962; "Production of Contraceptives Organized and Restored in Canton," *Yang-ch'eng wan-pao*, Canton, Aug. 21, 1962; and "Kwang-tung Province Convenes Conference to Exchange Experience in Work on Planned Childbirth," *Nan-fang jih-pao*, Canton, Apr. 14, 1965; translated in *SCMP*, No. 3446, Apr. 29, 1965, p. 20.

³⁴² "Food Grain Problems and Ideological Problem" (editorial), *JMJP*, Aug. 5, 1957; translated in *SCMP*, No. 1591, Aug. 15, 1957, p. 4.

ued through the end of the year.³⁴³ A great debate on the food question was conducted in the countryside the object of which was to induce the peasants to abide by official grain purchase policies and to admit that their complaints of grain shortages were false. But the authorities recognized that the food problem could not be solved by debate alone; there must also be a general increase in grain production.³⁴⁴ In September, an article in the journal *Grain* warned that "chaos in the food situation will shake the national economy as a whole and socialist construction will be disturbed."³⁴⁵

In October, an article in the journal *Labor* noted that population growth complicated the problems of unemployment, differential living levels between rural and urban areas, the excess migration of rural labor into the cities, and the need to use the rural areas for absorption of superfluous urban labor. He expressed the hope that in time planned childbearing would ease these problems.³⁴⁶ The economist Yang Po wrote in November that unless agricultural development could be accelerated, there could be "no definite guarantee" that living conditions could be improved because of the rapid growth of the population and the economic backwardness of the country.³⁴⁷ In January 1958, another writer suggested that "if agriculture does not succeed . . . , the life of the people not only cannot be raised, but the danger also exists that it might even decline."³⁴⁸

Meanwhile, in the rural areas, some of the peasants were "wavering" in their allegiance to the cooperatives. The "rightist wind" of discontent that had started in the cities during the "hundred flowers" period had blown to the countryside and was stirring up a "commotion" there.³⁴⁹ A number of urban cadres were sent down to rural areas in the fall of 1957 to help reinforce local controls and assist the local cadres in conducting the debates which were to check the "rightist wind" among the peasants.³⁵⁰ The debates were addressed to such sensitive questions as whether or not there actually were grain shortages in various localities, whether the policy of planned purchase and sale of grain was right, why there were variations in grain rations within and between rural and urban areas, whether the agricultural taxes and compulsory grain purchases imposed too heavy a burden on the peasants, whether life was really hard for them, whether their living standards had been raised or lowered, whether they were on the "brink of starvation," whether agricultural cooperativization had been pushed too fast, whether the cooperatives offered any advantages,

³⁴³ Wang Ke and Fang Tsun-hsiao, "Present Conditions of Grain Sales," *Liang-shih (Grain)*, Dec. 25, 1957; translated in *ECMM*, No. 125, Apr. 14, 1958, p. 37.

³⁴⁴ "Distinguish Right and Wrong Over the Food-Grain Problem" (editorial), *JMJP*, Aug. 15, 1957; translated in *SCMP*, No. 1608, Sept. 12, 1957, pp. 3-6; and "Consumption of Food Grains Should Be Planned" (editorial), *JMJP*, Aug. 28, 1957; translated in *SCMP*, No. 1608, Sept. 12, 1957, pp. 7-9.

³⁴⁵ Hou Chien-chung, "Some Understanding of the 'Make Up Shortage by Plenty' Policy," *Liang-shih (Grain)*, No. 8, Sept. 25, 1957; translated in *ECMM*, No. 106, Nov. 4, 1957, p. 23.

³⁴⁶ Sung Ping, "The Problem of Employment," *Lao-tung (Labor)*, No. 21, Oct. 4, 1957; translated in *ECMM*, No. 117, Feb. 3, 1958, pp. 19-23.

³⁴⁷ Yang Po, "Simultaneous Development of Industry and Agriculture with Priority Given to Heavy Industry," *Cheng-chih hsueh-hsi (Political Study)*, No. 11, Nov. 13, 1957; translated in *ECMM*, No. 117, Feb. 3, 1958, pp. 15-18.

³⁴⁸ Hsiang Nan, "The Transformation of the Standard of Living of Employees in Shanghai During the Past Five Years," *Hsin-wen jih-pao*, Shanghai, Jan. 1, 1958.

³⁴⁹ Chung Chiu, "Consolidate the Socialist Position in the Countryside," *Shih-shih shou-ts'e (Current Events)*, No. 16, Aug. 21, 1957; translated in *ECMM*, No. 102, Oct. 7, 1957, p. 9.

³⁵⁰ Ch'in Wen-sheng, "Why Are Large Numbers of Cadres Being Sent to the Countryside and Basic Levels," *Cheng-chih hsueh-hsi (Political Study)*, No. 11, Nov. 13, 1957; translated in *ECMM*, No. 117, Feb. 3, 1958, pp. 7-9.

whether cooperativization was an "indescribable mess," and whether the peasants should follow the "socialist road" or not.³⁵¹

The official position on all these questions was to dispute the claims of the peasants and rural cadres, but the Party leaders may not have been as hopeful as the official propaganda line implied. Despite their denial of the seriousness of food shortages, they called upon local administrations to economize on the use of grain through strict rationing³⁵² and urged greater efforts to maintain the State grain purchases in crop surplus areas because of the fact that even in years of good harvest some 30 to 40 million people are affected by natural disasters and in need of supplementary grain rations.³⁵³ Also, on September 14, the Central Committee of the Party issued a directive to overhaul the cooperatives, another to improve the administration of production, and a third to implement a policy of mutual benefit for cooperative members. Despite the customary ambiguities in wording, the intent of all three directives was to make concessions toward the peasants in order to motivate them to greater production efforts.³⁵⁴ As the First Five-Year Plan period was drawing to a close, China's economic outlook seemed doubtful. A widening gulf separated the people from the Party, and within the Party structure there was growing alienation between the top leadership and the cadres down in the ranks. Mao desperately needed vindication of his political vision.

The impatience and frustration of the Party leaders was apparent in the somewhat wistful idea of a "leap forward" in agricultural production put forward in the spring of 1958. As explained by Agriculture Minister Liao Lu-yen in March, the plan would involve a revolutionary struggle against nature to realize the great potential of agriculture by maximizing the advantages of the collective economy. Conservative ideas among the peasants were to be opposed in "constant combat." No instant transformation was expected. Liao suggested working hard for 10 years beginning in 1958, but he emphasized the need for planning, technical development, and sound administration. There was nothing blithe about his "leap forward."³⁵⁵

Among the more technically oriented spokesmen of government and Party, a spirit of sobriety prevailed through much of the spring of 1958. In April the *People's Daily* warned of the need to exert great

³⁵¹ "Consumption of Food Grains Should Be Planned," p. 7; "Distinguish Right and Wrong Concerning the Food Grain Problem," p. 3; "Why Food Grains Do Not Conform in Various Areas," *JMJP*, Aug. 23, 1957; translated in *SCMP*, No. 1612, Sept. 18, 1957, pp. 4-5; "Food Grain Consumption Must Be Reduced in Cities," *JMJP*, Sept. 2, 1957; translated in *SCMP*, No. 1614, Sept. 20, 1957, pp. 15-17; Chang Hao-jan, "Is the Peasants Burden Too Heavy?" *Hsiieh-hsi (Study)*, No. 16, Aug. 18, 1957; translated in *ECMM*, No. 104, Oct. 22, 1957, pp. 11-14; "Rural Cadres Debate the Different Living Standards for Workers and Peasants," *JMJP*, Oct. 28, 1957; translated in *SCMP*, No. 1649, Nov. 12, 1957, pp. 1-7; Ching Chi, "Is the People's Life Not Bettered?" *Shih-shih shou-ts'e (Current Events)*, No. 15, Aug. 6, 1957; translated in *ECMM*, No. 101, Sept. 30, 1957, p. 28; Chung Chiu, "All Is Well With Agricultural Production and Cooperation, *Shih-shih shou-ts'e (Current Events)*, No. 15, Aug. 6, 1957; translated in *ECMM*, No. 101, Sept. 30, 1957, p. 23; Yü Chia, "Is Agricultural Cooperation Pushed Too Fast?" *Hsiieh-hsi (Study)*, No. 16, Aug. 18, 1957; translated in *ECMM*, No. 109, Dec. 2, 1957, pp. 19-24; "Where Do the Individual Peasants Gain the 'Advantage'?" *JMJP*, Sept. 19, 1957; translated in *SCMP*, No. 1624, Oct. 4, 1957, p. 11; Niu Chung-huang, "The Development of Socialist Construction and the Improvement in the People's Living Standard," *Hsiieh-hsi (Study)*, No. 15, Aug. 3, 1957; translated in *ECMM*, No. 106, Nov. 4, 1957, p. 15; and "The Big Question of Whether Agricultural Cooperation Is Right or Wrong" (editorial), *JMJP*, Oct. 9, 1957; translated in *SCMP*, No. 1670, Oct. 12, 1957, pp. 1317.

³⁵² "Consumption of Food Grains Should Be Planned," p. 8.

³⁵³ "Purchase More Food Grains in Good Harvest Areas" (editorial), *JMJP*, Aug. 30, 1957; translated in *SCMP*, No. 1608, Sept. 12, 1957, pp. 9-10.

³⁵⁴ "CCP Central Committee Issues Directive to Overhaul Agricultural Producer Cooperatives," NCNA, Peking, Sept. 15, 1957; "CCP Central Committee Issues Directive to Improve Administration of Production," NCNA, Peking, Sept. 15, 1957; and "CCP Central Committee Issues a Directive on Methods of Applying the Policy of Mutual Benefit Among the Cooperative Members," NCNA, Peking, Sept. 15, 1957; translated in *SCMP*, No. 1618, Sept. 26, 1957, pp. 20-28.

³⁵⁵ Liao Lu-yen, "Struggle for the Realization of the Agricultural Program With Revolutionary Efforts," *Hsiieh-hsi (Study)*, No. 3, Feb. 3, 1958; translated in *ECMM*, No. 124, Mar. 24, 1958, pp. 25-36.

efforts to conquer spring famine and achieve a "leap forward" in agriculture.³⁵⁶ In May, Yang Po was still pointing out that an economically backward country with 600 million people could not easily overtake the more advanced nations and that the "leap forward" still had to contend with "rightist conservative ideology" in various quarters, including the cadres.³⁵⁷ As late as June, there were some reports of local food shortages.³⁵⁸

The "Hopeh Reform" of Statistics

By about mid-spring, however, there were signs that some of the Party leaders were beginning to assume a posture of radical optimism. Given the experiences of the previous year, optimism had probably become a vital political necessity, if the confidence within the Party essential to effective civil administration was to be restored. In 1956 and 1957, the Party's critics had often been refuted by citing official statistics but the data sometimes failed to provide a clear and unequivocal vindication of Party policies. Early in 1958, the State Statistical Bureau was apparently given a clear warning that this must change. At a conference of statistical cadres in Peking in February, the Bureau's Director, Hsüeh Mu-ch'iao, said that the statisticians had carried professional detachment to the point where they were doing statistics for statistics' sake and becoming separated from politics and "reality." Statistics, he told them, must serve national construction and be coordinated with the political work of the Party. In this way, a "leap forward" in statistical work could be achieved.³⁵⁹

The Party was not satisfied with Hsüeh's exhortation. Its leaders demanded nothing less than complete control of statistical work. In April, the *People's Daily* asserted that there were only two ways of doing statistical work—"dispiritedly" or "ardently." The former resulted when statistical workers shut themselves up in the "temple of doctrinarism," remained imperturbable above the din of political action, and adhered to the "taboos and commandments" of professionalism, which made statistics a "mystical" thing understood only by experts. However, statistics could become "ardent" by emphasizing the "mass line" and "letting politics assume command." The advantages of politicized statistics had reportedly been demonstrated earlier in the spring in Hopeh Province, where statistics had been combined with "the central tasks of the Party and with the high tide of production." Statistical workers had paid less attention to methodology and more to ideological leadership. As a result, statistical work had become "creative" and played a major role in promoting the production enthusiasm of the masses.³⁶⁰

The "Hopeh reform" was immediately instituted on a national scale. By July, the Party secretaries had taken personal charge of local statistical activities and made statistics "an instrument of political

³⁵⁶ "The Problem of Food Grain Supply During the Busy Farming Season" (editorial), *JMJP*, Apr. 23, 1958; translated in *SCMP*, No. 1768, May 9, 1958, pp. 28-30.

³⁵⁷ Yang Po, "What Is the General Line for Socialist Construction?" *Cheng-Chieh hüeh-hsi (Political Study)*, No. 5, May 31, 1958; translated in *ECMM*, No. 137, July 28, 1958; pp. 6-9.

³⁵⁸ For example, "Examine Sales at Collection for Summer Grains," *Tu-kung-pao*, Peking, June 23, 1958; translated in *SCMP*, No. 1813, July 17, 1958, pp. 12-13.

³⁵⁹ Hsüeh Mu-ch'iao, "T'ung-chi kung-tso ju-ho yu-chin" ("How To Leap Forward in Statistical Work") (Summation), *T'ung-chi kung-tso (Statistical Work)*, No. 5, Mar. 14, 1958, pp. 1-5.

³⁶⁰ "Two Ways of Doing Statistical Work" (editorial), *JMJP*, Apr. 29, 1958; translated in *SCMP*, No. 1775, May 20, 1958, pp. 4-7.

struggle," thus "rectifying" its "estrangement from politics and reality." The professional statisticians were ordered to "rely" on the Party and the masses,³⁶¹ and it was said that by leaving statistical work to the "masses," they could come out of their offices and devote as much as 80 percent of their time to production work as manual laborers.³⁶² Those statisticians who were afraid that the direct intervention of the local Party committees would "impair the scientific value and integrity of statistical work" and "pervert its accuracy" were told that their viewpoint was wrong.³⁶³ Instead, "facts prove that accuracy in statistical work is more reliably guaranteed under the leadership of the Party."³⁶⁴

What the "leap forward" in statistical work actually meant for statistical accuracy may be inferred from what happened to the estimates of agricultural production as the "leap" was implemented. In March, Director Hsüeh had told Bureau statisticians that in the previous month the target figures calling for a 5.9 percent increase in grain and a 6.7 percent increase in cotton had seemed "very progressive," but that it now seemed likely that the increase in grain could reach 15 percent or more and the increase in cotton 20 percent or more.³⁶⁵ In May, the formerly cautious T'an Chen-lin told the second session of the Eighth National Congress of the CCP that the grain crop for 1958 might be "more than 10 percent and perhaps 20 percent" above 1957.³⁶⁶ In August, he said that some areas had experienced an increase of between 40 and 100 percent in grain production.³⁶⁷ By the end of the year, Liao Lu-yen estimated the national grain figures at more than 100 percent above 1957.³⁶⁸ With great confidence, the Party leaders set astronomical production targets for 1959.

"Leap" Attitudes Toward Population

While the agricultural production figures were leaping forward, the attitudes of the Party leaders toward China's economic prospects and the importance of population problems also underwent a transformation. In April 1958, Hu Yao-pang, First Secretary of the Communist Youth League, told a national conference of youth work representatives in Shanghai that there was "great hope" for the future development of the country, and that China's large population was a factor of "decisive significance." He scorned those "pessimists who seem to believe that a huge population is a catastrophe" and defined the correct attitude as follows:

³⁶¹ "On-the-spot Conference Decides to Change Outlook of Statistical Work in Three Months," NCNA, Paoting, July 31, 1958; translated in *SCMP*, No. 1862, Sept. 28, 1958, pp. 1-2.

³⁶² Ch'en Chien-fei, Vice-Governor of Heilungkiang Province, "Big Leap Forward in Statistical Work in Heilungkiang," *T'ung-chi kung-tso* (Statistical Work), No. 14, July 29, 1958 (Excerpts from a speech given at a provincial statistical conference on June 18); translated in *ECMM*, No. 145, Oct. 13, 1958, pp. 42-49.

³⁶³ "All Party and People to Engage in Statistical Work (editorial), *JMJP*, Aug. 13, 1958; translated in *SCMP*, No. 1839, Aug. 25, 1958, pp. 28-29.

³⁶⁴ "Wei cheng-chih tou-cheng fu-wu, wei sheng-ch'an tou-cheng fu-wu, t'ai ko chi tang wei ling-tao hsia, kuan-ch'e chih-hsing ch'ün-chung lu-hsien, k'u-chansan-ko yüeh shih-hsien ch'üan-kuo t'ung-chi kung-tso ta yü-chin" ("Fight Bitterly for Three Months to Realize a Big Leap Forward in Statistical Work in the Whole Country Under the Leadership of the Party Committee and Thoroughly Carry Out the Mass Line to Serve the Political Struggle and Serve the Production Struggle"), *T'ung-chi yen-chiu* (Statistical Research), No. 7, July 23, 1958, p. 4.

³⁶⁵ Hsüeh Mu-chiao, *op. cit.*, p. 2.

³⁶⁶ T'an Chen-lin, "Explanatory Report on the Second Revised Draft of the 1956-67 Program for Agricultural Development," NCNA-English, Peking, May 27, 1958; in *CB* No. 508, June 4, 1958, p. 3.

³⁶⁷ T'an Chen-lin, "Strive for a Bountiful Life in 2-3 Years," *Hung-ch'i* (Red Flag), No. 6, Aug. 16, 1958; translated in *ECMM*, No. 144, Oct. 6, 1958, p. 1.

³⁶⁸ Liao Lu-yen, "The Task for 1959 on the Agricultural Front," *Hung-ch'i* (Red Flag), No. 1, Jan. 1, 1959; translated in *ECMM*, No. 158, Feb. 16, 1958, p. 14.

We Marxists believe that, for the sake of the health of our people and the welfare of the next generation, planned parenthood should be promoted. However, a large population is a good, not an undesirable, thing. A larger population means greater manpower. This is simple logic. . . . Man is the most precious treasure and the determining factor in our great undertakings. . . . The force of 600 million liberated people is tens of thousands of times stronger than a nuclear explosion. Such a force is capable of creating wonders which our enemies cannot even imagine. Facts since the "big leap forward" movement have sufficiently proved this point.³⁶⁹

On May 5, Liu Shao-ch'i, Mao's successor designate as Chairman of the Party, in an address to the second session of the Eighth National Congress of the CCP, explained the reasoning behind the Party's decision to embark on the "leap" policies. The speed of national development was the most important question confronting the Party since 1949. Only by increasing the pace of development could living standards be raised and the socialist state "consolidated." Some people had said that the accelerated pace made people feel "tense," but Liu said that a slowing of the pace would make them more tense:

Surely one should be able to see that a really terribly tense situation would exist if more than 600 million people had to live in poverty and without culture, had to exert their utmost efforts just to eke out a bare living, unable to resist natural calamities . . .

Hence, he concluded, none of the arguments against increasing the rate of development could hold water. But to sustain the argument for the "leap," it was necessary to take a view of the relationship between population growth and economic development vastly different from that which the Party and Mao had endorsed a year earlier:

Some people doubted whether agricultural production could expand very rapidly. They quoted authoritative works, chapter and verse, to prove that agriculture could only advance slowly and that, what is more, its growth could in no way be guaranteed. Some scholars even asserted that the rate of growth could not keep pace with the growth of population. They argued that as the population grows, consumption will increase and there won't be much of an increase in accumulation. From this they draw their pessimistic conclusions on the rate of growth of agriculture in our country, and, indeed, of the national economy as a whole. Underlying such ideas is an underestimation of the organized revolutionary peasants of our country, and the facts inevitably give them the lie. The great leap forward in agricultural production and construction this year has not only completely knocked the bottom out of their contention that agriculture cannot make quick progress but also blown sky high their argument that a big population impedes accumulation. All they see is that men are consumers and that the greater the population the bigger the consumption; they fail to see that men are first of all producers and that when there is a large population there is also the possibility of greater production and more accumulation. Their views obviously run counter to Marxism-Leninism.³⁷⁰

In an article written for the first issue of the new Party journal *Red Flag*, which appeared on June 1, Mao interpreted the "leap" production reports to mean that China could catch up with the more advanced countries in agricultural and industrial production in less time than formerly was thought. He attributed the success of the "leap" in part to population:

The decisive factor, besides leadership by the Party, is the 600 million people. The more people, the more views and suggestions, and the more intense the fervor and the greater the energy. Never before have the masses been so spirited, with such high morale and so strongly determined. . . . Apart from their other characteristics, China's 600 million people are, first of all, poor, and secondly

³⁶⁹ Hu Yao-pang, "Man Is the Determining Factor in Our Great Undertakings," NCNA, Shanghai Apr. 13, 1958; translated in *SCMP*, No. 1768, May 9, 1958, p. 7.

³⁷⁰ Liu Shao-ch'i, "The Present Situation, the Party's General Line for Socialist Construction, and its Future Tasks," NCNA, Peking, May 26, 1958; translated in *CB*, No. 507, June 2, 1958, p. 17.

"blank." This seems a bad thing, but in fact it is a good thing. Poor people want change, want to do things, want revolution. A clean sheet of paper has nothing on it and so the newest and most beautiful words can be written and the newest and most beautiful pictures painted on it.³⁷¹

Thereafter, official spokesmen denounced the "preposterous" notion that China's agriculture was backward and could not keep pace with population growth. The prospect that China might have 800 million people in 10 or 15 years was welcomed, because, "as we see it, the more people the better." The "leap" had demonstrated the truth of Mao's principle that "men are the most valuable of all things in the world" by showing that more people meant more production.³⁷² Peasants were said to have proven that the potentiality of the land is unlimited and the wisdom and strength of the people are inexhaustible.³⁷³ Lu Ting-yi said that the doubling of grain production showed the superiority of man in having "not only a mouth but also hands."³⁷⁴ Others said that the "creativity of the masses" was limitless, that one leap would follow another year after year, that "miracle after miracle will happen," that "the soil will yield in proportion to man's audacity," and that it is "man and not nature (that) decides."³⁷⁵ The "incredibly high" food grain harvest of 1958 had "smashed the idealistic theory of diminishing returns from land and put the final nail in the Malthusian coffin."³⁷⁶ The "vaunted reactionary bourgeois theory of population" had been "dealt a destructive blow by iron-clad facts."³⁷⁷

In August, as these unbelievable achievements were being celebrated, China's more than 740,000 agricultural producer cooperatives were combined into over 26,000 "people's communes," which were said to be a vastly superior unit for the management of labor and for general economic planning and development. They were supposed to have been instituted in response to "the enthusiastic demands of the mass of peasants," but a resolution on the establishment of communes adopted by the Party Central Committee on August 29,³⁷⁸ and other references to the "encouragement and guidance" provided by the Central Committee and Chairman Mao³⁷⁹ may give a more accurate indication of the source of their impetus. Once established, they were said to have produced a great "liberation of the social productive forces of China" and demonstrated "the truth of Marxism-Leninism, and the wise and correct views of the Central Committee of the Party and Chairman Mao . . ." ³⁸⁰

³⁷¹ "Chairman Mao Tse-tung's Article for Red Flag," NCNA-English, Peking, May 31, 1958; in *SCMP*, No. 1784, June 4, 1958, p. 9.

³⁷² Peking radio, July 13, 1958.

³⁷³ NCNA, Peking, Radioteletype dispatch, Aug. 13, 1958.

³⁷⁴ "Comrade Lu Ting-yi Visits Sian Institutes of Higher Learning," *KMJP*, Nov. 8, 1958; translated in *SCMP*, No. 1908, Dec. 5, 1958, p. 4.

³⁷⁵ Wu Chuan-ch'i, "Can Grain Production Leap Forward and Leap Forward Again?" *Cheng-chih hsueh-hsi (Political Study)*, No. 8, Aug. 13, 1958; translated in *ECMM*, No. 148, Nov. 17, 1958, pp. 31-33; NCNA, Peking, Hellschreiber dispatch, Dec. 23, 1958; NCNA, Peking, Hellschreiber dispatch, Jan. 14, 1959; and Jo Shui, "Mouths and Hands," *JMJP*, Apr. 15, 1959; translated in *SCMP*, No. 2024, June 1, 1959, pp. 9-12.

³⁷⁶ "China's Rice Harvest—Second Major Food Crop Success in 1958," NCNA, Peking, Sept. 30, 1958; translated in *News from Hsinhua News Agency*, no. 283, Oct. 2, 1958, p. 44.

³⁷⁷ Shih Ping, "The Proposterous View of China's Backwardness in Agriculture Is Bankrupt," *Hsueh-hsi (Study)*, No. 15, Aug. 3, 1958; translated in *ECMM*, No. 147, Nov. 3, 1958, p. 11.

³⁷⁸ "Party Resolution on Questions Concerning People's Communes," NCNA-English, Peking, Dec. 18, 1958; translated in *CB*, No. 542, Dec. 29, 1958, p. 8.

³⁷⁹ For example, "Raise High the Red Flag of the People's Commune and March Forward" (editorial), *JMJP*, Sept. 3, 1958; translated in *CB*, No. 517, Sept. 5, 1958, p. 5.

³⁸⁰ Wu Chih-pu, "On People's Communes," *KCNCP*, Sept. 16, 1958; translated in *CB*, No. 524, Oct. 21, 1958, p. 9.

The Return to Earth

By December, the surge of enthusiasm that had buoyed up the "leap" was beginning to ebb. The Party Central Committee warned the comrades that they should not expect the transition from socialism to communism to occur very soon, that "the present level of development of the productive forces in our country is, after all, still very low," that the communes have not had time to "consolidate" and "perfect" themselves, and that the transition from that point onward would be "gradual." However, it reaffirmed the view that the bumper harvest of 1958 had obviated worries about overpopulation and had replaced them with concern over the shortage of manpower. Most significant of all, the Central Committee took the position that:

In the next several years, local conditions permitting, we should try to reduce the area sown to various crops to about one-third the present acreage. Part of the land so saved can lie fallow or be used for pasturage. . . . This is a great ideal that can be realized.³⁸¹

That the Party leaders would endorse a fallow land program of such magnitude after 10 years' experience with food shortages and famines in a country where such occurrences were perennial is an indication of the extent to which they trusted the statistical illusions conjured up by their own policies.

Early in 1959, the first signs of doubt about the success of the "leap" and the communes began to appear. In January Liao Lu-yen talked incongruously of struggling "with a hundredfold confidence and in ever more serious mood" to meet 1959 agricultural targets, of being "both hot and cold minded," of gearing the revolutionary spirit with the realistic spirit, and of popularizing "the working style of pragmatism."³⁸² In April, a national statistical conference in Peking sharply criticized the Party's meddling in statistics and was advised by Hsüeh Mu-ch'iao to emphasize accuracy and maintain the scientific nature of statistics while accepting leadership by the Party.³⁸³ Nevertheless, in the same month the "leap" production figures were released by the State Statistical Bureau, including a claimed total of 375 million tons of grain in 1958, more than twice the 1957 official total of 185 million tons.³⁸⁴ At the first session of the second NPC a week later, Vice-Premier Li Fu-ch'un announced the food grain production target for 1959 as 525 million tons.³⁸⁵ But already rumors were flying that the "leap" production figures had been grossly exaggerated by "wild estimates" and outright falsification. In August, the eighth session of the Eighth Central Committee of the CCP was told that "repeated checkups" during the first half of 1959 had shown the reported agricultural production figures for 1958 to be "a bit high." The grain figure was reduced to 250 million tons. Having been forced to back

³⁸¹ "Party Resolution on Questions Concerning People's Communes," pp. 7-8 and 11-13.

³⁸² Liao Lu-yen, "The Task for 1959 on the Agricultural Front," p. 22.

³⁸³ "Further Improve the Accuracy of Statistical Data for a Continued Big Leap Forward in National Economy," *Chi-hua yü t'ung-chi (Planning and Statistics)*, No. 8, May 23, 1959; translated in *ECMM*, No. 181, Aug. 31, 1959, pp. 27-33; and Hsüeh Mu-ch'iao, "T'ung-chi lun-li chung te chi-ko chung-yao wen-t'i" ("Some Important Questions of Statistical Principle") *Chi-hua yü t'ung-chi (Planning and Statistics)*, No. 8, May 23, 1959, pp. 5-9.

³⁸⁴ State Statistical Bureau, "Communique on Fulfillment and Overfulfillment of China's First Five-Year Plan," NCNA-English, Peking, Apr. 13, 1959, in *CB*, No. 556, Apr. 15, 1959, p. 6; and State Statistical Bureau, "Communique on China's Economic Growth in 1958," NCNA-English, Peking, Apr. 14, 1959; in *CB*, No. 558, Apr. 20, 1959, p. 5.

³⁸⁵ Li Fu-ch'un, "Report on the Draft Economic plan for 1959," NCNA-English, Peking, Apr. 21, 1959; in *CB*, No. 562, Apr. 27, 1959, p. 10.

down, the Party foresaw that the "principal danger" now lay in the rise of "right opportunist" ideas among "some cadres" who would take this opportunity to "slander" the "leap" and the communes by overemphasizing their "defects."³⁸⁶

Once again, there was gloomy talk about natural calamities, including a belated admission that they were serious in "many areas" of China in 1958.³⁸⁷ Chou En-lai, in explaining the revision of the 1958 grain figures, said that grain was in short supply in areas "amounting to less than 5 percent" of the country in the spring of 1959, due in part to natural calamities and in part to bad management of harvesting and distribution. Nevertheless Chou insisted that the "situation is favorable," that shortcomings were as "one finger in ten," and that every effort must be made to check the tendency to exaggerate the "errors" in the "leap" and commune movements and the tendency to regard with skepticism the prospects for doing away with the "poverty and blankness" of the 600 million people.³⁸⁸ The *People's Daily* editorialized against those persons who said the people's communes were not "the natural products of objective circumstances, but rather the products of the subjective views of a small number of persons,"³⁸⁹ who said the backyard blast furnaces were "more of a loss than a gain,"³⁹⁰ and who called the "big leap forward" a "big flop," disparaged the communes, were blind to the "good situation," and spread "pessimistic sentiment."³⁹¹ The Party journal *Red Flag* also editorialized against skepticism among the cadres, warning that such tendencies might spread "like germs" to other cadres and "cause serious damage to our entire economic construction program." The editorial insisted that "the present situation is very favorable," but that it was necessary to "adhere to the principles of being realistic," of "knowing and respecting objective laws," of giving serious consideration to the demands of the masses, listening to their views with an open mind, and avoiding "commandism."³⁹²

While the Party leaders talked of the "favorable situation" and called for continuing leaps forward, they also began to speak more candidly of economic difficulties and unmet human needs. The tone of their discourse was increasingly alien to the spirit in which the "leap" and the communes had been initiated. Po I-po, a Vice Premier and Chairman of the National Economic Commission, writing in *Red Flag* in October 1959, insisted that the main obstacle to the speedy transformation of agriculture was the shortage of manpower, but he also conceded that the productivity of the peasants and their level of production was "still very low" and that "gradual" mechanization must be carried out over the next 10 years.³⁹³ Sha Ch'ien-li, Minister of

³⁸⁶ "Communiqué of 8th Plenary Session of 8th Central Committee of the Chinese Communist Party," NCNA-English, Peking, Aug. 26, 1959; in *CB*, No. 589, Sept. 1, 1959, pp. 2-3.

³⁸⁷ State Statistical Bureau, "Communiqué on China's Economic Growth in 1958," p. 5.

³⁸⁸ "Premier Chou En-lai's Report on China's Economy," NCNA-English, Peking, Aug. 28, 1959; in *CB*, No. 590, Sept. 9, 1959, pp. 7 and 11-12.

³⁸⁹ "Long Live People's Communes" (editorial), *JMJP*, Aug. 29, 1959; translated in *CB*, No. 590, Sept. 9, 1959, p. 22.

³⁹⁰ "Let Us Put an End to the Theory 'What You Have Lost Is More Than What You Have Gained'" (editorial), *JMJP*, Sept. 1, 1959; translated in *CB*, No. 590, Sept. 9, 1959, p. 28.

³⁹¹ "Strive to Overfulfill the Grain and Cotton Production Plans" (editorial), *JMJP*, Sept. 3, 1959; translated in *CB*, No. 590, Sept. 9, 1959, p. 38.

³⁹² "Overcome the Rightist Mentality and Whip Up a New Upsurge in the Mass Campaign for Production Increase and Economy" (editorial), *Hung-ch'i (Red Flag)*, No. 16, Aug. 16, 1959; translated in *ECMM*, No. 183, Sept. 11, 1959, pp. 9-12.

³⁹³ Po I-po, "Strive to Carry out the Great Task of the Transformation of Agriculture More Swiftly," *Hung-ch'i (Red Flag)*, No. 20, Oct. 16, 1959; translated in *ECMM*, No. 188, Nov. 2, 1959, pp. 1-7.

Food, recalling the food crises of former times, insisted that Malthusian predictions of continuing food crises had been proven false, that China's 650 million people had been "assured of reliable supplies of food," and that, contrary to the views of "some people," the experience of the previous 10 years had caused China's leaders to "appreciate one truth profoundly . . . that politics can yield food grains." But he also observed that "the output of food grains in China cannot as yet be called plentiful" and that "it is still unable to keep pace with the increase in demand. . . ." ³⁹⁴ In September 1960, Agriculture Minister Liao Lu-yen acknowledged that the per capita share of grain in the country was "still relatively small," that the communes had failed to avoid damages due to calamities, and that "to a large extent, agricultural production is subject to the dictates of natural conditions" and to factors that "cannot as yet be fully controlled by man." ³⁹⁵ In February 1961, Liao admitted there were "temporary difficulties" in agriculture due to the serious calamities of 1959 and the "still more serious" calamities in 1960, which he said were without precedent in 100 years. The extent of the "difficulties" may be judged from the fact that winning a rich harvest was to be the central task of the Party and the people in 1961. ³⁹⁶ Another writer reported that of China's 1,600,000,000 mou of land under cultivation, 600 million had been hit by calamities in 1959 and 900 million in 1960. ³⁹⁷

The year 1961 saw continuing acute food shortages. Once again, the official spokesmen repeated the familiar phrase about "favorable conditions" for good harvests in following years. Nevertheless, they emphasized the need to recognize the production brigade or the production team as the effective unit for management if the commune unit proved too large and to "deduct less and distribute more" of the products and income produced by the peasants so that their "enthusiasm" for production would not be "dampened." ³⁹⁸ In 1962, the Party leaders engaged in a sober "summing up" of experience both good and bad, with special emphasis on the latter, because, as one spokesman put it, "failure is the mother of success." ³⁹⁹

Equivocation on Population Problems

In the years immediately following the collapse of the "leap," specific statements about the relationship between population growth and economic development were infrequent in the mainland press. Those that appeared did not reflect a single, consistent outlook. There were cautionary statements that seemed to reflect in guarded fashion the actual economic conditions of the time, there were protestations of confidence that ignored the state of the economy but may have made

³⁹⁴ Sha Ch'ien-li, "Brilliant Achievement on the Food Grain Front," *JMJP*, Oct. 25, 1959; translated in *CB*, No. 604, Nov. 26, 1959, pp. 22-23 and 33.

³⁹⁵ Liao Lu-yen, "Participate in the Large-Scale Development of Agriculture by the Whole Party and the Whole People," *Hung-ch'i (Red Flag)*, No. 17, Sept. 1, 1960; translated in *SCMM*, No. 228, Sept. 26, 1960, pp. 3-5 and 10.

³⁹⁶ Liao Lu-yen, "Exert Utmost Efforts to Win a Rich Harvest," *Hung-ch'i (Red Flag)*, No. 3-4, Feb. 1, 1961; translated in *SCMM*, No. 249, Feb. 20, 1961, pp. 1-9.

³⁹⁷ Ho Wei, "A Three-Year Continued Leap Forward, A Great Victory for the Party's Three Red Banners," *KJJP*, No. 2, Jan. 16, 1961; translated in *SCMM*, No. 251, Mar. 6, 1961, pp. 13-17.

³⁹⁸ Lo Keng-mo, "The Character of the Rural People's Communes at the Present Stage," *KJJP*, July 19, 1961; translated in *CB*, No. 669, Nov. 16, 1961, p. 3; and Lo Keng-mo, "The System of Distribution According to Work of the Present Stage of the Rural People's Communes," *KJJP*, July 21, 1961; translated in *CB*, No. 669, Nov. 16, 1961, pp. 7-8.

³⁹⁹ Shih Hung, "Several Problems Relating to the Summing up of Experiences about Agricultural Production," *Shih-shih shou-ts'e (Current Events)*, No. 15, Aug. 6, 1962; translated in *SCMM*, No. 334, Oct. 8, 1962, p. 10.

sense politically, and there were some discussions that assumed both positions. A significant proportion of the articles dealing with this subject were belligerently anti-Malthusian attacks on Ma Yin-ch'u's continuing articles in the magazine *New Construction*. Ma's critics insisted that China's large population was an unqualified advantage for the building of socialism.⁴⁰⁰ Vice-Premier Li Fu-ch'un included in his report on the economic plan for 1960 a statement that the "leap" expressed the "fervent aspirations of the 650 million Chinese people" to change China's condition from "poor and blank" to prosperous and powerful and that "the masses of people are the creators of history and are the most active element of the productive forces."⁴⁰¹ Chou En-lai, in an interview with Felix Greene in September 1960 discounted population density, population pressure, manpower utilization, scarcity of arable land, and grain shortages as problems for the Chinese economy.⁴⁰² In October, the *China Youth Daily* drew attention to Lin Piao's revival of Mao's idea that man, not weapons, was the decisive factor in war, and added that this statement referred not only to regular troops but also to "the 650 million awakened and organized people" of China.⁴⁰³

Among the more pessimistic statements was one made by Foreign Minister Ch'en Yi in 1961 to two Canadian newsmen, in which he noted that natural calamities had "indeed caused us serious difficulties," though China had successfully averted the famine that would have occurred under like circumstances in former times. But he added that "to feed the 650 million people, we have to increase production by every means, and cannot rely on imports of grain * * * No foreign country can meet such a big demand."⁴⁰⁴ An article in a Peking paper in March 1961 said that hard work and economy would be "forever necessary" to China's economic development. It quoted Mao's warning that: "China is a big country. But she is still very poor. It will take a few decades before China can be made rich."⁴⁰⁵

Other articles enfolded discussions of serious problems in manpower and economic development in standard assurances that all was well. For example, an article in the Party journal *Red Flag* in March 1961 exulted over the disappearance of unemployment in China and the emergence of a "labor shortage," but discussed at length the many problems of "arranging for labor power," including the excessive movement of rural labor into the cities, the low technical level of the labor force, the persistent over-employment in some enterprises, and the low level of labor productivity.⁴⁰⁶ Both the pessimistic and the optimistic pronouncements probably reflected the concerns of the leadership in a period of difficulties. The absence of any forthright acknowledgment of the extent of difficulties during these years is no measure of their actual significance or of the seriousness with which they were viewed by the Party leaders.

⁴⁰⁰ See, for example, Li Lin-ku, *op. cit.*, pp. 1-10; and Wu Ta-kuan, *op. cit.*, pp. 6-7.

⁴⁰¹ "Text of Vice Premier Li Fu-ch'un's Report on the Draft 1960 Economic Plan," NCNA-English, Peking, Mar. 30, 1960; in *CB*, No. 615, Apr. 5, 1960, p. 3.

⁴⁰² "Television Interview Given by Premier Chou En-lai to British Correspondent Felix Greene," *China Reconstructs*, Jan. 1961, Supplement.

⁴⁰³ "Man Is the Factor Which Decides the Outcome of War," *OKONP*, Oct. 29, 1960; translated in *SCMP*, No. 2422, Jan. 23, 1961, pp. 1-3.

⁴⁰⁴ "Full Text of Ch'en Yi's Television Interview with Canadian Newsmen," NCNA-English, Geneva, July 2, 1961, in *SCMP*, No. 2533, July 10, 1961, p. 4.

⁴⁰⁵ Wan Sul, "Industry and Thrift are Forever Necessary," *KJJP*, Mar. 1, 1961; translated in *SCMP*, No. 2476, Apr. 14, 1961, pp. 16-17.

⁴⁰⁶ Ma Wen-jui, "The Question of Labor in Building Socialism in Our Country," *Hung-ch'i (Red Flag)*, No. 5, Mar. 1, 1961; translated in *SCMA*, No. 253, Mar. 20, 1961, pp. 1-13.

IV. THE SECOND BIRTH CONTROL CAMPAIGN: 1962 TO 1966

Probably the prevailing view of the need for birth control within the central committee changed again soon after the collapse of the "leap" illusions, but nothing could be done about the resumption of active promotional efforts during the depths of the food crisis. The decentralization of authority necessary to maximize local initiatives for food production would have made it difficult to impose a centrally directed campaign during these years. Besides, an urgent effort to reduce the birth rate at this time might have increased public anxiety about an impending famine and created serious political problems.

However, at the beginning of 1962, when the first signs of significant improvement in agriculture were in evidence, a new birth control campaign was instituted. In January, the customs office in Canton announced that henceforth no duty would be imposed on contraceptives imported from abroad.⁴⁰⁷ In March and April, the press suddenly began to carry news items and articles on late marriage and birth control. No explanation was given of the hiatus between the two campaigns; in fact, only a few newspaper articles referred to the interruption.

Press coverage during the new campaign was much more limited in scope and seemed to be under stricter control than in the previous campaign. Foreign collections of Chinese source materials contain about 1,000 items on the first campaign but fewer than 150 on the second, although the second campaign lasted as long as the first. The difference may be due in part to the fact that local newspapers were less available outside China in the 1960's than in the 1950's. Yet even if the comparison is limited to major Peking papers, such as the *People's Daily*, the *Peking Daily*, the *Peking Daily Worker*, and *Kuang-ming jih-pao*, the availability of which is more comparable for the two periods, family limitation obviously received much less press attention during the second campaign. More of the news items appeared in magazines for women and youth rather than in the daily newspapers, suggesting a more specific target audience. The content of press items was less variable than during the first campaign. Even the individual testimonials, which were fairly numerous in both campaigns, were more uniform in style and substance.

Official Views of Population Problems and Economic Development

During the second campaign, the press had much less to say about population problems and their relation to problems of economic development, and birth control was rarely mentioned in such contexts. There was almost no discussion of general population policy, except in connection with such peripheral matters as urban-to-rural transfers and the place of love, marriage, and children in the ideal conception of personal happiness. No interest was shown in explaining the socialist "law" of population or in developing a "proletarian" demography. References to population and manpower were cautious and often ambiguous.

⁴⁰⁷ Canton Customs Office Announces Revision of Tariff on Travellers' Personal Effects and Goods Delivered by Post." *Ta-kung pao*, Hong Kong (dispatch from Canton), Jan. 21, 1962; translated in *SCMP*, No. 2670, Jan. 31, 1962, p. 12.

One of the few statements by high Party officials about population and economic development was made by Ch'en Yi in June 1962 in another interview with foreign newsmen. Ch'en remarked that it takes "decades of endeavor to build a fine socialist society in a China that has a population of more than 600 million and rich in natural resources." He felt, therefore, that it was premature to reach a conclusion that China's efforts had succeeded or failed. He admitted that the level of living in China was somewhat lower in the middle of 1962 than it had been before the food crisis, and he again pointed out that the Chinese must solve their own food problems because, given the size of China's population, no other country could make up their shortages.⁴⁰⁸

At the tenth plenary session of the Eighth Central Committee in September 1962, the Party announced a reversal of its former policy of giving first priority to the development of industry with special emphasis on heavy industry.⁴⁰⁹ Mao was said to have proposed that the development of agriculture now be given "the leading position" and that the country should "shift the operations of the industrial departments firmly to the orbit based on agriculture."⁴¹⁰ There was no mention of population in the context, though it is obvious that population growth and the food crisis were largely responsible for the change in economic priorities.

In June 1963, a writer for the *People's Daily* raised the question as to why the "building of our great motherland" must take so long and be so difficult. "The reason," he explained, "is that we are poor and blank." Thus, the phrase Mao used in May 1958 to argue that poverty was an asset to economic development was now used to account for China's backwardness. The writer also quoted a statement from Mao's 1957 speech on "contradictions," composed in an earlier period of pessimism, to the effect that the building of socialism would require hard work and sacrifices for a long time to come.⁴¹¹ In August, a writer in another Peking paper explained the emphasis on agricultural development as follows:

Ours is a country where the land is vast, material resources are plentiful, and the population is large. It has a total territory of 9,600,000 square kilometers, second in size only to that of the Soviet Union and that of Canada. However, we have only 1,600,000,000 *mow* of arable land, and wasteland suitable for reclamation purposes is rather limited. Yet we have a population of almost 700 million, accounting for one-fourth of the world's total. Thus ours is basically a country with a large population and a small acreage of arable land. . . .⁴¹²

On the other hand, some writers still argued that a large population was an asset. A *People's Daily* editorial in December 1963 claimed that China's experiences during 3 years of calamities had led to the correction of many "shortcomings and errors," that "our economy is becoming better and better with each passing day," and that the "650 million hard-working and courageous people" and the "correct leadership of the CCP and Chairman Mao Tse-tung who resolutely adhere to Marxism-Leninism" were "favorable conditions" for

⁴⁰⁸ "Ch'en Yi Interview with Japanese Newsmen," *Journalist*, Tokyo, June 26, 1962.

⁴⁰⁹ "Communique of the 10th Plenary Session of the 8th Central Committee of the Chinese Communist Party," NCNA-English, Peking, Sept. 28, 1962; in *CB*, No. 691, Oct. 5, 1962, pp. 4-5.

⁴¹⁰ Chung Huang, "Develop Industry with Agriculture as the Foundation," *Ching-chi yen-chiu (Economic Research)*, No. 2, Feb. 17, 1963; translated in *SCMM*, No. 356, Mar. 18, 1963, p. 1.

⁴¹¹ Wang Ch'ang-ch'ing, "Fight Amid Hardship and Build the Country through Industry and Thrift," *JMJP*, Peking, June 27, 1963; translated in *SCMP*, No. 3019, July 16, 1963, pp. 8-13.

⁴¹² Yang T'ing-hsiu, "All-Round, Comprehensive Development of Agriculture," *KMJP*, Aug. 29, 1963; translated in *SCMP*, No. 3066, Sept. 24, 1963, p. 1.

building socialism "within a not very long historical period."⁴¹³ An unsigned article in *Red Flag* in May 1964 repeated Mao's dictum that "It is the people, and the people alone, that are the motivating force in making the history of the world" and his belief that "the creative power of the masses of the people is inexhaustible." But the article concluded by attacking the "bourgeois world outlook" for exaggerating the role of man's subjective will by "seeing man and not things" and for exaggerating the role of things in limiting man's activism by "seeing things and not man." Mao's intention, the article implied, was to preach the more moderate idea that "man and things are united but the role of man occupies the leading position."⁴¹⁴ Whatever Mao's intention, the Party's intention was to pull back from the excesses of Maoist reliance on politicized manpower without encouraging the economic determinists in China to reassert their pessimistic view of the country's development prospects.

The Argument for Birth Control

During the second campaign, the official rationale emphasized the advantages of planned childbirth and smaller families to the health of mothers and children, to the opportunities for work, study, and political progress for both parents, and to the economic welfare of the family and the state. These reasons were sufficient to make the matter urgent. As one article put it, "the aim is to make planned childbirth a new way of life in our society."⁴¹⁵

A unique feature of the second campaign was its morbid exaggeration of the effects of early marriage and childbearing on the health of mothers, children, and even fathers. Yeh Kung-shao, Dean of the Department of Public Health of the Peking Medical College, who had not been prominent in the first campaign, played a leading role in promoting this view, and it was also reinforced by personal testimonials, suggesting that it was probably part of a deliberate propaganda plan. The objective apparently was to implant the idea that people who marry and have children early are likely to suffer serious health impairment. The problem for young husbands was that the "formation of the cells of the cerebral cortex" which are responsible for reasoning and hence for inhibition of impulses tends to occur late in adolescence, defined by Dr. Yeh as "from 18 to 25 years," whereas the sexual impulse peaks early; hence the impulse is strongest when the power of the brain to exercise restraint is still weak.⁴¹⁶ Other articles in the same vein stated that unrestrained indulgence of the sexual impulse not only prevents the young men from getting adequate rest and exercise after work, but results in "strong nervous stimulation" and "excessive dissipation of bodily fluid," "malfunctioning of the central nervous system," "sexual neurasthenia, low spirits, headaches, . . . discomfort all over the body," ematiation, dizziness, tension, memory decline, premature old age, mental and physical

⁴¹³ "Continue to Strive to Build an Independent, Complete, Modern National Economic System" (editorial), *JMJP*, Dec. 4, 1963; translated in *SCMP*, No. 3117, Dec. 11, 1963, pp. 2-6.

⁴¹⁴ *Hung-ch'i* Commentator, "On Man As the Primary Factor," *Hung-ch'i (Red Flag)*, No. 10, May 23, 1964; translated in *SCMM*, No. 422, June 22, 1964, pp. 1 and 7.

⁴¹⁵ Po Ling, "If There Is No Birth Control . . ." *Yang-ch'eng wan-pao*, Canton, Aug. 21, 1963.

⁴¹⁶ "A Letter From Professor Yeh Kung-shao of Peking Medical College to the Young People on What Is the Most Ideal Age to Get Married, How Many Children Should a Couple Give Birth To, and What Is the Most Ideal Interval for a Couple to Give Birth to Another Child," *PCJP*, July 11, 1962.

pain, and impotence. Some of the ills in this awesome catalogue might imply that the problem would tend to be self-correcting, but the propaganda indicated that only by marrying later when the cerebrum was "mature" could the "reckless sexual impulse" be controlled.⁴¹⁷

For young women the health dangers of early marriage lay not in excessive sexuality but in excessive childbearing. The argument was that though young girls may be capable of reproduction in their early teens, they are not physically mature until their mid-twenties. Dr. Yeh said that bone calcification continues until age 23 to 25, and that too early pregnancy will deprive the mother of calcium needed for her own bones. Pregnancy in general was represented as a great physical drain on the mother, not only because the growing fetus "consumed" her body, but because of the enlargement of the uterus, breasts, and pelvis, during the "10 difficult months of gestation." Delivery was likened to "a major operation," in which, "no matter how smooth the labor is, some energy has to be spent and some blood will be lost." There were dire warnings against "the tortures of child-bearing," the dangers of difficult labor below age 20, and the sometimes fatal diseases and complications, such as puerperal septicemia, eclampsia, and cancer of the cervix, to which mothers were subject. Even nursing was said to be bad for a mother's health because it took "nutriment" from her body and deprived her of sleep. Individual testimonials of women who had children too early or too frequently told how their health deteriorated and they became enfeebled at an early age. A credulous reader of the birth control articles in the Chinese press in 1962 and 1963 might easily have concluded that childbearing was not a normal physiological process but a perilous undertaking.⁴¹⁸

The adverse consequences of excess childbearing were visited upon the next generation as well. Children born to young mothers or in too close succession were said to be premature, weak, difficult to nurse, and unhealthy. They did not develop satisfactorily and posed special problems in rearing.⁴¹⁹

Aside from the health risks, all the problems of family finance, lost opportunities for education, career, and political development noted during the previous campaign were recalled and a new emphasis on the dangers of conflict between spouses was added. The propagandists argued that, however affectionate a couple had been during courtship, it was "inevitable" that small disputes over financial

⁴¹⁷ "What's To Be Done If One Has Married Early?" *CKCNP*, July 7, 1962; translated in *SCMP*, No. 2785, July 25, 1962, p. 11; Yang Hsiu, "For Late Marriage," *CKCN*, No. 11, June 1, 1962; translated in *SCMA*, No. 322, July 18, 1962, p. 24; Ta Yü, "What Are the Disadvantages of Early Marriage?" *KJJP*, June 28, 1962; translated in *SCMP*, No. 2777, July 13, 1962, p. 11; "A Problem That Deserves Careful Consideration by Unmarried Young People," *CKCNP*, May 10, 1962; translated in *SCMP*, No. 2745, May 24, 1962, pp. 15-16; and Yeh Kung-shao, "What Is the Most Suitable Age for Marriage?" *CKCNP*, Apr. 12, 1962; translated in *SCMP*, No. 2745, May 24, 1962, p. 17.

⁴¹⁸ Yeh Kung-shao, "What Is the Most Suitable Age for Marriage?" p. 18; Wang Shu-chen, "Marriageable Age and Childbirth Viewed from the Physiological Angle," *Chieh-fang jih-pao*, Shanghai, Mar. 5, 1963; "A Letter from Professor Yeh Kung-shao of Peking Medical College to the Young People on What Is the Most Ideal Age to Get Married, How Many Children Should a Couple Give Birth To, and What Is the Most Ideal Interval for a Couple to Give Birth to Another Child," *loc. cit.*; Ta Yü, *op. cit.*, p. 10; Yeh Kung-shao, "My Views on the Problem of Young People's Marriage, Love, and Children," *CKCNP*, July 21, 1962; translated in *SCMP*, No. 2795, Aug. 9, 1962, p. 14; T'ao Ch'eng, "A Talk with Young Friends About the Question of Marriage," *KJJP*, July 28, 1962; translated in *SCMP*, No. 2800, Aug. 16, 1962, p. 12; "What's To Be Done if One Has Married Early?" *loc. cit.*; "A Problem that Deserves Careful Attention by Unmarried Young People," *loc. cit.*; and "Early Marriage Is Harmful, Not Beneficial," *Nan-fang jih-pao*, Canton, May 15, 1962; translated in *SCMP*, No. 2757, June 13, 1962, p. 11.

⁴¹⁹ Ta Yü, *op. cit.*, p. 11; Lin Ch'iao-chih, "Can Late Marriage Cause Difficult Labor?" *CKFN*, No. 4, Apr. 1, 1963; translated in *SCMA*, No. 364, May 13, 1963, p. 36; Yeh Kung-shao, "What Is the Most Suitable Age for Marriage?" p. 17; "Early Marriage Is Harmful, Not Beneficial," *loc. cit.*; and Wang Wen-pin, "A Talk About the Question of Age for Marriage From the Physiological Angle," *KJJP*, Nov. 15, 1962; translated in *SCMP*, No. 2871, Dec. 3, 1962, p. 11.

affairs would "mar" their married life, because of their immaturity, inexperience, and lack of skill in handling husband-wife relations. Those who married on impulse would change their minds later and "often fight with each other and even end up in divorce."⁴²⁰ After reading about the imminent danger of marital unhappiness for early-weds, a 21-year-old woman who had married a year earlier and was still living happily with her husband wrote to the editor of a newspaper in a state of "jitters" to ask what they could do to preserve their happiness. The answer was contraception. "Motherhood," said the editor, "will not do you any good."⁴²¹

Instilling a negative attitude toward marriage and childbearing in China's young people called for a further revolution in basic values. This was a large order, in view of the fact that the revolution already accomplished appeared to be insecure. During these years, a major concern of the Party and Chairman Mao was the danger that China's young people, having no experience of conditions in pre-Communist China and no recollection of the struggle for "liberation," would not be able to appreciate the benefits of socialism and would become susceptible to the appeal of "bourgeois" ideas. Mao reportedly feared that his revolution might then "change color" from "red" to "white." Presumably some signs of a slackening of revolutionary vigor had already been detected following the relaxation of Party controls during the food crisis years. The 10th plenary session of the Party's Eighth Central Committee warned in September 1962 that a "small number of persons" were trying to take advantage of China's recent difficulties to "depart from the socialist road." The efforts of the small number were enough to require a full-scale resumption of the "class struggle" to preserve the "purity" of Marxism-Leninism and the unity of the Party.⁴²²

Toward the end of 1962, the "socialist education movement" was launched to promote indoctrination in the "thought" of Chairman Mao. Mao's collected works were published in a new multi-volume edition. On the theory that many young people failed to appreciate the "sweetness" of life under socialism because they were too young to remember how bad things were in the days before "liberation," a "recall past bitterness" campaign was also developed. This consisted mainly in having old peasants and workers visit schools and factories to tell lachrymose tales of the hardships they had suffered in the "old" China. A series of new "heroes" were commended for emulation by the young, among whom the most notable was Lei Feng, a soldier distinguished for his unquestioning submission to the will of the Party and his absolute veneration of Chairman Mao. A new "reform through labor" program was also initiated, aimed particularly at young people, in which the basic concept of the spiritual value of manual labor was carried to a new and rather bizarre extreme. Since in the "old" China no job was more despised than night soil collecting, the political virtue of manual labor must appear in most concentrated form in that activity. Accordingly, large numbers of students and teachers were "steered" through night soil work in order to subject them to "rigorous

⁴²⁰ "Pien hou kan" ("Thoughts After the Compilation"), *CKFN*, No. 7, July 1, 1962, p. 25; T'ao Ch'eng, *loc. cit.*; "Is It Desirable To Get Married Early?" *KJJP*, Oct. 5, 1962; translated in *SCMP*, No. 2871, Dec. 3, 1962, p. 14; and Chou Hsin-min, "On the Encouragement of Late Marriage and the Statutory Marriage Age," *KJJP*, Nov. 7, 1962; translated in *SCMP*, No. 2871, Dec. 3, 1962, p. 14.

⁴²¹ "What's To Be Done If One Has Married Young?" *loc. cit.*

⁴²² "Communique of the 10th Plenary Session of the 8th Central Committee of the CCP," p. 4.

training and tests" and to purge their minds of "bourgeois" ideas about the superiority and inferiority of various occupations.⁴²³

A related development was the policy of accelerated transfers of urban residents to rural areas, first announced by Chou En-lai to the Second NPC in March 1962.⁴²⁴ Thereafter increasing numbers of urban young people were induced to "volunteer" to go to rural and mountainous areas and engage in manual labor. In July, Teng Tzu-hui made it clear that "educated youths must on no account consider the rural areas merely as a temporary stop, which they will leave at the first opportunity, but should 'take roots,' build their homes, and found their careers there, and expect to work there for the rest of their lives."⁴²⁵ In education, a new effort was made to emphasize political indoctrination and work experience at the expense of academic training.

Among the recurrent themes in the "socialist education movement," "recall past bitterness campaign," and reform through labor program were some that had a direct bearing on the campaign for late marriage and birth control. They included philosophical arguments that true happiness for young people would be found in putting collective interests ahead of individual interests, in advancing the cause of revolution, and in serving the "masses," the Party, and the State. Writers in the magazine *China Youth* warned in May 1963 that "love of comfort can kill ambition," sink young people in "the quagmire of individualism," and deprive them of their "revolutionary vitality," whereas "poverty and a pure and plain life" would enable them to conquer difficulties.⁴²⁶ The argument at times bore a strong resemblance to medieval asceticism. One writer asserted that "eating good food, wearing fine clothes, and living in a nice house" was not happiness, it was "outright sin," "confusing fish eyes with pearls," and a danger to one's "spiritual life." "Living in a world of wine and women" and indulgence in pleasure seeking were "bourgeois thoughts" which, like germs, could contaminate a person and cause him to "change his character." The "tender souls" of young people were particularly susceptible to "infection," which if not checked in good time, would lead to corruption and degeneration. Young comrades must resolutely "cleanse" themselves by taking part in political movements and conducting "criticism and self-criticism."⁴²⁷

For the revolutionary youth, fidelity to the revolutionary cause was "more precious than his own life." For its sake he would unhesitatingly make the ultimate self-sacrifice, as had many Communist martyrs before him. Marx said that "struggle means happiness" and Mao said that "struggle against heaven, earth, and man is an inexhaustible source of pleasure."⁴²⁸

⁴²³ "Labor of Great Significance," *Nan-fang jih-pao*, Canton, Feb. 11, 1965; translated in *SCMP*, No. 3407, Mar. 2, 1965, p. 14.

⁴²⁴ "Communique Issued on NPC Congress," Peking Radio Domestic Service, Apr. 16, 1962.

⁴²⁵ Teng Tzu-hui, "Several Questions Concerning Educated Youths Going to the Rural Areas," *CKCN*, No. 13, July 1, 1962; translated in *SCMM*, No. 325, Aug. 7, 1962, p. 6.

⁴²⁶ "What Concept of Happiness Should Youths Have?" *CKCN*, No. 10-11, May 18, 1963; translated in *SCMM*, No. 371, July 2, 1963, p. 6.

⁴²⁷ Wang Chih-yüan, "Beware of Contamination by the Germs of Bourgeois Thought," *Nan-fang jih-pao*, Canton, Apr. 27, 1963; translated in *SCMP*, No. 2967, May 27, 1963, pp. 1-4.

⁴²⁸ Wei Wei, "The Flower of Happiness Blooms for the Valiant," *CKCN*, No. 20-21, Oct. 20, 1963; translated in *SCMM*, No. 394, Dec. 9, 1963, pp. 8-12.

This applied not only to political struggles but to labor also; therefore the young comrades were to be prepared to "struggle" and to "work hard forever."⁴²⁹ To sacrifice personal interests for the sake of the interests of the Party was said to be "the highest expression of Communist morality."⁴³⁰

In the light of this spartan ethic, love, marriage, and family appeared to partake of a common venality. Supposed case histories were cited to prove that having love affairs, looking at girls in pretty dresses, and going strolling with them in the street were all forms of unhappiness, that love was "intoxicating" and an unreliable kind of motivation, and that it was a "waste of time and energy" that could lead to neglect of work and study. Marriage and family were said to be a "stumbling block," a cause of "backwardness," and an insuperable obstacle to a woman's career. For a woman to live only for husband and family was a useless life. She must break out of her preoccupation with the "small family" of domestic affairs and devote herself to the "large family" of cooperative, factory, and country. She could not live for both family and revolution; therefore the revolution must be given first place.⁴³¹ An effort was made to associate ideas of guilt and remorse with early marriage and childbearing.⁴³²

The interest of the Party and the State in late marriage and birth control was made even more explicit in the second campaign than in the first. Early marriage was said to cause a loss to State and society because of the inability of youthful parents to rear children properly.⁴³³ The failure of students educated at State expense to put study and work ahead of marriage showed a lack of appreciation of the State's generosity and an irresponsible attitude.⁴³⁴ The young people were expected to "lay the foundations of their careers before the age of 30" instead of taking on family burdens.⁴³⁵

Childbirth was "not altogether a personal matter" but also a legitimate concern of the State because of its relationship to the national economy and the economic welfare of the people. The State, it was pointed out, had to bear the burden of providing food, clothing, housing, transportation, schooling, and employment for all the children.⁴³⁶ Hence family planning had a bearing not only on the family but also on the "health and prosperity of the entire people and the socialist construction of the State."⁴³⁷

⁴²⁹ Kan Feng, "Steer Clear of the Bourgeois Idea of Pleasure-Seeking," *CKCN*, No. 16, Aug. 16, 1963, p. 38.
⁴³⁰ Ching Ch'ien, "What Is Communist Morality?" *Nan-fang jih-pao*, Canton, Apr. 20, 1963; translated in *SCMP*, No. 2982, May 20, 1963, p. 6.

⁴³¹ "What Concept of Happiness Should Youths Have?" p. 7; "Do Not Get Married While Still in School," *CKCNP*, Nov. 22, 1962; translated in *SCMP*, No. 2879, Dec. 13, 1962, pp. 6-7; Kan Feng, "Foresight and Prudence Is Necessary in Handling the Question of Marriage," *KJJP*, Nov. 22, 1962; translated in *SCMP*, No. 2879, Dec. 13, 1962, pp. 7-10; "Treasure Your Future and Devote Yourself to Study," *CKCN*, No. 12, June 16, 1963; translated in *SCMM*, No. 374, July 22, 1963, p. 33; "What Do Women Live For," *CKFN*, No. 7, July 1, 1963; translated in *SCMM*, No. 379, Aug. 28, 1963, pp. 21-24; "The Relationship Between Work and Household Chores," *CKFN*, No. 8, Aug. 1, 1963; translated in *SCMM*, No. 384, Sept. 30, 1963, pp. 27-30; and Yuan Tzu-jen, "Yi Shih-ch'uan Gets Married," *CKFN*, No. 6, June 1, 1963; translated in *SCMM*, No. 383, Sept. 23, 1963, p. 41.

⁴³² For example, see "Is It Good or Bad to Get Married Early?" *KJJP*, Oct. 9, 1962; translated in *SCMP*, No. 2845, Oct. 24, 1962, pp. 10-12; and Hsiu Hung, "Who Says 'Many Sons Means Much Happiness'?" *Yang-ch'eng wan-pao*, Canton, Aug. 19, 1963.

⁴³³ "Gynecologist and Obstetrician on Late Marriage and Planned Childbirth," *Hsin-min wan-pao*, Shanghai, Mar. 7, 1963.

⁴³⁴ "Give the Revolutionary Task Top Priority," *CKFN*, No. 4, Apr. 1, 1963; translated in *SCMM*, No. 364, May 16, 1963, pp. 40-41.

⁴³⁵ Lin Feng, "Comments on 'Graduation Means Marriage'," *Hsin-min wan-pao*, Shanghai, Oct. 23, 1963.
⁴³⁶ Po Ling, *loc. cit.*; and Chung Cho-huan, "This Is Not an Embarrassing Thing or an Unimportant Matter," *Nan-fang jih-pao*, Canton, Dec. 1, 1963; translated in *SCMP*, No. 3128, Dec. 30, 1963, p. 12.

⁴³⁷ Fu Lien-chang, "The Positive Significance of Planned Family," *CKFN*, No. 4, Apr. 1, 1963; translated in *SCMM*, No. 364, May 13, 1963, p. 38.

Although there were no new major official policy statements by key Party figures endorsing birth control and late marriage during the second campaign, many press articles indicated that the support for family limitation was strong. Yeh Kung-shao told young people that saving their energies for work and study was what the Party and the people expected of them.⁴³⁸ A model woman worker told them that the proper arrangement of their marital affairs was necessary if they were to be "worthy of the Party's expectations."⁴³⁹ A family planning conference in Kwangtung was told that planned childbirth and late marriage were "the established policy of our country during the socialist construction period" and that "both the Party and the government have attached considerable importance and shown great concern for this work."⁴⁴⁰ Another writer acknowledged that the Party had called on young people to practice planned births "long ago," and added that since socialism is planned economy, the growth of population should also be planned.⁴⁴¹

In spite of these apparently firm commitments, there is some evidence of wavering in official circles from late fall of 1964 through the summer of 1965. During that interval, press coverage of the campaign declined sharply and seems to have been almost wholly confined to regional newspapers. The magazine *Women of China*, which had been giving family planning heavy coverage since 1962, carried no items on the subject from December 1964 through September 1965. In October the magazine resumed coverage with an editorial note announcing the institution of a new column on family planning in response to popular demand. No explanation can be given for this puzzling hiatus. The only hypothesis that can be advanced is that it may have had something to do with an outbreak of "leftist extremism" in China in 1964, revealed in Mao's celebrated "big character poster" of August 1966.⁴⁴²

Organization

In spite of the apparent priority of birth control work, there was still no single agency in charge. The local "guidance committees" were gradually reestablished under the sponsorship of the local Party and government. It was already August of 1962 before the Canton Municipal Bureau of Health held a meeting at which the chief of the Bureau told the city's medical personnel that "the Party and government are very concerned about the work of planned childbirth" and issued the call to establish "advisory bodies" and "centers for the sale of contraceptives."⁴⁴³ The Kwangtung Provincial Guidance Committee was not established until the end of 1963, and in April 1965 a conference convened by the Committee decided that the program needed more extensive development in both rural and urban areas and a strengthening of leadership and coordination.⁴⁴⁴ Shanghai did not get around to

⁴³⁸ Yeh Kung-shao, "What Is the Most Suitable Age for Marriage?" p. 19.

⁴³⁹ Yi Shih-chüan, "Establish Oneself in One's Career' First and 'Get Married' Afterward," *Chieh-fang jih-pao*, Shanghai, Mar. 18, 1963.

⁴⁴⁰ "Kwangtung Province Convenes Conference to Exchange Experiences in Work on Planned Childbirth," p. 19.

⁴⁴¹ Chang Li-chih, "Tui she-hui-chu-i yu-li to shih wo nung pu tai-i'ou ma?" ("Can I Afford Not to Take the Lead in Doing Things Which Are Beneficial to Socialism?"), *CKFN*, No. 1, Jan. 1, 1966.

⁴⁴² Mao Tse-tung, "P'ao ta ssu-ling-pu" ("Bombard the Headquarters"), poster dated Aug. 5, 1966; reprinted in *Hung-ch'i (Red Flag)*, No. 13, Aug. 7, 1967, p. 3.

⁴⁴³ "Meeting on Planned Childbirth Held in Canton," *Nan-fang jih-pao*, Canton, Aug. 26, 1962; translated in *SCMP*, No. 2829, Oct. 1, 1962, p. 12.

⁴⁴⁴ "Kwangtung Province Convenes Conference to Exchange Experiences in Work on Planned Childbirth," pp. 19-20.

setting up its "work committee for family planning" until May 15, 1963.⁴⁴⁵

Consistent with the thesis that political leadership was the key to social action, the new committees were heavily loaded with local potentates. The Shanghai work committee was made up of "responsible comrades" from the Party Municipal Committee, the municipal people's council, and a collection of local government agencies and mass organizations, together with "some medical experts."⁴⁴⁶ The Chairman of the Kwangtung Committee was the secretary of the Party's provincial secretariat, and assorted Party secretaries, provincial vice governors, deputy secretaries general of the provincial people's council, and other officials took prominent parts in a meeting of June 1963 and the April 1965 conference.⁴⁴⁷ However, in January 1966, the need for cadres to take the lead in birth control work was still being pointed out as though they had not been giving it their best. Some exemplary cadres had taken the required initiative and were commended, but for the benefit of the rest it was said that "talking about it 10 times is not as good as doing it once."⁴⁴⁸ The discrepancy between talk and action is universal, but it is especially to be borne in mind in judging the concrete results of a campaign seen only at a distance through press accounts.

Propaganda Tactics and Popular Resistance

The tactics employed in the second campaign were similar to those of the first campaign. Meetings, conferences, forums, and exhibitions were combined with more intensive "propaganda and education" conducted through factories, enterprises, communes, schools, mass organizations, and street committees.⁴⁴⁹ Information places were set up and contraception was publicized by the maternal health clinics. Detailed instructions on the use of particular contraceptives were provided in the press. The more offensive forms of public propaganda were apparently avoided this time.

The available evidence suggests that opposition to birth control and late marriage was still very strong. As before, many people feared that contraception would affect their health.⁴⁵⁰ The specific fears were that contraception could bring on "nervous depression," permanent sterility, infections, impotence, and incompatibility, and result in the birth of monstrosities.⁴⁵¹ Some people believed that contraceptives would prevent a man and his wife from "invigorating each other, or

⁴⁴⁵ "Shanghai Sets Up Work Committee for Family Planning," *Chieh-fang jih-pao*, Shanghai, May 16, 1963.

⁴⁴⁶ "Shanghai Sets Up Work Committee for Family Planning," *loc. cit.*

⁴⁴⁷ "Kwangtung Province Convenes Conference to Exchange Experiences in Work on Planned Childbirth," p. 19; and "Kwangtung Provincial Office of Culture and Education Calls Informal Meeting to Discuss Planned Birth," *Nan-fang jih-pao*, Canton, June 27, 1963; translated in *SCMP*, No. 3032, Aug. 2, 1963, p. 15.

⁴⁴⁸ "Chei-ke 't'ou' tai te hao" ("This 'Lead' Was Taken Well"), *CKFN*, No. 1, Jan. 1, 1966.

⁴⁴⁹ "Shanghai Sets Up Work Committee for Family Planning," *loc. cit.*

⁴⁵⁰ "Will the Use of Contraceptives and Rubber Sheaths Affect Health?" *Nan-fang jih-pao*, Canton, Aug. 24, 1962; translated in *SCMP*, No. 2829, Oct. 1, 1962, p. 10; Wang Wen-pin, "Will Contraception Affect Health?" *op. cit.*; "Hsin hun te jen neng pi-yun ma?" ("Can Newlyweds Practice Contraception?"), *CKFN*, No. 10, Oct. 1, 1963; and Hsiao Min, "Wo te ku-lü shih pu-pi-yao-te" ("My Worry Was Necessary"), *CKFN*, No. 12, Dec. 1, 1963.

⁴⁵¹ Shih Lan, "Yu-kuan chi-hua sheng-yü to chi-ko wen-t'i" (Several Questions on Planned Childbirth), *CKFN*, No. 4, Apr. 1, 1962; "Will the Use of Contraceptives and Rubber Sheaths Affect Health?" *loc. cit.*; Wang Nü-chieh, "Three Musts in the Practice of Contraception," *Hsin-min wan-pao*, Shanghai, Sept. 3, 1962; Wang Wen-pin, "Will Contraception Affect Health?" *loc. cit.*; Shih Lan, *loc. cit.*; "Hsin hun te jen neng pi-yün ma?" *loc. cit.*; and Ku Yi, "Contraception Will Not Impair One's Health," *CKCN*, No. 14-15, July 28, 1963; translated in *SCMM*, No. 383, Sept. 23, 1963, p. 42.

sow "sexual discord" between them, because they were "against nature."⁴⁵² Others continued to have "mental reservations," or did not want to bother with contraception, or could not get the husband to cooperate, or believed the number of children was determined by fate, or wanted children of both sexes, or were too embarrassed to practice contraception, or felt that the matter was personal, or denied any need for contraception, or were deterred by pressure from friends and relatives.⁴⁵³ Some people still resented the impertinence of health cadres who visited homes to promote birth control and called them "busybodies" behind their backs.⁴⁵⁴

Resistance against late marriage was again reported on the part of young and old alike. Parents, relatives, and friends harassed those young people who put off marrying. Young girls were warned that they would become old maids if they waited too long, that they would not be able to find good husbands, and that childbirth at a later age would be difficult. The failure of a young girl to marry gave rise to local gossip and derision. She was sometimes accused of being "disobedient," too "choosy," having "nobody in her eyes," being overconfident, or "aiming at the high ranking cadres."⁴⁵⁵ Parents sometimes arranged marriages without their daughters' consent. Traditional attitudes were reflected in popular sayings such as "A man old enough should get married and a girl old enough should be given away" and "blossoms should be plucked before they wither." The traditional belief that early marriage and early childbearing brought good fortune was evidently still intact.⁴⁵⁶

Among the young people themselves there was a widespread feeling that "to fall in love and get married is the greatest happiness," that early marriage has a settling effect, that it will bring "peace of mind," that "love and family will give meaning to life in one's youth," and that "life begins with marriage." The idea that early marriage meant early retirement was said to be "still quite typical" among young people.⁴⁵⁷ Girls felt that if they delayed too long, the young men of their choice might find other mates and that they could not afford to let a good opportunity slip away.⁴⁵⁸ Some girls in a Shanghai factory were criticized for competing with one another in becoming "heroes" in love.⁴⁵⁹ The exemplary young people who delayed their

⁴⁵² Ku Yi, *loc. cit.*

⁴⁵³ *CKFN*, Editor, "Huan-ying ta-chia fa-piao i-chien" ("We Welcome Everyone to Express His Opinions"), *CKFN*, No. 2, Feb. 1, 1964; Ku I, "Hai-shih chi-hua sheng-yü hao" ("Planned Birth Is Better"), *CKFN*, No. 12, Dec. 1, 1962; Chung Cho-huan, *loc. cit.*; Hsi Tsung-hsiu, "Tsai chieh-shou-le liang-tz'u chiao-hsün i-hou" ("After Learning Two Lessons"), *CKFN*, No. 5, May 1, 1964; Wang Chung-p'ing, "Wo tsen-ma hui sheng-le liu-ko nü-erh?" ("How Did I Have Six Daughters?"), *CKFN*, No. 8, Aug. 1, 1964; and Hsi Chu, "Ai-jen te ssu-hsiang k'ai-le-ch'iao" ("My Husband Opened His Mind"), *CKFN*, No. 8, Aug. 1, 1964.

⁴⁵⁴ Chung Cho-huan, *loc. cit.*

⁴⁵⁵ "A Problem That Deserves Careful Consideration by Unmarried Young People," p. 15; Wang Wen-pin, "A Talk About the Question of Marriage from the Physiological Angle," p. 9; "Is It Good or Bad to Get Married Early?" p. 12; Yi Shih-chüan, *loc. cit.*; Hsiao Hsia, "Should I Refuse to Marry?" *CKCNP*, Nov. 26, 1963; translated in *SCMP*, 3122, Dec. 18, 1963, p. 13; and "T'a pu t'an chao-tao ch'ao-hsiao tsen-man?" ("What Should She Do When She Is Ridiculed for Not Wanting to Be in Love?"), *CKFN*, No. 8, Aug. 1, 1963.

⁴⁵⁶ Ch'en Hsiao, "Men and Women Old Enough Should Marry," *KJJP*, Sept. 27, 1962; translated in *SCMP*, No. 2837, Oct. 11, 1962, p. 9; Kan Feng, "Foresight and Prudence Is Necessary in Handling the Question of Marriage," *loc. cit.*; and Chou Hsin-min, *op. cit.*, p. 14.

⁴⁵⁷ Kan Feng, "Foresight and Prudence Is Necessary in Handling the Question of Marriage," *loc. cit.*; Yang Hsiu, *op. cit.*, p. 25; "Is It Good or Bad to Marry Early?" p. 1; Hsiao Hsiao, "Little Mother's Trouble," *Chieh-fang jih-pao*, Shanghai, Mar. 18, 1963; Lin Fang, *loc. cit.*; and Yang Wen-lung, "Nüerh te-hun-shih" ("My Daughter's Wedding"), *CKCN*, No. 3, Feb. 1, 1964.

⁴⁵⁸ "Is It Desirable to Get Married Early?" *loc. cit.*; and "Is It Good or Bad to Get Married Early?" pp. 10-11.

⁴⁵⁹ "Make a Career First and a Home Next: Consciously Delay Marriage," *Hsin-min wan-pao*, Shanghai, Nov. 2, 1963.

marriages and whose "correct" viewpoints were celebrated in magazine articles were usually depicted as persisting against universal hostility and misunderstanding on all sides. The ideal of late marriage was apparently not easily disseminated.

Methods of Contraception

The methods of contraception advocated during the second campaign differed from those advocated during the first primarily in the addition of intrauterine devices and the paucity of references to herbalist prescriptions and homemade formulas. The condom remained the most widely used contraceptive device, probably because it was simple, easily understood, and relatively cheap. Detailed instructions were again provided for its proper use, cleaning, storage, and checking prior to reuse.⁴⁶⁰ It was said that the condom was 90-percent effective, would prevent infection, and could "prolong the duration of sexual intercourse."⁴⁶¹ The diaphragm was also strongly recommended as the most effective contraceptive available in China at that time.⁴⁶² One source pointed out that, used by itself, it was only about 60 to 70 percent effective, but that in conjunction with a spermicide, its effectiveness was around 95 percent.⁴⁶³ Spermicides were said to be only about 50 percent effective when used without the diaphragm.

Intrauterine rings were given a fair amount of attention in the press during the second campaign, perhaps because they were being offered to the public for the first time on a mass scale. The publicity dealt at length with the origins of the device, how it was inserted, what side effects it might produce, and how it was believed to work. The ring was said to be particularly advantageous because it was convenient to use, economical, and highly effective. Once put in place, it required no attention for 2 to 3 years except in the cases of those women who tended to expel it during menstruation or in the course of hard physical labor. Women who had heart disease, active tuberculosis, serious menstrual irregularity, prolapse of the uterus, or inflammation of vagina or uterus were told they should not use intrauterine devices, but for the rest, such devices were said to be free of health hazard. Japanese, German, and Chinese research results were cited to show that the ring did not increase the risk of uterine tumors. The efficiency rate was found to be 94.24 percent for 625 women on whom records were kept by the Union Medical College in Peking between January 1957 and September 1958 and 97.4 percent according to reports from seven localities received at a gynecological and obstetrical conference at Wuhan in January 1963. For women who conceived in spite of the ring, there was said to be no indication of foetal abnormality.⁴⁶⁴ In October 1962, it was announced

⁴⁶⁰ "What's to be done if one has married young?" pp. 11-12.

⁴⁶¹ Shu Ming-yen, "Several Contraceptives Recommended for General Use," *op. cit.*, p. 15.

⁴⁶² "What's To Be Done If One Has Married Young?" p. 12.

⁴⁶³ Shu Ming-yen, *op. cit.*, p. 12.

⁴⁶⁴ Shu Ming-yen, *op. cit.*, p. 16; Chiang Mei, "Contraceptive Rings," *PCJP*, Mar. 25, 1963; "Why Can Pregnancy Be Prevented by Placing a Contraceptive Ring in the Uterus? Is This Method of Contraception Bad to Health?" *Yang-ch'eng wan-pao*, Canton, Mar. 27, 1963; Yü Hsien, "Fang-le pi-yün-huan pu-hui ying-hsiang sheng-t'í ch'ien-k'ang" ("The Contraceptive Ring Will Not Affect Health"), *CKFN*, No. 10, Oct. 1, 1965, p. 31; Ch'én Mei-p'u, "Fang-le chieh-yü-huan i-hou" ("After the Insertion of the Contraceptive Ring"), *Ta-chung i-hsueh (Popular Medicine)*, No. 1, Oct. 1965, p. 29; "Pi-yün-huan neng tai chi-nien?" ("How Many Years Can a Contraceptive Ring Be Used?"), *CKFN*, No. 1, Jan. 1, 1966, pp. 24-25; and Wu Yü-hsiang, "Wo an-shang pi-yün-huan hou p'ing-an wu-shih" ("I Am Safe and Sound After I Was Fitted With a Contraceptive Ring"), *CKFN*, No. 2, Feb. 1, 1966, p. 32.

that women in Canton seeking insertion of contraceptive rings could obtain them at six different hospitals.⁴⁶⁵

The rhythm method and prolonged breast feeding were again mentioned in the press during the second campaign, and again their unreliability was carefully explained. The rhythm method, it was pointed out depends upon regularity of the menstrual cycle, which can be disturbed by emotional and health problems. Irregular ovulation may occur even with a normal menstrual cycle. The "safe period" was defined as the 10 days before ovulation, a period too brief to commend this method to many couples.⁴⁶⁶ Breast feeding mothers were advised that their chances of conception were probably reduced somewhat but that not every woman stops ovulating during the lactation period and that lactation could not be prolonged indefinitely without affecting the health of mother and child.⁴⁶⁷

Little was said about other methods of contraception. The traditional medicine formulas and homemade contraceptives that caused such heated contention during the first campaign were scarcely mentioned. One writer warned against "taking certain medicinal herbs prescribed by unqualified doctors,"⁴⁶⁸ and an herbalist in the Peking Institute of Chinese Medicine, recalling the publicity given to tadpoles and *tecoma grandiflora* in the previous campaign, urged that "the advice of doctors" be obtained before mass use of traditional medicines for contraception was advocated again.⁴⁶⁹ However, an article in a pharmaceutical journal discussing steroids and other oral contraceptives cited clinical experiments during the late 1950's which were said to have shown that tadpoles and several Chinese herbs had "considerable effectiveness" as contraceptives.⁴⁷⁰ Oral contraceptives were not mentioned in the daily press, perhaps because, as with intrauterine devices during the first campaign, there was no possibility of making them generally available.

At the beginning of the second campaign complaints about the poor quality, limited supply, and lack of variety of contraceptives were heard again as in the first campaign. In Canton, some stores that stocked diaphragms did not have the spermicides needed to make them fully effective, and some only offered one kind of spermicide. Supply problems were complicated by the lapse in production of contraceptives during the interval between the two campaigns and by the slow reaction of local departments of commerce to the resumption of birth control propaganda. Some commercial units attached little importance to the sale of contraceptives because the price reductions still in force since the previous campaign had greatly reduced the profit margin. What stocks the pharmacies held were not prominently displayed, and sales personnel were still too ignorant of contraception to advise their customers.⁴⁷¹ The public health, commercial, and industrial departments in Canton "swung into action"

⁴⁶⁵ "Consulting Rooms for Planned Childbirth Set Up in Various Hospitals in Canton," *Nan-fang jih-pao*, Canton, Oct. 5, 1962; translated in *SCMP*, No. 2844, Oct. 23, 1962, p. 12.

⁴⁶⁶ Shu Ming-yen, *loc. cit.*; "What's To Be Done If One Has Married Young?" *loc. cit.*; and Wang Nü-chieh, *loc. cit.*

⁴⁶⁷ "Is Contraception by Prolonging the Period of Breast Feeding Reliable?" *Nan-fang jih-pao*, Canton, Oct. 23, 1962; translated in *SCMP*, No. 2860, Nov. 15, 1962, p. 10; and Sheng Tan-ch'ing, "Ch'ang-ch'i wei-nai neng ch'i tao pi-yün so yung ma?" ("Can Prolonging the Period of Breast Feeding Serve the Purpose of Contraception?"), *CKFN*, No. 5, May 1, 1962.

⁴⁶⁸ Wang Nü-chieh, *op. cit.*, p. 1.

⁴⁶⁹ "Concerning Chinese Traditional Medicine for Prevention of Contraception," *PCJP*, July 16, 1962.

⁴⁷⁰ Ch'eng P'ei-yün, "K'ou-fu pi-yün yao-wu te chin-chan" ("Development of Oral Contraceptives"), *Yao-hsüeh hsüeh-pao (Acta Pharmaceutica Sinica)*, vol. 11, No. 12, Dec. 1964, pp. 842-855.

⁴⁷¹ "Crying Out for Birth Control." pp. 9-10.

immediately upon receiving these complaints via the newspapers and resumed production on a crash basis.⁴⁷² Presumably, a similar resumption was taking place elsewhere. In Shanghai in May 1963, it was said that contraceptives had increased in quantity and improved in quality.⁴⁷³ Thereafter there were no further criticisms of this kind in the press.

Abortion

Abortion received little press attention during the second campaign. In 1962, the attitudes expressed were close to those held by the China Medical Association a few years earlier. Abortion was said to be a negative approach to birth control, providing no protection against repeated impregnation, and frequently causing menstrual disturbances, infection, damage to the uterus, hemorrhaging, leucorrhea, pain, headache, dizziness, insomnia, loss of sexual desire, and other health problems. Self-induced abortion was described as still more dangerous.⁴⁷⁴ The writer of an article for *Women of China* depicted curettage in terms designed to instill a sense of fear and repugnance in readers and also warned against abortifacients taken orally. The article concluded that abortion should be limited to persons suffering from serious heart disease, high blood pressure, chronic kidney infection, and tuberculosis for whom abortion would be less dangerous than a full term pregnancy.⁴⁷⁵

However, by March 1963, the official attitude toward abortion had changed. A press item from Shanghai noted that medical literature in China and other countries and the experience of Shanghai medical personnel with abortion indicated that the chances of death, complications, and after-effects from clinical abortion were lower than those from normal delivery. The method of abortion used in Shanghai was said to be "simple, reliable, and quick, and less painful to expectant mothers."⁴⁷⁶ The method was not described, but it was undoubtedly the suction method reported to be in wide use in China during the latter part of the second campaign period. An article in *Women of China* in March 1964 said that "in general, abortion is a comparatively simple operation," but that "many persons" regarded abortion as a commonplace matter and used repeated abortions in place of contraception. The article warned that this could lead to health problems.⁴⁷⁷ Perhaps because of concern that the simplicity and ease of the new method might make it too popular, it was not described in the public press. However, the techniques were discussed in medical journals, taught to the personnel of rural medical teams,⁴⁷⁸ and freely shown to some foreign visitors.

Edgar Snow saw a classroom demonstration of a suction abortion machine in Peking during his visit to China in the winter of 1964-65. The machine, which was powered by an electric suction pump, was said to extract the foetus from the uterus with almost no pain and a minimum loss of blood. Snow was told by Huang Ching-wen, director

⁴⁷² "Production of Contraceptives Organized and Restored in Canton," *loc. cit.*

⁴⁷³ "Shanghai Sets Up Work Committee for Family Planning," *loc. cit.*

⁴⁷⁴ "Will the Use of Contraceptives and Rubber Sheaths Affect Health?" *loc. cit.*; and Wang Ta-wan, "Planned Childbirth Must Not Depend on Artificial Abortion," *KJJP*, Sept. 27, 1962; translated in *SCMP*, No. 2837, Oct. 11, 1962, p. 10.

⁴⁷⁵ Yin Ch'i, "Jen-kung liu-ch'an yü to-t'ai" ("Abortion and Miscarriage"), *CKFN*, No. 10, Oct. 1, 1962.

⁴⁷⁶ "Gynecologist and Obstetrician on Late Marriage and Planned Childbirth," *loc. cit.*

⁴⁷⁷ Ying Ch'i, "Che-yang-tso hao-ma?" ("Is It Good To Do It This Way?"), *CKFN*, No. 3, Mar. 1, 1964.

⁴⁷⁸ "Hsüeh-shu huo-tung" ("Academic Activities"), *Chung-hua wai-k'o tsu-chih (Chinese Journal of Surgery)*, vol. 13, No. 12, Dec. 10, 1956, p. 1120.

of the department of women's and children's health of the Ministry of Public Health, that abortion was granted on the request of the woman. She was no longer required to have the approval of her husband or of the local Party organization. No attention was paid to her marital status. The only remaining restrictions were that abortion could not be performed after the second month of pregnancy and only one abortion was allowed per woman per year, a limitation not easily enforced without a better recordkeeping system than the Chinese were likely to have had.⁴⁷⁹ At least in urban areas, abortion seemed to be on the rise.

Sterilization

In contrast to the coverage on abortion, sterilization received considerable press attention during the second campaign, almost all of it designed to popularize vasectomy, which was universally described as simpler and more economical than tubal ligation. Chou En-lai, while escorting Korean visitors through a factory in the northeast in 1963, congratulated a plant director for having had a vasectomy, and the incident was reported in the magazine *China Youth*.⁴⁸⁰ However, the press was careful to point out that vasectomy must be regarded as permanent sterilization, since there was only a 35 to 49 percent chance that the vas deferens could be resected and even so the likelihood of being able to father children again was small.⁴⁸¹ But there were other fears that seemed to represent more serious obstacles to the widespread adoption of vasectomy. Many men thought the operation would have a permanent affect on their health, that it was painful, and that it would lead to various physiological changes such as loss of beard, change of voice, and decline in sexual desire. Some men thought vasectomy was a form of castration or that it meant amputation of the penis.⁴⁸² Elaborate explanations of the physiology of vasectomy were given to clear up these misapprehensions. One article said that observation of 900 cases of vasectomy and salpingotomy showed that among the males involved, 72 percent found no change in sexual desire, 18 percent found it stronger, and 10 percent found it weaker. The stronger desire was said to have been due in most instances to the absence of worry about pregnancy and to a more harmonious sex life. The cases of weaker sex urge were ascribed to misgivings about the operation, normal decline in patients already elderly, other diseases not related to the operation, and faulty operating techniques which affected the functioning of the testes.⁴⁸³

⁴⁷⁹ Edgar Snow, "Halte aux Naissances," *Candide*, Paris, No. 209, 1965, pp. 21-22. Snow was also shown a simpler version of the suction machine that utilized a hand or foot powered suction pump.

⁴⁸⁰ Wang Po-ch'ing, "Ch'in-ch'ieh te kuan-huai jeh-ch'ing te ku-li" ("Intimate Concern and Warm-Hearted Encouragement"), *CKCN*, No. 17, September 1, 1963, p. 15. A few months later, when Chou was reminded of this incident during an interview with Edgar Snow, he pointed out that there was "great resistance" to vasectomy on the part of men in China. See "Edgar Snow's 5-Hour Interview with Cough En-lai," *The Washington Post*, Feb. 3, 1964.

⁴⁸¹ Sung Hung-tso, "Will Vasectomy Affect Health?" *CKFN*, No. 4, Apr. 1, 1963; translated in *SCMM*, No. 364, May 13, 1963, p. 33; Hsiung Yü-ch'eng, "A Talk With Male Comrades on Birth Control," *Chieh-fang jih-pao*, Shanghai, June 16, 1962; "Measures for Permanent Contraception," *PCJP*, Aug. 27, 1962; and Wang Jung-tseng, "Concerning Vasectomy," *PCJP*, May 27, 1963.

⁴⁸² Hsiung ju-ch'eng, "Is It Better for Husband or for Wife to Undergo Sterilization?" *Chieh-fang jih-pao*, Shanghai, June 5, 1963; "Medical Experts and Doctors Discuss the Question of Vasectomy," *PCJP*, June 7, 1963; and Lu Ta-ch'uan, "Before and After I Had My Vasectomy," *CKFN*, No. 4, April 1, 1963; translated in *SCMM*, No. 364, May 13, 1963, p. 35.

⁴⁸³ Sung Hung-tso, *op. cit.*, pp. 32-33.

Some cases of impregnation of wives by newly sterilized husbands were also reported, giving rise to doubts as to the effectiveness of the vasectomy. These were explained as due to a residue of sperm in the vas deferens and the seminal vesicle, or the failure of the surgeon to cut the right tube, or spontaneous resection of the vas, or the wife already being pregnant before the operation unbeknown to the couple. Men who had vasectomies were advised to use contraception for a time after the operation to be sure that all live sperm had been expelled.⁴⁸⁴

Late Marriage

The campaign for late marriage was pushed vigorously through the press and in factories and mass organizations. There were occasional rumors that the cadres in some areas were bringing some pressure to bear on couples seeking to marry early by delaying issuance of marriage licenses and subjecting them to stern lectures, but there was no further talk of revising upward the minimum ages for marriage allowed under the marriage law. The recommended ages for marriage were once again at some variance from one press article to another. In April 1962, Dr. Yeh urged that women wait until ages 23 to 27 and men until 25 to 29, but she added that "there should be no rigid rules."⁴⁸⁵ Other articles in 1962 suggested 23 to 26 and 25 to 29, 22 to 26 and 28 to 32, 25 to 26 and "around 30," and 23 to 28 and 25 to 30 for women and men, respectively.⁴⁸⁶ In 1963, with the exception of Dr. Yeh, there seemed to be general agreement that the best ages for marriage were around 25 for women and 30 for men, though many articles suggested that there were advantages in marrying at still later ages and that "over 30 is not too late."⁴⁸⁷ The value of delay was emphasized in a series of articles citing particular young women for courage in postponing their marriage dates,⁴⁸⁸ in resisting the efforts of relatives and friends to arrange marriages for them, and in stalling off suitors. At times the local Party leadership became directly involved in particular struggles against families and groups of young people opposed to late marriage, and here and there female cadres set examples by delaying their own marriages.

Results of the Campaign

The effectiveness of the second birth control campaign is even more difficult to measure than that of its predecessor, partly because the significance of abortion, sterilization, and late marriage, all of which were more important in the second campaign, cannot be assessed, and partly because the press carried few articles giving even impressionistic evaluations of campaign results and none containing statistical data on

⁴⁸⁴ *Ibid.*, p. 33.

⁴⁸⁵ Yeh Kung-shao, "What Is the Most Suitable Age for Marriage?" p. 19.

⁴⁸⁶ Yang Hsü, *op. cit.*, p. 24; Ta Yü, *op. cit.*, p. 11; Ch'en Hsiao, *op. cit.*, p. 9; and Wang Wen-pin, "A Talk About the Question of Age for Marriage From the Physiological Angle," p. 11.

⁴⁸⁷ For example, Wang Shu-chen, *op. cit.*, p. 14; "Gynecologist and Obstetrician on Late Marriage and Planned Childbirth," *loc. cit.*; Fu Lien-chang, *op. cit.*, p. 39; Yi Shih-chüan, *loc. cit.*; and Yuan Tzu-jen, *op. cit.*, p. 39.

⁴⁸⁸ For example, Wang An-ch'ing, "Wang Chüan-chüan san-tz'u t'ui-ch'ih hun-ch'i" ("Wang Chüan-chüan Postponed Her Wedding Three Times"), *CKFN*, No. 5, May 1, 1963, p. 19; and Yin La-mei, "Wo liu kai hun-ch'i" ("I Changed My Wedding Date Six Times"), *CKFN*, No. 11, Nov. 1, 1965, pp. 22-23.

its progress. The objectives of the second campaign were not as clearly defined. Though late marriage was to be made "a way of life" in China, there was still no recordkeeping system capable of providing accurate data on age at marriage, hence no possibility of measuring the impact, if any, of the campaign for delay of marriage. Birth registration had apparently been abandoned in much of the country, so that not even the municipalities that gave the highest priority to the birth control campaign were able to cite figures to show what effect their efforts were having on the local birth rate. Hospitals and clinics must have had records which would have permitted the authorities to take a measure of the frequency of abortion and sterilization, but such data were apparently not compiled, or at any rate, not used in press propaganda.

There was a greater effort in the second campaign to establish the small family as a new ideal replacing the traditional concept of the largest possible family size as the optimum. Some attention had been given to this matter during the first campaign, with most comments concurring in the idea that the ideal family has three children spaced at 3-year intervals.⁴⁸⁹ Toward the end of the first campaign, one newspaper article advised campaign workers not to lay too much stress on the point that "it is quite enough for a family to have one or two children" but rather to promote birth control according to the "concrete conditions" of the individual family.⁴⁹⁰ During the second campaign, the most frequently recommended family size was two children with a 3- to 5-year interval between them. Dr. Yeh argued that "generally" couples should have only two children; when conditions were favorable, the couple might "consider" having a third, but it was best not to have any more than three.⁴⁹¹ At the end of the second campaign, the two-child ideal was being promoted without the option of a third child.⁴⁹² However, the authorities had no effective means of imposing a two-child limit on the population as a whole. Several times during the second campaign, the foreign press carried stories to the effect that the Chinese Communists had imposed a new set of regulations under which food and cloth rations, family allowances, and maternity leave would not be allotted for the fourth and subsequent children born to a family,⁴⁹³ but accounts of refugees from the mainland suggest no uniformity in the application of such regulations. In view of the fact that, as Mao himself reportedly admitted to Edgar Snow in 1964,⁴⁹⁴ the population records upon which rationing was based had been significantly inflated by false reporting to secure extra ration coupons, the attempt to use rationing to induce acceptance of family limitation was not likely to have had much success.

⁴⁸⁹ Yang Ta-wan, *loc. cit.*; "Pen-pao chao-k'ai ch'ih-hün chieh-yü wen-t'i tso-t'an-hui," *loc. cit.*; Yeh Chao-yu, "Kei chiang-yao chieh-hun ch'ing-nien-nü t'i i-ko fang-an" ("A Plan Recommended for Young People Who Are Getting Married"), *Chiao-shih pao*, Nanking, Mar. 5, 1957; and "Chieh-yü pi-yün chi ch'i-t'a," *loc. cit.*

⁴⁹⁰ "Further Develop Birth Control Work in Rural Areas," p. 7.

⁴⁹¹ Yeh Kung-shao, "My Views on the Problem of Young People's Marriage, Love, and Children," p. 15.

⁴⁹² Liao Chi-chien, "Wo te ku-lü shih to-yü-te" ("My Worry Was Unnecessary"), *CKFN*, No. 4, Apr. 1, 1966, p. 32; and Shenyang Lantern Slide Factory, "Chin-hua ho Ying-hua" ("Golden Flower and Silver Flower"), *CKFN*, No. 5, May 1, 1966, pp. 30-31.

⁴⁹³ For example, see Jacques Marcuse, "Birth Control in China by Cotton Rationing," *The Sunday Times*, London, Nov. 17, 1963, p. 2; Seymour Topping, "Peking Urges Birth Curbs: Big Families are Penalized," *New York Times*, New York, Apr. 27, 1966, p. 1; and Vergil Berger, "Population Control in Red China," *Japan Times*, Tokyo, June 30, 1966.

⁴⁹⁴ Edgar Snow, "Interview With Mao," *The New Republic*, Feb. 27, 1965, p. 20.

The years of the second birth control campaign were marked by intensive propaganda calling for a fundamental change in Chinese values but without the firm administrative grip on the local cadres that would have been required to make indoctrination compulsory. The lack of strong administrative initiatives may have been due to the serious divisions within the top leadership group, of which the outside world was not generally aware until the start of the "cultural revolution" in the summer of 1966. Many foreign observers supposed that the leadership, having weathered the difficult years of the food crisis period without collapse, were more confident and more strongly entrenched than ever before. Actually, the failure of the "leap" and the ensuing food crisis had apparently contributed to a split among the top leadership that widened beyond repair in the next several years until in the summer of 1966 it shattered the Party from top to bottom. One of the issues in the political turmoil was the conflict between dogmatic Maoism and the more pragmatic approach to economic and political administration later identified with Liu Shao-ch'i. During the years just prior to the "cultural revolution," Maoism seemed to inspire the public propaganda drives but Liuism dominated administrative actions, giving domestic affairs a somewhat schizoid character. Birth control, with its inherently pragmatic implications, and late marriage, with its Liuist correlaries about submission to the will of the Party, would presumably have been affected by the contest within the Party Central Committee, even if these were not major points at issue. It may be significant that at the end of 1963, when many foreign observers were predicting a sharp escalation of the campaign, the public propaganda efforts began to wane and remained at a much lower level of visibility during the next two and a half years.

It is possible, as some foreign analysts have suggested, that the press campaign, which is more visible from foreign vantage points, was deliberately minimized while more pressure was being brought to bear quietly through administrative channels. Yet it is hard to imagine a plausible rationale for such a change or to relate it to the strategies of public propaganda efforts in previous years. There is more than a suggestion of uncertainty about the urgency of birth control efforts in the remarks of Chou En-lai to Edgar Snow during an interview in Conakry, Guinea, in January 1964, in which Chou said:

We do believe in planned parenthood, but it is not easy to introduce all at once in China and it is more difficult to achieve in rural areas, where most of our people live, than in the cities. The first thing is to encourage late marriages.

Referring to the "remarkable decline" in the rate of population growth in Japan, Chou added:

We have sent people to Japan to study means and results there. Our present target is to reduce population growth to below 2 percent; for the future we aim at an even lower rate. However, I do not believe it will be possible for us to equal the Japanese rate as early as 1970—for some of the reasons mentioned. For example, with improving living conditions over the past two years, our rate of increase again rose to 2.5 percent.⁴⁶⁵

Without more concrete evidence to the contrary, it must be assumed

⁴⁶⁵ "Edgar Snow's 5-Hour Interview With Chou En-lai," *loc. cit.*

that the uncertain tempo of the propaganda campaign reflected an ambivalence about the priority of control as a national objective.

Apart from political considerations, it is doubtful whether the second birth control campaign, even if energetically sustained in the press, could have had much more impact on actual fertility behavior among the worker and peasant masses than did the first campaign. Popular resistance was evidently still strong, even if the press had less to say about it, and the field efforts were apparently not on the same scale as during the first campaign. The effort seems to have been directed more specifically toward women and young people, and the concentration on value change suggests that the goals were long-term rather than immediate. Furthermore, reliable contraceptives and trained medical personnel were not available in the numbers necessary for successful implementation of an urgent birth control campaign. It is not likely, therefore, that urban birth rates were much affected, and the impact on rural birth rates must have been extremely slight.

V. THE "CULTURAL REVOLUTION" AND THE INTERRUPTION OF BIRTH CONTROL WORK: 1966 TO 1969

When the "great proletarian cultural revolution" was first launched in the fall of 1965, it appeared to be little more than a continuation of the "socialist education movement" combined with a purge of anti-Maoist literary and political figures of secondary importance. By the summer of 1966, however, it was clear that the "cultural revolution" reflected a major split in Party ranks. Mao had become alienated from his heir-apparent, Liu Shao-ch'i, and from a number of key figures in the regime who had been closely associated with Mao for many decades. As the struggle increased in vituperation and violence, it became apparent that its roots lay in the reaction against Maoist policies that had set in after the failure of the "leap" and communes. Although Mao's chief antagonist at the Lushan Party plenum of 1959, Defense Minister P'eng Teh-huai, had been dismissed, effective control of the Party had passed into the hands of Liu Shao-ch'i and the more moderate elements in the Party hierarchy in the ensuing years of crisis and recovery, so that Mao himself, though much honored in the press, was to a considerable degree deprived of his once absolute authority. In the "cultural revolution," Mao and certain loyalist elements sought to overthrow Liu and the entire power structure that had rejected extreme Maoism and had substituted a more pragmatic approach to China's domestic development problems.

Having lost control of the Party and government apparatus, Mao could not avail himself of the usual administrative channels for conducting purges. The security police and the conventional mass organizations, such as the Youth League and the Federation of Trade Unions, were all under Party control, and the loyalty of the army was apparently uncertain despite the intensive Maoist indoctrination of recent years. To construct an independent instrument of political power, the Maoists called upon youth faithful to Mao throughout the country by direct appeal via the mass media to form entirely new organizations as "Red Guards" and "Revolutionary Rebels." These were summoned to Peking to "see Chairman Mao," to "exchange experiences" in making revolution, and to participate in mass rallies in the Tien An Men Square. The rallies were intended to intimidate Mao's enemies

and to fire the youths to a peak of fervor before they were dispatched to various localities to "drag out the power holders" who were opposed to Maoism.

Return of the Transferees

The 9 million or so youths who attended the Peking rallies in the summer and fall of 1966 gave every appearance of being the kind of zealots that many foreign observers had long supposed would have been produced by years of ideological training in the Chinese Communist school system. They seemed equally intent upon destroying the vestiges of traditional and foreign culture and Mao's contemporary rivals. However, at least a part of their enthusiasm may have been generated by personal rather than ideological considerations. The lack of employment opportunities in urban areas had resulted since the middle of the 1950's in diversions of large numbers of would-be entrants into the urban labor force to agricultural employment. Graduates of urban elementary and secondary schools unable to advance to the next level of the sharply narrowing educational pyramid, and graduates of higher and specialized secondary educational institutions for whom there were no jobs were obliged to join employees discharged from overstuffed enterprises and surplus administrative cadres from top-heavy government units in periodic mass relocations in rural areas. Some of the transferred personnel were only on temporary reassignment designed to purge them of "bourgeois" attitudes or to punish them for political misdeeds of one sort or another; these were usually returned to urban posts when their penance was satisfactorily completed. Others were consigned permanently to rural life. Although some press accounts insisted that the majority of the students transferred to rural areas had volunteered and were "determined to become the first generation of cultured peasants," other, more candid discussions of their plight made it clear that many of the students had been pressured into volunteering and felt they had been "shamed" by their assignment. Some became pessimistic and "tired of life." Others complained that they had "suffered a loss," that tilling the land offered "no future," and that they had been deprived of any hope of becoming "specialists." They concluded that their education had been a waste of time. "What is the use of culture," they asked, "for one who breaks earth lumps in the countryside?"⁴⁹⁶

The same concerns were expressed when the transfers were resumed during the 1960's. The young people were told that the rural areas offered a "vast world" of "promising prospects" and that they should not "grumble" or "go into tantrums" but accept their rural assignments in the spirit of patriotism befitting the "masters" of the country. They were reminded of Mao's precept that "A good comrade is one who is eager to go where the difficulties are greater" and of Liu's precept that they must put "the interests of the Party above all."⁴⁹⁷ But some objected that it was "going beyond reality" to say that

⁴⁹⁶ "Over Two Million Middle and Primary School Graduates Go to Rural Areas," *KMJP*, Sept. 22, 1957; translated in *SCMP*, No. 1631, Oct. 15, 1957, p. 3; "What Students Who Fail to Gain Admission into Institutions of Higher Education Should Do," (editorial), *JMJP*, Aug. 22, 1957; translated in *SCMP*, No. 1603, Sept. 4, 1957; and "The Problem of Primary and Middle School Graduates Taking Part in Agricultural Production," (editorial), *JMJP*, Apr. 8, 1957; translated in *SCMP*, No. 1513, Apr. 18, 1957, pp. 1-11.

⁴⁹⁷ Teng Ying-ch'ao, "Greetings to University Students Who Are to Graduate This Year," *CKCNP*, May 30, 1963; translated in *SCMP*, No. 3000, June 17, 1963, pp. 5 and 7; "Go to the Rural Areas," (editorial), *JMJP*, Dec. 22, 1962; translated in *SCMP*, No. 2894, Jan. 9, 1963, p. 3; Ching Ch'ien, *op. cit.*, p. 6; and "Interests of the Party Above Everything Else," (editorial), *JMJP*, Dec. 20, 1964; translated in *SCMP*, No. 3360, Jan. 4, 1965, p. 4.

participation in agricultural labor was just as promising as going on to higher education. Some students believed that farm work was "dishonorable" and "inferior," that it was like "leaving a piece of good iron untempered" or "planting a beautiful flower in ox dung." These sentiments were often shared by parents, who encouraged their children to study lest they become manure collectors, and by teachers, who led them to believe that "If you are able to gain admittance into a university, you will become a dragon, and if you fail to do so, your lot will be that of a worm." The transferred students found rural life hard, and the peasants in some cases made it harder by assigning them the most menial tasks, such as night soil collecting, and satirizing their distress with ostensibly good-humored jokes that carried a sting.⁴⁹⁸ Little wonder many found it difficult to see the "endless, bright, and great future" and the "wide scope" for their talents that Mao and the Party told them they would discover in the countryside.⁴⁹⁹

When the call to form "Red Guard" units and come to Peking to see Chairman Mao went out in the fall of 1966, it was answered by millions of these young people with understandable eagerness. Their excitement was further heightened by a conviction that gained currency in various quarters during the latter part of 1966 and the spring and summer of 1967 that the unpopular policy of transferring youths to rural areas was a Liuist policy. How this idea got started is not clear. The transfer policy, with its injunctions about obeying the Party's call and going where the Party directed, was fully consistent with Liu's instructions on "How To Be a Good Communist," a treatise much commended for youthful reflection during the 1960's, but it was also linked with Mao's ideas about the need for "tempering" through manual labor, the opportunities for youths to make revolution in the "vast countryside," and the goal of eliminating the differences between workers and peasants, all of which were associated with Mao's self-abnegative "socialist education movement." At the start of the "Red Guard" movement in August and September 1966, Mao's directions to urban young people to settle in the countryside were still being issued.⁵⁰⁰ Later in the fall, however, the youths were electrified by the news that Chairman Mao wanted them to make "long marches" from city to city at public expense in order to "exchange experiences" with other revolutionary groups and to "bombard the headquarters" of local Party officials not in the Maoist camp. Early in the "cultural revolution," there were charges in the ubiquitous wall posters that Liu's "agents" had tried to prevent young people from leaving the rural areas, and several revolutionary youth publications charged that Liu's "towering crimes" of sending youths to rural areas in spite of their state of health had caused grave health impairment and death in some cases. Thus, they felt justified in rebelling against the policy.⁵⁰¹

⁴⁹⁸ Wu T'ien-shih, "We Cannot Go Beyond Reality When Talking About Our Future," *CCKNP*, Feb. 22, 1964; translated in *SCMP*, No. 3177, Mar. 12, 1964, pp. 8-10; "Labor Is a Melting Pot for Revolutionising Educated Youths," *CCKNP*, Feb. 25, 1964; translated in *SCMP*, No. 3180, Mar. 17, 1964, p. 1; Yu T'ing-ying, "Correctly Educate the Children in Their Ideals and Prospects," *KJJP*, Jan. 9, 1964; translated in *SCMP*, No. 3181, Mar. 18, 1964, p. 10; "Exercise Stronger Leadership Over Teaching Work" (editorial), *JMJP*, Feb. 9, 1963; translated in *SCMP*, No. 2938, Mar. 14, 1963, p. 7; and "How Should I Look at the Views Expressed by Commune Members?" *CCKNP*, Feb. 8, 1964; translated in *SCMP*, No. 3169, Mar. 2, 1964, pp. 4-5.

⁴⁹⁹ "Educated Youths Who Go to Rural and Mountainous Areas Have a Great Future," (editorial), *CCKNP*, Sept. 8, 1964; translated in *SCMP*, No. 3305, Sept. 25, 1964, p. 7.

⁵⁰⁰ "Educated Young People Settle in Chinese Countryside," *NCNA-English*, Peking, Sept. 27, 1966; in *SCMP*, No. 3792, Oct. 3, 1966, pp. 25-27.

⁵⁰¹ "Letter from Ch'a-ling," *Ko-ming ch'ing-nien (Revolutionary Youth)*, Canton, Nov. 10, 1967; translated in *SCMP*, No. 4102, Jan. 18, 1968, pp. 6-8; and "Three Years of Blood and Tears," *Chih-nung hung-ch'i (Aid-Agriculture Red Flag)*, Canton, No. 7, January 1968; translated in *SCMP*, No. 4125, Feb. 26, 1968, pp. 7-13.

When the junketing youths got out of hand in the winter of 1966-67, the Maoist leaders were obliged to issue an order to those still on the farms to "stay where they are,"⁵⁰² and to follow this with repeated instructions to stop exchanging experiences and return to their rural posts. In April 1967, it was intimated that those instigating the exchange of experiences were "capitalist roaders."⁵⁰³ In June, it was suggested that refusal to return meant that the youths had been "ensnared by the bourgeois reactionary line,"⁵⁰⁴ and in December it was stated categorically that it was "China's Khrushchev" (Liu Shao-ch'i) who was inciting young people to leave the rural areas.⁵⁰⁵ Whether or not there was any truth in the Maoist charges, they probably served the political purposes of first rallying the young people to the Maoist camp and later sloughing them off to rural areas when their uncontrollable violence made them more of a liability than an asset.

The Uncertain Status of Birth Control

A similar confusion arose over the birth control and late marriage policies. Press propaganda on these subjects disappeared immediately when the "cultural revolution" moved into high gear in June 1966. In the same month, Tung Pien, the theretofore anonymous editor of the Women's Federation magazine *Women of China*, was denounced as a "black gang element" for planting the "poisonous weeds" of "revisionism" and "bourgeois humanism" in her magazine, mainly in two series of articles dealing with what women live for and what they should look for in choosing a husband, and for refusing to publish Mao's quotations, poems, and pictures.⁵⁰⁶ None of the many accusations leveled at Tung specifically mentioned her coverage of family limitation, to which she had devoted much space, but she was charged with having relied too much on the advice of experts in treating such subjects as "knowledge of life," "knowledge of science," love, marriage, and childbirth. These charges might have been applied to some of the articles on contraception, abortion, sterilization, and late marriage carried in *Women of China*. Under Maoist pressure, the Women's Federation Secretariat dismissed Tung and dissolved her editorial committee.⁵⁰⁷

The main cause of Tung's downfall was probably her alinement with the anti-Maoist faction in the Party, but the charges may have been construed as an indication that the Maoists were against birth control and late marriage. This impression spread even within Maoist circles during the next year. A news item broadcast by Tsingtao Radio in September 1967 reporting on further purges in the women's movement said that a representative of the municipal revolutionary committee called on women to criticize and repudiate "China's Khrushchev" and his agents in Shantung and Tsingtao, and to wipe the "poisonous

⁵⁰² "Central Committee Issues Emergency Directive," (Peking dispatch) *Mainichi*, Tokyo, Jan. 17, 1967.

⁵⁰³ "*Wen-hui Pao* Tells Students Not to Leave Units," Shanghai Radio, Apr. 22, 1967.

⁵⁰⁴ "Shanghai Paper Urges Return to Rural Areas," Shanghai Radio, June 28, 1967.

⁵⁰⁵ "The Correct Orientation of Making Educated Youths Go to Mountains and Villages Must Be Firmly Followed," *Hung-se ch'ing-nien* (*Red Youth*), Canton, No. 12, Dec. 21, 1967; translated in *SCMP*, No. 4125, Feb. 26, 1968, pp. 14-15.

⁵⁰⁶ Federation of Women, Meng Hsien, Shansi, "*Chung-kuo-fu-nü* Will Become a Red Periodical We Hope," *CKFN*, No. 7, July 10, 1966; translated in *SCMM*, No. 542, Sept. 19, 1966, pp. 5-7; *Chung-kuo-fu-nü's* Whole Body of Revolutionary Workers, "Expose the Crimes of Black Gang Element Tung Pien," *CKFN*, No. 7, July 10, 1966; translated in *SCMM*, No. 543, Sept. 26, 1966, pp. 4-10; and "The Big Plot of False Discussion and Real Release of Poison," *CKFN*, No. 8, Aug. 10, 1966; translated in *SCMM*, No. 8, Oct. 31, 1966, pp. 22-26.

⁵⁰⁷ Liu Li-wen, "The Poisonous Influences of *Chung-kuo-fu-nü*, Must be Liquidated," *CKFN*, No. 7, July 10, 1966; translated in *SCMM*, No. 543, Sept. 26, 1966, p. 11.

stuff of revisionism spread by them with regard to the women's movement, marriage, family planning, and children's education."⁵⁰⁸ Apparently this view became so widely held that a Maoist leader reportedly told a group in Peking in October 1967 that, contrary to what some people were saying, birth control was a Maoist, not a Liuist, idea and that the effort to link it with Liu was a Liuist plot to deceive the people. Be that as it may, the clarification seems to have been somewhat belated, perhaps because birth control and late marriage were not popular with the youth groups whose support the Maoists needed or perhaps because the Maoist leaders themselves were uncertain whether to reject or endorse family limitation.

By the beginning of 1968, the Maoists also began to make clear their attitudes toward early marriage. Several letters from rural areas to a Shanghai paper in January revealed that early marriages and sumptuous weddings were once again becoming popular among youths and that young people of 18 or 19 were "in a hurry to get married," hence it was necessary to "strengthen education in Mao Tse-tung's thought, oppose early marriages, advocate late marriages, . . . and resolutely ban sumptuous wedding ceremonies."⁵⁰⁹ On January 15, the Shanghai Municipal Revolutionary Committee issued a "Notice on Strengthening Planned Birth and Advocating Late Marriage" which all revolutionary mass organizations in Shanghai were ordered to implement "in accordance with Chairman Mao's instruction on the question of population."⁵¹⁰ In July, it was said that some young people were "divorcing themselves from politics" by indulging in love affairs and family life and that this trend was found in "factories, rural areas, and schools." It was necessary to "take resolute actions against this unhealthy practice."⁵¹¹ Most news items on this subject saw the youthful deviations as part of a sinister plot. In April a Shanghai editor charged that a "handful of class enemies" were dispensing the "rubbish" that the promotion of late marriage and birth control was part of the "bourgeois reactionary line."⁵¹²

The distinction between Maoist and Liuist attitudes on such matters seemed difficult to establish. Even in the Maoist center of Shanghai, a "wave of getting married now" was sweeping the ranks of young factory workers. When Maoist cadres tried to talk to the young people about postponing marriage, they were told to "Mind your own business" Not only youth but the cadres as well were caught in the trend. The press noted that "some people among us, including those cadres who have not yet been 'emancipated,' appear quite keen on finding mates for young revolutionary rebels so as to create good will and divert the attention of these young revolutionary fighters." Others, acting from "ulterior motives," used matchmaking to "conclude political deals," and even "some leading cadres" avoided interfering with what they called "personal matters of no consequence," such as marriage and childbearing, because they regarded the indoctrination of youth as a "tough job" and were

⁵⁰⁸ "Tsingtao Women Denounce China's Khrushchev," *Tsingtao Radio*, Sept. 13, 1967.

⁵⁰⁹ Shanghai Radio, Jan. 13, 1968.

⁵¹⁰ "Go Quickly Into Action To Carry Out the Patriotic Public Health Movement With Elimination of the Four Pests as Key," *Wen-hui pao*, Shanghai, Apr. 22, 1968; translated in *SCMP*, No. 4179, May 16, 1968, pp. 8-9.

⁵¹¹ Shanghai Radio, July 27, 1968.

⁵¹² "Paper Boats and Bright Candles Light the Way to the Skies" (editorial), *Wen-hui pao*, Shanghai Apr. 22, 1968; translated in *SCMP*, No. 4179, May 16, 1968, p. 11; and Chu Ying-hsing, "Revolutionary Youths Should Take the Lead in Changing Prevailing Bad Practices and Customs," *Wen-hui pao*, Shanghai, Apr. 23, 1968; translated in *SCMP*, No. 4181, May 20, 1968, p. 15.

afraid they might "say the wrong things" and be subject to "denunciation."⁵¹³ In July it was said that an "evil wind of falling in love and getting married early" had become a "fad" among young workers in literary and art circles in Shanghai, who had been hit by the "sugar-coated bullets" shot by the "handful of class enemies," had lost their revolutionary fervor, and were interested only in romance. They would report for work in the morning but slip away in pairs during the afternoon to stroll the streets. These tendencies were identified with the "anarchist trend of thought" widely evident among revolutionary youth groups.⁵¹⁴

The Alienation of Mao and the Young Revolutionaries

Anarchism among the young rebels had been a recurrent problem from the beginning of "Red Guard" activities. The revolutionary youth groups had been assembled in haste without internal organization or an external command system. They could easily be roused to violent action by the public media and in mass gatherings, but they were almost impossible to redirect when they got off target. Threats to deprive them of their free food, lodging, and travel, and of the trucks, public address equipment, and other materials they had commandeered from government offices seemed to have only limited effect. The Maoists had urged them to act as autonomous units free of Party control only to find that they rejected Maoist control as well. Urged to destroy the traces of the "old society" and "old culture," they rampaged through the city streets tearing down street signs, defacing historic monuments, and harassing foreign diplomats. They set upon people with Western dress and hair styles found on the street and broke into houses looking for traces of Western influence. They seized and "dragged out" school teachers, government officials, and "Liuist" Party cadres, subjecting their victims to such humiliation and physical abuse that some committed suicide, died of injuries and exhaustion, or were broken in body and spirit. Their mood was expressed in such battle cries as "We will crush your dogs' heads" and "Rats are running across the street with everyone shouting 'Kill them! Kill them!'"

The Maoists were embarrassed by some of these excesses, but at first they took an indulgent view. In December 1966 and January 1967, they criticized faint-hearted associates who intimidated that the young mobsters were going too far. "The youths are the huge army of the cultural revolution," said an approved wall poster in Peking, "and they must be allowed to act as freely as they wish."⁵¹⁵ Still, the Maoist revolutionary committee advised youths not to attack people indiscriminately and suggested they give up their violent language, particularly the constant references to "dogs' heads." As the spring of 1967 wore on, even the Maoist leadership began to be more deeply troubled by the disorderly conduct of the youth groups. In their rivalry for power, the radical youth leaders were splitting the local "Red Guard" and "Revolutionary Rebel" detachments into

⁵¹³ "Revolutionary Youths Should Care for the Affairs of State and Oppose Early Marriage; Revolutionary Cadres Should Boldly Guide Youths to Attain Healthy Growth," *Wen-hui pao*, Shanghai, Apr. 23, 1968; translated in *SCMP*, No. 4181, May 20, 1968, pp. 17-18; and Chu Ying-hsing, *loc. cit.*

⁵¹⁴ "Stem the Evil Wind of Falling in Love and Getting Married Early Among Literary and Art Circles," *Wen-hui pao*, Shanghai, July 28, 1968; translated in *SCMP*, No. 4250, Sept. 4, 1968, pp. 17-18.

⁵¹⁵ *Mainichi*, Tokyo, Dec. 19, 1966. The poster added that "All restrictions against youth movements must be smashed to bits."

factions which ignored their anti-Maoist enemies and fell upon each other with redoubled ferocity.

In some localities, they seized weapons from the military and besieged each other's headquarters with fire and bullets, crying "Let there be civil war!" Pseudo-revolutionary groups said to have been instigated by Liuist forces donned red armbands, waved the little red books of Mao's quotations, and chanted Maoist slogans as they attacked Maoist units, adding to the general confusion. Army units were asked by the Maoists to help the true "Red Guards" put down the false, but the local commanders complained they could not tell which was which. As one official put it, "You rebel; he rebels too; you unite, he unites too; you seize power, he seizes power too! Nobody has a clue as to which is genuine and which is phony!"⁵¹⁶ The factionalizing of Maoist youth groups and the consternation with which Maoist leaders viewed it is indicated in one unusually candid description:

They gather some forces and simply dash out to create new organizations; or else they smash each other and fight, causing an absolutely appalling situation. The enemy stands aside and laughs, saying, "Let them fight; let them have their civil war; let them kill each other off! The more chaos the better!"⁵¹⁷

The Maoist press began to emphasize the need to curb anarchism during the spring of 1967. An effort was made during the balance of the year and in 1968 to involve the rebel groups along with the military and the rehabilitated Party cadres in three-way alliances in order to check the "evil wind of armed struggle," but the rebels were reluctant to share their new-found power. Increasingly the Maoists were obliged to rely on the army to stop the public beatings, bloodshed, burning, looting, and sabotage, and to force the youth mobs to disband and return to the rural areas. Anti-Maoist forces took advantage of Maoist discomfiture to stage a comeback, which the Maoists labeled a "rightist reversal of verdicts," only to have the youth groups grasp this slogan as a battle cry in resisting Maoist efforts to suppress their independence. On July 28, 1968, according to a widely circulated story, Mao summoned selected youth leaders to Peking and berated them for betraying his revolution by their refusal to unite and put an end to factionalism.⁵¹⁸ Thereafter, the effort to force the youth groups to break up and go back to the countryside was greatly intensified. It was given Mao's imprimatur in a special order to China's young people in December.⁵¹⁹

Throughout 1969, a press propaganda campaign insisted that the willingness of young people to go to the countryside and receive "education" from the "poor and lower middle peasants" was a critical test of their loyalty to Chairman Mao. However, the radical youth leaders refused to leave the cities. They charged Maoist authorities with "turning the spearhead against the masses" and practicing "suppression of the masses." Repeating the 1966 instructions given them by Mao that "to rebel is justified," that obedience to the Party was evidence of a "slave mentality," and that "lawlessness" is the means by which revolutionaries take destiny in their own hands, they fought Mao with his own slogans. When the Maoists

⁵¹⁶ Nanchang Radio, Kiangsi, Feb. 11, 1967.

⁵¹⁷ *Ibid.*

⁵¹⁸ One version of the story is given in John Gittings, "Stiffing the Students," *Far Eastern Economic Review*, Hong Kong, No. 35, Aug. 23, 1968, pp. 377-379.

⁵¹⁹ Peking Radio, NCNA Dispatch, Dec. 23, 1968.

tried to reassert the "dictatorship of the proletariat," meaning absolute central authority, the youth leaders echoed an early commandment of the "cultural revolution" to "smash all rules and regulations." With increasing impatience, the Maoist leaders denounced the young rebels for anarchism, factionalism, liberalism, "splittism," "mountain-top-ism," individualism, "show-off-ism," and "ultra-democracy." Finally, in May 1969, Lin Piao reportedly told the Political Bureau of the Party Central Committee that political power must be used to "subjugate the rebels."⁵²⁰ With the help of the military, masses of students were again moved out of the cities. In 1970, as the effort at Party rebuilding got under way, the Maoists made it clear that activism in the "cultural revolution" did not automatically qualify a person for leadership or membership in the new Party. The alienation between Mao and the youth groups was complete.

VI. THE THIRD BIRTH CONTROL CAMPAIGN: 1969 TO THE PRESENT

The rationale for the third birth control campaign, as it developed during the waning phases of the "cultural revolution," incorporated few of the arguments used in the earlier campaigns. In July 1970, an article in a pamphlet printed in Shanghai revived the contention that in a socialist country where everything is planned, population growth must also be planned,⁵²¹ but most of the current arguments have been based on quotations from Mao's works used without regard to their original context and intent. The injunction "Be prepared against war, be prepared against natural disasters, and do everything for the people" has been interpreted as authorization for promoting birth control, though the connection would seem somewhat remote. The phrase "Show concern for the growth of the younger generation" is said to be Mao's authorization for discouraging early marriage. The exegetic freedom exercised in making such gratuitous interpretations, is necessitated by the fact that the works of Mao, like those of Marx, Engels, and Lenin, contain little that can be construed as an endorsement of family limitation.

The use of Maoist phrases to sanctify birth control clearly indicates that the campaign now has unequivocal support at the highest level. Birth control and late marriage are repeatedly said to be "of exceedingly great significance in changing habits and customs and transforming the world."⁵²² Birth control work is "a major event bearing on the national economy" and "one of the important tasks of socialist revolution and socialist construction." To promote birth control is to "carry out . . . Chairman Mao's instructions" and to "hold high" the "great red banner of Mao Tse-tung thought." Late marriage is identified with "war preparations," "Party consolidation," the class struggle, Mao's hopes for the young, and his opposition to revisionism. All opposition to birth control and late marriage is attributed to the pernicious influence of that "traitorous scab" Liu Shao-ch'i and his ubiquitous "agents." Liu has been denounced "with great indignation"

⁵²⁰ *Tokyo Shinbun*, Tokyo, Oct. 28, 1969.

⁵²¹ Liu-li Commune Revolutionary Committee, Ch'uan-sha Hsien, "Under the Guidance of Mao Tse-tung Thought, Do A Good Job to Promote Late Marriage of Young People," in "Planning Childbirth and Promoting Late Marriage," *I-tiao wei-sheng tzu-tiao (Medical and Health Data)*, Shanghai, No. 5, July 1970.

⁵²² "Practice of Planned Births and Late Marriage is Formed at State Cotton Mill" *Kung-jen tao-fan pao (Workers Rebel Paper)*, Shanghai, Feb. 1, 1970; and Shanghai Municipal No. 1 Health Clinic for Women and Infants, "Planned Birth," in "Planning Childbirth and Promoting Late Marriage," *I-tiao wei-sheng tzu-tiao (Medical and Health Data)*, Shanghai, No. 5, July 1970.

for his "towering crime of sabotaging planned births" and for such "counter-revolutionary revisionist fallacies" as "no interference with problems of marriage and love," "no interference with early marriage either," "match-making offices should be set up," and "rearing sons for old age."⁵²³

Another feature of the rationale for the third birth control campaign is the reassertion of the connection between lower fertility and population pressures on the food supply. None of the references available thus far are as explicit as the most candid discussions of this relationship during the first birth control campaign, but the intent is obvious. One article in July 1970 related planned childbirth and late marriage to the effort of a particular production team to become self-sufficient in food grain and observed that the population of the team has not increased in the past 3 years.⁵²⁴ A radio broadcast from Peking in November 1970 also linked grain production to the solution of over-population problems in a brigade in Chekiang Province.⁵²⁵ In November 1971, Vice Premier Li Hsien-nien, in an interview with a Cairo newsman with whom he was discussing China's economic development, remarked that, "We have been racing against time to cope with the enormous increase in population," and a little later added:

What can be said in this connection is that, despite the enormous population, we have been able to find a basic solution for the problem of clothing needed by all Chinese, although, in our judgment, it may not be a good solution. We have also done the same thing regarding food. Thus, we have guaranteed that no citizen will die for lack of food or clothing.⁵²⁶

Except for the absence of pessimism, the essential spirit of these expressions is reminiscent of the Malthusianism that marked official attitudes and Mao's own position during the "hundred flowers" period. If this is a true reflection of the mood of the current leadership, its significance goes far beyond the prospects for family limitation efforts, for it implies a return to pragmatism in domestic administration and candor in public statements.

Organization, Propaganda, and Popular Resistance

Little has been said in the press about the organization of birth control efforts during the third campaign. This is hardly surprising in view of the fact that local political and administrative organization has been in flux throughout this period. The "cultural revolution" incapacitated government organs and shattered local Party committees without being able to provide an effective alternative. It was only with the help of the military that order was restored in urban centers. Interim arrangements such as the political "work teams" sent out to join in the local struggles by the Party regulars, the "Mao Tse-tung thought propaganda teams" organized to consolidate Maoist control, the three-way alliances, and the revolutionary committees that succeeded one another through the general turmoil often involved complete changes of personnel, and the Party rebuilding and rectification efforts of the post-"cultural revolution" period seem to have been protracted and uncertain of outcome. Although most economic organs

⁵²³ Shanghai Municipal No. 1 Health Clinic for Women and Infants *loc. cit.*; Liu-li Commune Revolutionary Committee, *loc. cit.*; and "Practice of Planned Birth and Late Marriage Is Formed at State Cotton Mill" *loc. cit.*

⁵²⁴ Liu-Li Commune Revolutionary Committee, *loc. cit.*

⁵²⁵ Peking Radio, NCNA dispatch, Nov. 29, 1970.

⁵²⁶ Mamduh Rida, "Days in China—An Interview With the No. 3 Man in China," *Al Jumhuriyah*, Cairo, Nov. 18, 1971, p. 9.

resumed normal operations in 1970-71, the power struggles initiated by the "cultural revolution" continued at the highest leadership levels. In the spring of 1971, Mao's wife, Chang Ch'ing, and his personal secretary, Ch'en Po-ta, seem to have lost power, and in September Mao's second heir apparent, Lin Piao, was purged and may have lost his life. Since then, the central political leadership has apparently been stable, and the bold new detente between the PRC and the United States suggests that the present leaders have enough security and confidence to change some formerly inflexible positions relating to international affairs. However, it cannot be assumed that the consolidation of the new authority at local levels has been completed throughout the country. Under these circumstances, there may be no alternative but to assign the promotion of birth control and late marriage to existing agencies to be integrated with existing programs.

As before, the health agencies seem to be the principal carriers of the message on birth control, which has been combined in some areas with schistosomiasis control and in others with the "patriotic health movement."⁵²⁷ Shanghai designated the last week of January 1970 as a "shock week" for mass propaganda on hygiene, health conditions, elimination of flies and mosquitoes, and propaganda for birth control and late marriage. Retired workers, "Red Guards," "little red soldiers," medical workers, and the "revolutionary masses" in residential areas were organized to conduct the propaganda work.⁵²⁸ In Canton and Shanghai, the municipal revolutionary committees seemed to have general charge of the work in 1969 and 1970, and in Shanghai they combined it with "consolidation" drives in the Party, the militia, and the Communist Youth League. Cadres, Party members, and medical personnel were to set an example for the rest of the population.⁵²⁹

In a rural area near Peking in 1971, the *hsien* revolutionary committee mobilized sanitation workers and "barefoot doctors"—youthful paramedics with a few months' basic training—to conduct birth control propaganda on a house-to-house and team-to-team basis in conjunction with prevention and treatment of women's illnesses.⁵³⁰ In a rural area in Hunan Province, a revolutionary committee set up a Mao Tse-tung thought study class to heighten vigilance against expensive weddings. In another rural area in Hopeh Province, the assistance of the Communist Youth League and "Red Guards" was to be sought in promoting late marriage.⁵³¹ The press attention given to these efforts was evidently intended to encourage other local jurisdictions to follow suit, but there seemed to be little uniformity of method in the country as a whole.

The fragmentary evidence available contains much less information than in either of the previous campaigns on the kinds of resistance encountered. This may be an indication that the current efforts,

⁵²⁷ Hunan Provincial Radio, Changsha, June 12, 1968; Shanghai Radio, Nov. 27, 1969; Shanghai Radio, Dec. 6, 1969; and Shanghai Radio, Dec. 29, 1969.

⁵²⁸ Shanghai Radio, Feb. 24, 1970.

⁵²⁹ Yuan Te-liang, "Grasp Revolution, Promote Production, and Whip Up a New Upsurge of Production," *Kuang-chou kuang-tai-hui (Canton Workers' Congress)*, No. 31, Oct. 10, 1969; translated in *SCMP*, No. 4342, Jan. 21, 1969, p. 10; and Shanghai Municipal No. 1 Health Clinic, *loc. cit.*

⁵³⁰ "Wei t'i-kao fu-nü chieh-k'ang shui-p'ing erh tou-cheng" ("Struggle To Raise the Health Level of Women"), *JMJP*, Mar. 3, 1971.

⁵³¹ "Vigorously Destroy Old Customs and Habits and Practice Frugality in Weddings," *JMJP*, Aug. 31, 1969; translated in *SCMP*, No. 4495, Sept. 15, 1969, pp. 3-4; and "Firmly Destroying Old Habits, Insisting on Late Marriage," *JMJP*, Aug. 31, 1969; translated in *SCMP*, No. 4495, Sept. 15, 1969, p. 5.

being largely directed toward thought remolding and indoctrination, have not aroused open opposition as did the more direct efforts in former campaigns. On the other hand, the evidence suggests that the cultural barriers to family limitation conspicuous in the first two campaigns are still major obstacles. The implementation of birth control and late marriage is said to accentuate "the struggle between the two lines and the struggle between public and private interests." For example, when oral contraceptives were publicized in a Shanghai cotton mill, the effort "suffered a definite setback" because some people "with ulterior motives" spread the rumor that the pills would "cause sterility, weaken the power of memory, and produce an appearance of 'jaundiced' obesity." The persistence of fear and distrust of government-sponsored contraceptives after years of birth control propaganda shows how little faith the people have in official reassurances. The same source also indicated that people still regard contraception as troublesome and that they continue to want children of both sexes and harbor other "incorrect thoughts."⁵³²

Another source indicates that health cadres are still reluctant to undertake birth control work.⁵³³ A foreign visitor in Canton in the fall of 1971 was told that the old problem of peasants desiring children of both sexes explained the persistently high birth rates.⁵³⁴ More significant, perhaps, are the recurrent complaints about the connivance of "evil minds" and the subversive activities of "Liu's agents" in connection with birth control and late marriage. In the rural area in Hunan, when the "class struggle" slackened, the "handful of class enemies" immediately fanned the evil wind of expensive weddings again.⁵³⁵ In Canton, Confucian ideas about filial piety were reportedly promoted by another "small batch of class enemies," and as a result, "many youths" had been "poisoned" by their "residual toxins" and could not handle their marriage problems correctly.⁵³⁶ When Edgar Snow talked with Mao on December 18, 1970, Snow remarked that there had been a "great change here in China" in respect to popular attitudes toward birth control compared with 5 or 10 years earlier, but Mao replied that Snow had been "taken in" by Chinese propaganda. Mao said that because of their preference for male children, many peasant couples go on having children until the woman is 45. This attitude must be changed, Mao added, but it is taking time.⁵³⁷ Obviously, the force of tradition in China is still strong. .

Contraception, Abortion, Sterilization, and Late Marriage

The methods of contraception used in China since the start of the third campaign include a variety of oral contraceptives. In 1970, two birth control pills based on synthetic progesterone and oestrogen became available for general use in at least some areas. They were said to have an effectiveness approaching 99.956 percent, though there are no details on the investigations that produced this extremely high and remarkably precise figure. The pills were to be taken for 22 days

⁵³² "Practice of Planned Birth and Late Marriage Is Formed at State Cotton Mill," *loc. cit.*

⁵³³ "Wei t'i-kao fu-nü chien-k'ang shui-p'ing erh tou-cheng," *loc. cit.*

⁵³⁴ Ross Terrill, "The 800,000,000," *The Atlantic Monthly*, November 1971, p. 110.

⁵³⁵ "Vigorously Destroy Old Customs and Habits and Practice Frugality in Weddings," *loc. cit.*

⁵³⁶ Tung Yin-ti, "For Revolution's Sake Insist on Late Marriage," *Nan-fang jih-pao*, Canton, Feb. 6, 1970; and Liang Yu-ken, "Business Type Marriages Should Cease," *Nan-fang jih-pao*, Canton, Feb. 6, 1970.

⁵³⁷ Edgar Snow, "A Conversation with Mao Tse-tung," *Life*, vol. 70, No. 16, Apr. 30, 1971, p. 47.

beginning with the 5th day of the menstrual cycle. Menstruation would normally follow within 1 to 3 days after the end of the 22-day period. A few women reportedly experienced side effects from the pills, which were said to disappear gradually as the body adjusted to the hormonal changes.⁵³⁸ On his visit to China in the winter of 1970-71, Edgar Snow was told by a Peking doctor, Lin Ch'iao-chih, that the 22-day pills were free of side-effects and 100 percent effective when taken according to instructions, but that irregularity in pill-taking was "far too prevalent."⁵³⁹

Snow was also told that a once-a-month pill was under test in Peking on a sample of 5,000 persons, which was said to be "completely effective" except for about 2 percent of the population, whose "systems reject it."⁵⁴⁰ Other experiments were being conducted on a once-in-3-months pill, according to Lin, and she added, "We now believe we can develop a pill or vaccine effective for about a year."⁵⁴⁰ The Shanghai Health Clinic reported that a once-a-month contraceptive injection using long-lasting progesterone and oestrogen was recommended for use in 1970. It was said to be 98.59 percent effective, but in a few cases it produced side effects similar to those of the progesterone pills, and some women experienced shortening of the menstrual cycle, for which special medical treatment was required.⁵⁴¹ At the time of Snow's visit, Chinese medical research personnel were showing considerable interest in Japanese development of a vaginal pill utilizing prostaglandin.⁵⁴² The evidence of a serious pursuit of the latest in fertility control technology is unmistakable.

Intrauterine devices of metal and plastic are still available in China, though they are said to be only about 80 percent effective and are apparently no longer regarded as the most desirable type of contraceptive. The metal devices can remain in place for 4 to 6 years and the plastic ones for 2 years, according to Chinese medical judgment, but they are not suitable for women with ulcerated cervix, inflammation of the uterine cavity, or vaginitis. Their major advantage is convenience; users are not required to plan carefully or observe prescribed procedures. Conventional contraceptives, such as condoms, diaphragms, and spermicides are also still available, but it is apparently expected that these devices will be displaced gradually by newer devices that are less inconvenient.⁵⁴³

The official position on abortion is still that this method should not be relied on instead of contraception. It may be performed "when contraceptive measures have failed" or when a woman is "unfit to give birth" because of too frequent births, too many children, economic problems, or problems of work or career. However, the woman is warned that the operation, though simple, can adversely affect health.⁵⁴⁴ Actually, there appears to be a considerable effort to increase the availability of the suction abortifacient machines throughout the country. According to Snow, who witnessed several such abortions during his last visit to China, abortion is now performed without

⁵³⁸ Shanghai Municipal No. 1 Health Clinic for Women and Infants, *loc. cit.*

⁵³⁹ Edgar Snow, "Population Care and Control," *The New Republic*, May 1, 1971, pp. 21-22.

⁵⁴⁰ *Ibid.*, p. 22.

⁵⁴¹ Shanghai Municipal No. 1 Health Clinic for Women and Infants, *loc. cit.*

⁵⁴² Edgar Snow, "Population Care and Control," *loc. cit.*

⁵⁴³ Shanghai Municipal No. 1 Health Clinic for Women and Infants, *loc. cit.*

⁵⁴⁴ *Ibid.*

charge on demand of the mother alone.⁵⁴⁵ There is no indication as to how widely available abortion is or the extent to which it is actually utilized.

Sterilization is available for both men and women, apparently without restriction. "Barefoot doctor" teams in some areas were reportedly bringing the operation to the people by means of "mobile operation rooms," which consisted essentially of carrying basic surgical equipment into the rural areas and setting up wherever patients willing to undergo the operation could be found.⁵⁴⁶ The Shanghai Health Clinic instructions required that applicants for sterilization be subjected to the "three-straightening-out" treatment—straightening out the thinking of the applicant, of his family, and of the "old folk"—so as to "remove all apprehensions."⁵⁴⁷ Evidently these precautions were necessitated by adverse public reactions to sterilization.

None of the available sources provides further information on the specific objectives of the late marriage drive during the current campaign. There has been no discussion of ages for marriage or possible changes in the marriage law. The essential approach seems again to have been to persuade young people to put education, career, and service to the revolution ahead of their own personal affairs. Mao's example in marrying late (he was almost 27 at the time of his first marriage) has been held up for emulation.⁵⁴⁸

Results of the Campaign

The effects thus far of the third birth control campaign are even harder to judge than those of the two preceding campaigns. The few available sources contain no quantitative measures of success or failure. A number of recent visitors to China have come back with reports that the current campaign has been a startling success and that birth rates are dropping sharply. Whatever the impressions given the visitors by their guides and by the local officials with whom they talk, the central authorities make no great claims for the success of the birth control program. Statements by returned visitors that local birth rates have dropped below 10 per 1,000 population, that the national urban rate is as low as 6 per 1,000 and the national rural rate is in the range of 18 to 20 per 1,000, make little sense except as the products of grossly defective birth registration systems. If fertility levels had actually fallen as low as these figures imply, the fact would be so obvious that, even without statistical confirmation, it would be celebrated openly as a victory for the thought of Mao. Instead, the prevailing official attitude is summed up in a sentence in the July 1970 article by the revolutionary committee of the commune near Shanghai: "We have done something, but what we have achieved is still far from what Chairman Mao expects from us."⁵⁴⁹ The same attitude was expressed in regard to the state of the economy in general by Li Hsien-nien in his interview with the Cairo newsman in November 1971, when he said:

⁵⁴⁵ Edgar Snow, "Population Care and Control," p. 21. In both operations, acupuncture was used for anaesthesia.

⁵⁴⁶ "Wei t'i-kao fu-nü chien-k'ang shui-p'ing erh tou-cheng," *loc cit.*

⁵⁴⁷ Shanghai Municipal No. 1 Health Clinic for Women and Infants, *loc cit.*

⁵⁴⁸ Liu-li Commune Revolutionary Committee, *loc cit.*

⁵⁴⁹ Liu-li Commune Revolutionary Committee, *loc cit.*

Actually, we have achieved some progress but we do not regard it as very great progress. When we hear from our friends that it is great progress, we look at such talk as something bigger than reality, or as courteous talk.⁴⁵⁰

In assessing the net effects thus far of the third birth control campaign, the significance of traditional values emphasizing early marriage and childbearing that have withstood so many years of supposedly intense indoctrination is not to be underestimated. The young people who have been the prime target of propaganda for Maoist asceticism and for late marriage and birth control give every evidence of holding persistently to their own priorities on love and marriage which they will not abandon except under strong pressure. While the Party and local government organs are being reconstructed, cadres at all levels have other duties more urgent and less unpopular than birth control and late marriage to which to give their attention. Meanwhile, all indications suggest that only a minority of urban dwellers and a still smaller percentage of rural residents are ready to use contraception effectively at present. Abortions and sterilizations may number in the tens of thousands annually, but such numbers scarcely constitute a perceptible reduction in the annual cohort of over 30 million births. In judging the potential impact of birth control campaigns in China, the implications of past experience suggest that it is better to be cautious than credulous.

VII. IMPLICATIONS OF PAST POLICIES FOR FUTURE TRENDS IN FERTILITY AND POPULATION GROWTH

In the 22-year history of the PRC, official population policy has changed sharply several times. The attitudes of individual Party leaders, including Mao himself, have not been constant. Yet the changes in population policy have been neither cyclical nor random. They have been associated with political, economic, and social developments that are not reversible because they represent options tried and exhausted, thus narrowing the range of alternatives open to future leaders. Hence it would not be reasonable to assume that population policy will continue to vary merely because it always has. Rather, the factors that have determined population policy or contributed to its success or failure should be identified and the prospects for each assessed as a basis for establishing the limits of possibility for the future.

Political Factors

Among political factors, the most conspicuous is ideology. It has certainly had an influence on population policy, but by no means as great as might have been expected if the Chinese leaders were absolutists in matters of dogma. Mao's initial position on population given in the NCNA release of September 16, 1949, undoubtedly derived much of its optimism from the Marxist conviction that labor is the source of all wealth and the inference that a country with abundant manpower was assured of early prosperity upon conversion to socialism. Even if they were not wholly convinced of this thesis, it was important that Party leaders appear confident during the period of consolidation because of the skepticism in China and abroad about the country's prospects for economic development. However, they would

⁴⁵⁰ Mamduh Rida, *op. cit.*

not have assumed such a firmly negative position on population policy if they had thought it possible that they might have to abandon it within a few years. It was probably ideology that committed them prematurely to doctrinaire anti-Malthusianism.

Despite ideology, Mao and his associates were not deterred from changing to a thoroughly Malthusian position by the end of the First Five-Year Plan period, but they were obviously not comfortable with it. When the "leap" figures on food grain production promised deliverance from the specter of famine, they quickly returned to the Maoist optimism of the early years. When the promise of the "leap" was broken by the food crisis of 1960-61, the optimistic attitude toward population problems was abandoned for the second time. A guarded Malthusianism intervened until the resurgence of Maoist revolutionary fervor in the early days of the "cultural revolution." Since the end of the "cultural revolution," a collection of abstract and highly adaptable Maoist exhortations serves as official ideology in place of the more disciplined traditional Marxist theory. Birth control and late marriage are found retrospectively to have received Mao's endorsement in phrases written long before Mao was concerned with population problems. Thus, ideology is itself being manipulated to rationalize demographic necessity.

It was probably inevitable that the Party leaders would come to rely less and less on ideology for guidance as its precepts were tried and found wanting. The manifold problems of political and economic administration confronted them with many specific situations requiring a choice between orthodoxy and expediency in which the price or orthodoxy was found to be prohibitive. Opting for expediency made it necessary to adopt more flexible interpretations of ideological mandates. With increasing flexibility, there were increasing divergences among the leaders as to the interpretations appropriate in particular circumstances, which further weakened the authority of ideology. By now this process is so far advanced that ideology is not likely to have much influence on population policy in the immediate future.

A more significant political factor is the degree of control the central authorities have over the entire political and administrative structure down to the local level. The responsiveness of local functionaries to central command determines how far the leaders can go in imposing by force policies that meet with popular resistance and how successful such efforts will be in securing conformity. The strength of the system of authority depends in part on the unity and stability of the leadership and in part on the effectiveness of rewards and punishments and on general morale throughout the system. In earlier years, before the local functionaries had become disillusioned by being caught too many times on the horns of the dilemma of "commandism" versus "disobedience to Party orders," their enthusiasm may have been higher, but they lacked organization, discipline, and experience. In the latter part of the First Five-Year Plan period, sagging morale and the elaboration of obfuscatory bureaucratism had begun to be major problems, and the disillusionments of the "leap" and food crisis periods caused further deterioration of the system. In the period between the food crisis and the "cultural revolution," an unsteady trend toward decentralization

preserved local administration at the expense of central authority. Hence the administrative system presumably passed its peak of effectiveness some time in the first 3 years of the First Five-Year Plan period, before the first birth control campaign was officially launched.

During the "cultural revolution," the cruel humiliation of top Party leaders and the purges of their associates in lower echelons, without regard to decades of loyal service, must have impressed all but the most obtuse cadres with the uncertainty of careers in Party and government. The slowness of the current Party rebuilding probably owes something to the lesson of these events. Until the Party has been reconstituted and the morale of administrators at all levels has been restored, it may not be possible to mount a high-pressure campaign for birth control and late marriage.

The first prerequisite for an effective administrative system is a firm and stable leadership. It would be hazardous to predict at this moment what the future holds. Maoism seems to be on the wane, and Chou En-lai seems to be the effective leader of the country. While Chou remains, the country has a highly skilled administrator of national and international eminence in charge of its affairs. However, in view of the recent turmoil, no one outside China can be certain how long the present leadership will last or what sort of leadership will succeed it.

Economic Factors

The main impetus toward family limitation in the PRC has been the fear of food shortages and famine. In the earliest years of the new regime, the Chinese leaders discussed their economic problems openly in the press because they were confident that the "socialist transformation" of the economy would bring relief in due course. However, from the start, peasant resistance to socialization posed a major obstacle to "transformation." In 1954, official anxieties were further heightened by the results of the census and vital rates investigations, which showed that the population was larger and growing more rapidly than had been realized, and by the widespread crop damage and consequent local famines caused by abnormal rainfall in the spring of the year. Thereafter, the priority of birth control seemed to rise or fall in proportion to the degree of pessimism with which the Party leaders viewed the prospects for agriculture, which was in turn largely determined by their assessment of the seriousness of the difficulties facing cooperativization. Later, when the "leap" statistics convinced the Party leaders that the prospects for agriculture were unlimited, birth control again went into almost total eclipse. When the "leap" illusions succumbed to the food crisis, birth control reappeared after a prudent interval.

Since the early 1960's, there have been no serious food shortages in China, and birth control has never quite regained the urgency it had in 1957-58. The recent increase in its priority coincides with an apparent revival by the current leadership of the comparatively pragmatic approach to economic management that prevailed during the First Five-Year-Plan period. The statement by Li Hsien-nien to the Cairo newsman cited in the last section is certainly in that vein, particularly in its acknowledgment that the effort to offset population growth by economic growth is a "race against time." Given this

attitude, any return of serious economic difficulties in China would undoubtedly result in a much greater effort to promote family planning. Without the threat of economic difficulties, it is likely that efforts to reduce fertility will continue but with a secondary priority.

Economic factors also bear on the willingness of the population to make use of the birth control services supplied by the government and to adopt the practice of late marriage. In general, the traditional peasant economy has depended upon a division of labor within the family in which larger families were able to manage their manpower more effectively and be more prosperous than small families. Large families also had an advantage in economic security. Thus, high fertility was economically rewarding for the family and the individual. As the level of mortality declined, the pressure of growing families on the available land could create economic problems at the village level and above and even for individual families, but the larger and more prosperous families were better able than the smaller families to survive these difficulties.

The socialization of agriculture was expected to establish the supremacy of collective over family and individual interests by demonstrating the economic advantages of cooperativization. Once the peasants had "seen their bright future" in the cooperatives, it was assumed that they would be willing to sacrifice their traditional independence for the greater personal gains assured through cooperation. But the superiority of the cooperatives failed to materialize. In order to secure maximum productivity, it was necessary to devise systems of cooperative management which relied on the family as the basic production unit, and under these arrangements the large family was able to retain its economic superiority in spite of socialization. Some recent evidence suggests that this is still the case, and as long as it is, rural population will not be motivated to adopt family limitation voluntarily.

Early marriage meant an early start on a large family and was therefore a key element in the large family tradition. Economic conditions had a direct bearing on early marriage also, inasmuch as weddings traditionally involved major expenses for gifts and feasts. In hard times, marriages were often delayed, but when prosperity returned, the marriage brokers became busy again. One of the first consequences of "land reform" was that many poor peasants, receiving their own land, implements, and livestock for the first time in their lives, immediately spent part of their new wealth on getting married or marrying off their children as soon as possible. The relative improvement in economic conditions after the food crisis was also accompanied by an increase in the marriage rate. There is therefore reason to expect that, in the immediate future at least, any increase in affluence in rural China may be followed by a decline in the average age at marriage.

In urban areas, the division of labor within the family had less economic value, except for families engaged in home handicraft industries. However, the advantage of having a maximum number of wage earners in the family unit was probably as great for urban as for rural households if not greater, since the nonagricultural economy offered fewer opportunities for the economically productive employment of women and young children than did agriculture. The income of urban families depended mainly on the number of male members gainfully employed, and family living levels were determined by the

ratio of dependent members to wage earning members. In the early stages of the family cycle, a large number of children meant a high proportion of dependents, but such families fared well in grain distribution because children were allotted the same rations as adults, a fact which was recognized as an incentive to high fertility during the First Five-Year Plan period. As soon as the older male children were able to go to work, family economic circumstances would take a more favorable turn. If the family had practiced early marriage for generations past, a given generation would pass through the childbearing years while the previous generation was still actively in the labor force, hence there might be no point in the cycle of generations in which the household was dependent upon the earnings of a single member. Having more than one wage earner in the family provided greater economic security to the urban as well as the rural family. Thus early marriage and high fertility had advantages in both urban and rural areas.

The effort to induce more urban women to join the labor force as wage earners, though it has met with only limited response thus far, may have eased somewhat the pressure on urban families to produce sons for economic reasons and may in some cases have introduced an element of competition between the economic incentives for employment of wives and the economic incentives for childbearing. On the other hand, the provision of creches and nurseries in factories where women work, and the provisions for maternity leave with pay and for mothers to nurse their infants while at work may have given working women the option of working and having children at the same time, thus making the best of both the traditional and the emancipated women's worlds.

Economic factors may also influence fertility when the earnings of workers and peasants permit them to choose between spending to improve their levels of living or assuming the expenses of additional children. Before this option can be realized, economic growth must exceed the rate of population growth by a margin sufficient to allow a significant increase in the rate of economic accumulation, and the authorities must be willing to allocate a substantial part of the surplus to the workers and peasants in the form of wages and consumer goods rather than invest the greater part of it in capital expansion or military hardware. There have been numerous reports from China indicating that in urban areas, at least, some types of consumer goods, such as radios, ballpoint pens, and bicycles, have become more abundant in the last few years. Whether these are sufficient and distributed widely enough to have an appreciable effect on the urban worker's attitudes toward family planning is not clear.

In the 1960's, there were some efforts to eliminate differences between workers' and peasants' income by leveling urban wages downward, and during the "cultural revolution" Maoism strongly opposed the use of economic incentives in any form to stimulate productivity of workers and peasants. Whether the Maoist attitudes toward "economism" still persist is somewhat doubtful, but if they do, they will tend to inhibit any rise in wages. Unless China's workers and peasants have the option of purchasing much-wanted consumer goods as an alternative to childbearing, economic growth will not have much effect on motivation toward family limitation.

In the first two birth control campaigns, a part of the propaganda effort was directed at implanting the idea that excessive birth rates contributed to the burden that the State had to bear in providing for education, public health, transportation, welfare benefits, and employment, and that this burden ultimately affected the conditions of life for individuals and families. There were apparently some attempts to reinforce this idea during the second campaign by denial of maternity leave, food and cloth rations, and other welfare benefits to couples who continued to have children after the third or fourth child. How successful "negative" economic incentives may have been is not indicated in any of the available sources. Even if "negative" incentives are potentially effective, their impact would depend to a considerable extent upon whether or not the welfare benefits withdrawn represented a significant proportion of the family income, whether the rationing system was tightly managed, and whether the sanctions were uniformly applied throughout all enterprises over a large area. There are reasons to be doubtful on all these counts.

In the years since the failure of the "leap," the Party leaders, while maintaining a posture of confidence, have generally not been overly sanguine about China's economic progress or prospects. For the most part, they have talked of gradual improvement to be sustained with much toil and sacrifice over a long period. If the development of China's economy lives up to their most hopeful expectations, and if domestic economic policies emphasize increased production of consumer goods and higher wage levels, the basis for a voluntary transition toward lower fertility levels will be laid and there can be little doubt that family limitation will make more progress, particularly in urban areas. However, if economic progress is slight, or if there are further setbacks like those that have occurred several times in the past 22 years, positive economic incentives toward family limitation may be slight, and the degree of civil control necessary to realize the questionable potential of "negative" incentives may be lacking. The range of possibilities so far as economic factors are concerned seems to be from a moderate influence in the direction of lower birth rates to no influence at all.

Attitudes and Values

The greatest single deterrent to family limitation in China has been the powerful and persistent values supporting early marriage and abundant progeny. Aside from whatever economic justification these values may have, they are so deeply engrained in Chinese culture and so closely linked to traditional concepts of family roles and to ideas about self-fulfillment, filial piety, fortune, and fate that they would tend to survive for a time after the loss of economic and functional correlates. Evidence of the persistence of traditional values relating to marriage and family formation appeared in press discussions in all three birth control campaigns. In the first and second campaigns, when the discussion was more detailed, the power of "feudal" thinking on these subjects was frequently recognized as a major obstacle to the work of the propagandists. Though there are also many claims of success in overcoming tradition, and some indications that at least a part of the population even in rural areas may have been predisposed in spite of tradition to adopt birth control once the means were made available,

allowance must be made for the fact that press propaganda would, as a matter of strategy, attempt to create the impression that public receptivity was greater than it actually was. Some local reports of spectacular mass conversions to the official view are too stereotyped to be credible. Others, referring to worker heroes or model female cadres, obviously recognize that these are unusual cases and do not expect them to be widely emulated.

Outside of China, there has been much speculation during the past two decades as to the ultimate effect on Chinese national character of mass indoctrination from the earliest years of childhood. Foreign visitors, shown groups of young children in schools and nurseries chanting adulation of Mao and hatred for the United States, have forecast the emergence of a nation of zealous automatons instantly and totally compliant to the will of the central authorities. Other observers have surmised that the new generations of Chinese were being socialized in roles and values that represented a distinct break from the past and that in due course China would take on an altogether new image. The first test of the success of indoctrination in China came during the "hundred flowers" period, when the attacks on the Party became so sharp that the leaders found it necessary to adopt a policy of extreme repression. The disenchanting critics included worker groups and university students long cultivated by the Party. Free criticism of authority was not permitted again until the "cultural revolution," when university and secondary school students and graduates, many of worker or peasant background, all of whom had literally grown up under Party teaching and had been especially indoctrinated in Maoism during the "socialist education" movement of the middle 1960's, were called upon to demonstrate their loyalty to Mao by attacking anti-Maoist authorities. The youths were only too eager to undertake this assignment, especially those for whom it meant an escape from the hardship of rural life, but when they found themselves free of authoritarian constraints, they cast aside rules and regulations and displayed an ungovernable lust for power, self-indulgence, indiscipline, and violence. Although they rarely rebelled directly against Maoist authority, they used Maoist slogans to resist Mao's efforts to bring them under control, and continued their anarchism after he had denounced and repudiated them. This is not the behavior of a generation imbued with the principle of total obedience to authority as a way of life.

The ineffectiveness of indoctrination on young people's attitudes toward marriage and having children was apparent in the widespread disregard of the strictures against early marriage, including violations of the minimum ages under the marriage law, which continued during the second birth control campaign, and in the "wave of getting married now" that swept through Maoist youth circles in the waning phases of the "cultural revolution." It has also been apparent in the admissions during the third birth control campaign that the "poison" of traditional ideas still influences the attitudes of many young people toward marriage and family. The experience of the three birth control campaigns suggests that, even among young people, traditional values will not easily be changed by propaganda except in directions which they perceive as offering personal advantage.

Development of Methods and Organization

The most important single factor favoring the adoption of family planning in China is the fairly steady improvement of birth control technology. During the first and second birth control campaigns the lack of effective, safe, simple, and convenient contraceptives was a major obstacle to success among people who were willing to practice contraception voluntarily. There is no doubt that the present leadership is determined to develop new methods and make them available throughout the country as quickly as possible.

Apart from the bizarre adventures with traditional medicine prescriptions and homemade concoctions during the first campaign, it has been the policy in all three campaigns to copy conventional contraceptives from the West and from Japan and to make technically advanced methods and devices available on a mass basis as soon as the necessary supplies could be produced in sufficient quantity in Chinese factories. Initial Chinese efforts at contraceptive research left much to be desired from a scientific standpoint, but the level of sophistication seems to have improved considerably during the second and third birth control campaigns. Research on intrauterine devices began during the first birth control campaign and continued for a time even during the quiescent interval between the start of the "leap" and the start of the second campaign. By the time the second campaign began, the intrauterine ring was ready for general distribution. Research on steroids was initiated in China several years ago, and their fairly widespread availability is obviously the result of considerable planning and development. More recently, Chinese medical research has been aggressively seeking new contraceptives that may provide longer periods of protection against conception with less frequent medicine dosages or treatment.

The development and large-scale production of simple abortifacient machines that can easily be carried about and operated in remote rural areas is another indication of the priority on technologies for reducing fertility. Although official policy still opposes a casual attitude toward abortion, some people seem to prefer this method, and their wishes are being accommodated. Clearly, it is the intent of the authorities that lack of means shall not be a deterrent to the practice of family planning.

The effective promotion of birth control has been an unsolved problem throughout all three campaigns. Various forms of propaganda and organization have been tried without conspicuous success. Aggressive publicity drives and pressure tactics during the first campaign evoked much public resentment and in some cases resulted in serious reverses. The ineffectiveness of propaganda efforts was in part a result of poor organization, a problem that has not yet been solved. During the first campaign, central directives were usually issued by the Ministry of Public Health, the local organs of which also played a prominent role in the birth control guidance committees. There was no standard format for the establishment of the committees and no system for making sure that instructions from Peking were implemented promptly or conscientiously. The efforts of health organs, propaganda agencies, mass organizations, pharmaceutical plants, and pharmacies were never adequately coordinated. Aside from the repeated injunctions to local leadership cadres to involve themselves

directly in the campaign, there was little indication that the central authorities recognized the seriousness of local organizational problems.

During the second campaign, much less was heard of organizational problems, but the methods seem to have been essentially the same as in the first campaign. The unstable tempo of the campaign suggests uncertainty as to its priority at the top level. In the several years since the "cultural revolution," during which the restoration of the administrative system has proceeded slowly, it is unlikely that the organization of birth control work could have been much improved. The use of "barefoot doctors," itinerant army medical teams, reconstituted youth organs, and local "revolutionary committees" in crash programs that are frequently combined with other objectives, suggests a continuation of the loose organizational patterns that have been ineffective in the past. This is probably the best arrangement that can be devised under present circumstances, and it may be followed by more effective organization in the future. In the meantime, however, birth control efforts are not likely to be well managed.

Implications for Population Growth

When the factors just discussed are considered in relation to each other, there is no possibility that they could be combined in the form in which each contributes its maximum potential support for family limitation. Economic adversity might assure a higher priority for family planning, but it would also tend to weaken the administrative system and inhibit the development of new consumer alternatives to childbearing. Economic prosperity would accelerate the changes in economic and other values that would make for more voluntary acceptance of family limitation, but it would also remove some of the urgency from population policies. Therefore, the weakening of cultural imperatives sustaining traditional patterns of marriage and family formation is likely to be a gradual process. Nevertheless, it seems inevitable that China will follow the course of other developing countries toward lower fertility levels.

The analysis of past policies on birth control and their relationship to political, economic, and social factors in the PRC does not lead to firm quantitative assumptions about future trends in fertility, but it does suggest the degree to which the PRC may be able to duplicate the experience of other developing countries that have successfully reduced birth rates through government-sponsored family limitation programs. By drawing on analogous experience with appropriate modification, it is possible to reach tentative conclusions not only about the prospects for fertility but also for mortality and population growth.

Of all the world's developing countries, the one with the closest cultural resemblance to the PRC is the Republic of China on Taiwan. Despite political differences, the basic institutions, including traditional marriage and family patterns, are common to both Taiwan and the mainland. Both the government of the Republic of China and that of the PRC are committed at present to national programs of family limitation. However, economic and social conditions in Taiwan are much more favorable to the voluntary adoption of birth control. The economy of Taiwan is more highly developed, and its rate of economic growth has been more rapid and more sustained in recent

years than that in the PRC. In 1952, the gross national product of Taiwan was equivalent to about \$1.2 billion in 1970 U.S. dollars; by 1971 it had reached \$6.1 billion, an annual growth rate of about 8.9 percent for the period, with a marked acceleration in more recent years. The corresponding figures for the PRC, according to estimates given elsewhere in this volume in the paper by Dr. Arthur G. Ashbrook, Jr., are \$59 billion in 1952 and \$128 billion in 1971, an annual growth rate of 4.2 percent. Between 1952 and 1971, the per capita gross national product in Taiwan rose from \$150 in 1970 U.S. dollars to \$410, whereas that for the mainland rose from \$104 to \$150. During this period, both countries received foreign aid, which served to broaden the productive bases of the economies, but the amount of foreign aid received per inhabitant of Taiwan was many times larger than that received per inhabitant of the PRC.

Urbanization and literacy are the two other aspects of national development that correlate with readiness to accept family limitation. In Taiwan in 1969, 62 percent of the population lived in urban areas, and more than 35 percent in cities of over 100,000 inhabitants. The corresponding figures for the PRC are not available, but at the end of the First Five-Year Plan period in 1957, official data showed only 14 percent of the population as urban, and those in cities of over 100,000 inhabitants probably amounted to only 8 or 9 percent. Since that time, official policy has discouraged urban population growth, and there have been intensive efforts to relocate urban youth permanently in rural areas. These efforts probably have not checked urban growth altogether, but the urban population is probably still not much above 15 percent of the total and certainly no higher than 20 percent. In Taiwan, more than 40 percent of the labor force is engaged in nonagricultural employment. On the mainland, according to estimates made by John Philip Emerson of the Bureau of Economic Analysis, U.S. Department of Commerce, the proportion of the labor force in nonagricultural employment was 14 percent in 1957, rose to 19 percent in 1958 during the "leap," dropped back to 14 percent by 1964, and was around 15 percent in 1971. About 75 percent of the adult population of Taiwan is literate as compared with an estimated 25 percent for the PRC.

Demographic measures and estimates also indicate that Taiwan is much farther advanced along the course toward lower fertility and mortality levels than is the PRC. In 1952, the birth rate for Taiwan was 46.6 per 1,000 population; by 1970, it had fallen to a provisional figure of 28.1 per 1,000. The death rate for Taiwan was already down to 9.9 per 1,000 population in 1952 and had declined to 5.1 by 1970. Natural increase for Taiwan dropped from 36.7 per 1,000 population in 1952 to 23.0 in 1970. Official vital rates for the PRC for 1952 were based on inadequate local surveys and suffered from serious under-registration of births and deaths; there are no official figures available for 1970. According to estimates made by the writer, the birth rate on the mainland in 1952 was in the vicinity of 45.0 per 1,000 population and had declined to 37.3 by 1970, while the death rate declined irregularly in the same period from about 25.0 per 1,000 population to 15.0. According to these estimates, natural increase was around 20.0 per 1,000 in 1952, has risen and fallen several times since, and is now around 22.0.

Given the differences between Taiwan and the PRC in respect to some of the factors most directly related to fertility and mortality, the PRC cannot be expected to achieve in the next 20 years the rates of decline in fertility and mortality that have taken place in Taiwan since 1952. On the other hand, it is extremely unlikely that economic stagnation could cause a virtual stalemate in demographic trends for so long a period. The most likely possibilities range from a steady decline in fertility and mortality at rates more moderate than those for Taiwan, to either steady or intermittent decline at much slower rates. These possibilities would lie well inside the boundaries described by assuming a repetition of Taiwan's demographic experience and alternatively hypothesizing no change in fertility and mortality levels at all.

Four Model Populations: 1970-90

To test the implications of these ranges for future trends in fertility, mortality, and population growth in the PRC, four model populations have been constructed for the period 1970-1990. All four models use a 1970 base total and age-sex structure derived from a single series of estimates representing probable demographic changes in China from the census of 1953 through 1970. The 1953-1970 series takes as its base population the 1953 census total, distributed by age and sex according to population models reflecting assumptions about the demographic history of China back to 1750.⁵⁵¹ The series assumes a slight decline in fertility by 1958, a somewhat larger decline during the crisis years 1959-62, and a rise again during the recovery period and the "cultural revolution." Mortality is assumed to decline significantly during the First Five-Year Plan period, to rise sharply during the crisis years, to fall rapidly in the early recovery years and more slowly during the "cultural revolution" years and subsequently.

The four models begin to diverge in 1971. Model 1 assumes a decline in intrinsic fertility rates patterned on the trend of intrinsic fertility in Taiwan since 1952 and a decline in mortality patterned on the trend in expectation of life at birth in Taiwan since 1946, the year in which the officially reported levels for Taiwan approximate the level estimated for 1970 in the series for the PRC. Model 2 is also based on fertility and mortality trends for Taiwan, but the rate of decline in both parameters is only two-thirds as rapid as for Taiwan. Model 3 assumes that fertility and mortality decline at one-third the rates for Taiwan. Model 4 assumes constant intrinsic fertility and mortality levels from 1970 through 1990. The table gives midyear populations and birth, death, and natural increase rates for the base series for selected years from 1953 to 1970 and for the four models for each year from 1970 to 1990.

⁵⁵¹ See John S. Aird, "Population Growth," Chapter 4 in Alexander Eckstein, Walter Galenson, and Ta-chung Liu, eds., *Economic Trends in Communist China*, Aldine Publishing Company, Chicago, 1968 pp. 244-276.

ESTIMATES AND PROJECTIONS OF THE POPULATION AND VITAL RATES OF THE PEOPLE'S REPUBLIC OF CHINA
1953-90

[Population figures in thousands as of July 1; vital rates per 1,000 population]

Year	Population	Birth rate	Death rate	Natural increase rate
1953.....	582,603	45.0	22.5	22.5
1955.....	610,881	44.0	19.5	24.5
1960.....	688,811	39.9	20.1	19.8
1965.....	750,532	37.2	16.5	20.7
1970.....	836,036	37.3	15.0	22.3
PROJECTION MODEL 1				
1970.....	836,036	37.3	15.0	22.3
1971.....	855,170	37.4	14.4	23.0
1972.....	875,283	37.4	13.9	23.5
1973.....	896,321	37.3	13.3	24.0
1974.....	918,236	37.2	12.8	24.3
1975.....	940,983	36.9	12.3	24.6
1976.....	964,462	35.4	11.7	24.7
1977.....	988,566	35.9	11.2	24.7
1978.....	1,013,151	35.1	10.6	24.5
1979.....	1,038,063	34.2	10.1	24.1
1980.....	1,063,159	33.2	9.6	23.7
1981.....	1,088,317	32.2	9.1	23.1
1982.....	1,113,435	31.1	8.6	22.5
1983.....	1,138,406	30.0	8.2	21.8
1984.....	1,163,122	28.9	7.7	21.1
1985.....	1,187,490	27.7	7.4	20.4
1986.....	1,211,429	26.6	7.1	19.6
1987.....	1,234,842	25.5	6.8	18.7
1988.....	1,257,649	24.5	6.6	17.9
1989.....	1,279,806	23.5	6.4	17.1
1990.....	1,301,260	22.4	6.2	16.2
PROJECTION MODEL 2				
1970.....	836,036	37.3	15.0	22.3
1971.....	855,107	37.4	14.6	22.8
1972.....	875,034	37.5	14.3	23.3
1973.....	895,788	37.5	13.9	23.6
1974.....	917,348	37.5	13.6	23.9
1975.....	939,705	37.4	13.2	24.2
1976.....	962,815	37.2	12.8	24.4
1977.....	986,587	36.9	12.5	24.4
1978.....	1,010,921	36.4	12.1	24.3
1979.....	1,035,728	35.8	11.7	24.2
1980.....	1,060,905	35.2	11.3	23.9
1981.....	1,086,386	34.5	10.9	23.6
1982.....	1,112,097	33.7	10.5	23.2
1983.....	1,137,958	33.0	10.2	22.8
1984.....	1,163,940	32.2	9.9	22.4
1985.....	1,189,971	31.4	9.6	21.9
1986.....	1,215,983	30.7	9.3	21.4
1987.....	1,241,963	30.0	9.1	20.9
1988.....	1,267,881	29.3	8.9	20.4
1989.....	1,293,678	28.6	8.7	19.9
1990.....	1,319,342	28.0	8.6	19.4
PROJECTION MODEL 3				
1970.....	836,036	37.3	15.0	22.3
1971.....	855,031	37.5	14.8	22.6
1972.....	874,741	37.6	14.7	22.9
1973.....	895,178	37.8	14.5	23.2
1974.....	916,374	37.9	14.4	23.6
1975.....	938,323	38.0	14.2	23.8
1976.....	960,988	38.0	14.0	24.0
1977.....	984,353	37.9	13.8	24.1
1978.....	1,008,360	37.8	13.6	24.1
1979.....	1,032,942	37.5	13.4	24.1
1980.....	1,058,047	37.2	13.2	23.9
1981.....	1,083,533	36.8	13.0	23.8
1982.....	1,109,579	36.4	12.8	23.6
1983.....	1,135,985	36.0	12.6	23.4
1984.....	1,162,754	35.5	12.4	23.2

ESTIMATES AND PROJECTIONS OF THE POPULATION AND VITAL RATES OF THE PEOPLE'S REPUBLIC OF CHINA: 1953-90—Continued

Year	Population	Birth rate	Death rate	Natural increase rate
1985.....	1,189,830	35.1	12.2	23.0
1986.....	1,217,372	34.7	12.0	22.7
1987.....	1,245,188	34.3	11.8	22.5
1988.....	1,273,330	33.9	11.7	22.2
1989.....	1,301,818	33.6	11.6	22.0
1990.....	1,330,648	33.3	11.5	21.8
PROJECTION MODEL 4				
1970.....	836,036	37.3	15.0	22.3
1971.....	854,943	37.5	15.1	22.4
1972.....	874,415	37.7	15.1	22.6
1973.....	894,504	38.0	15.2	22.8
1974.....	915,254	38.3	15.2	23.0
1975.....	936,695	38.6	15.3	23.3
1976.....	958,834	38.8	15.3	23.5
1977.....	981,663	39.0	15.4	23.6
1978.....	1,005,156	39.1	15.4	23.7
1979.....	1,029,281	39.1	15.4	23.7
1980.....	1,054,008	39.1	15.4	23.7
1981.....	1,079,310	39.1	15.4	23.7
1982.....	1,105,178	39.1	15.4	23.7
1983.....	1,131,609	39.0	15.4	23.9
1984.....	1,158,600	38.9	15.4	23.5
1985.....	1,186,159	38.8	15.3	23.5
1986.....	1,214,300	38.7	15.3	23.4
1987.....	1,243,046	38.7	15.3	23.4
1988.....	1,272,422	38.6	15.3	23.3
1989.....	1,302,441	38.5	15.2	23.3
1990.....	1,333,128	38.5	15.2	23.3

From the total population figures given in the table, it can be seen that all four models show a net population increase between 1970 and 1990 of almost 500,000,000. More startling is the fact that by 1990, the total population in model 4, in which intrinsic fertility and mortality are constant, is only 32,000,000 larger than that in model 1, in which fertility and mortality decline at the same rate as for Taiwan. This difference is less than 2.5 percent of the smaller total figure. The population under 20 years of age in 1990 in the two models differs by some 75,000,000 or 12 percent on a base total of 605,000,000 for model 1.

However, if instead of comparing models 1 and 4, both of which seem outside the realm of possibility, the same comparisons are made between models 2 and 3, the differences are smaller still. The 1990 totals differ by only 11,000,000, or less than 1 percent, and the figures for the population at ages under 20 differ by about 24,000,000, or less than 4 percent on a base total of 637,000,000 for model 2. These models imply that even a major and successful effort at fertility reduction in the PRC is not likely to make much difference either in the size of the total population or in the size of the younger age groups, hence it cannot afford much relief from population pressure in general or from such specific problems as the need for education, employment, housing, and other services for young people. To escape from such limited prospects, the PRC would have to find a way to alter some of the factors that have thus far determined demographic experience in other developing countries.

The principal reason why these models show so little difference even for successful efforts at family limitation is that they assume a correlation between fertility and mortality trends. It is, in fact, hard to conceive of circumstances favorable to a general acceptance of family limitation which do not also result in improvement in general health and a lowering of mortality. The dissemination of family planning in the PRC has often been associated and is currently being combined with a general drive for better medical care and sanitation throughout the countryside. For countries at an intermediate stage in the mortality reduction process, as the PRC now is, mortality sometimes falls more rapidly than does fertility in the early stages of a successful birth control campaign. As a result, natural increase may rise rather than fall at the beginning of the effort, as is the case for models 1, 2, and 3 during the 1970's. When mortality has reached the levels that are characteristic of the developed world and the more advanced of the developing countries, further decline in the death rate tends to be at a much slower rate, and the rapidly falling birth rates begin to close the gap. Thus it will be seen that in models 1, 2, and 3, most of the decline in natural increase takes place after 1980, when it occurs at an accelerating rate. Taiwan is already at the point where there can be little further decline in the crude death rate; instead, changing age composition may soon cause the death rate to rise somewhat. Thus, any further reduction in the birth rate in Taiwan will result in a corresponding or larger reduction in natural increase. In the PRC, the effect on population growth of even a highly successful birth control campaign may be largely or entirely neutralized during the next 10 years by falling mortality.

Of course it is not impossible that the relationship between fertility and mortality trends in the PRC may differ somewhat from the experience of Taiwan since 1952. Though the decline in fertility may still be closely correlated with the decline in mortality, the rate of mortality decline may be faster or slower in relation to fertility decline. The differences would probably not be great but they may be significant. If mortality in the PRC declines more slowly in relation to the decline in fertility, the reduction of natural increase could occur somewhat sooner and be carried somewhat farther by 1990 than is shown in models 1, 2, and 3. If instead the decline in mortality in the PRC is more rapid than in Taiwan at a corresponding stage of demographic development, natural increase would rise more rapidly in the 1970's than is shown in models 1, 2, and 3, the peak would be higher, and the subsequent decline would be less rapid.

The extreme implications of departure from the Taiwan pattern may be explored by constructing two hypothetical variants of model 1 to show the results of combining constant intrinsic rates for one parameter with declining rates for the other. The first variant assumes that fertility declines at the same rate as in the original model 1 but that intrinsic mortality remains constant as in model 4. The second variant assumes that mortality declines as in the original model 1 but that intrinsic fertility remains constant as in model 4. The first variant produces a population in 1990 that is smaller by 107,000,000, or a little over 8 percent, than that of the original model 1. The population at ages under 20 is smaller by 63,000,000, or 10 percent. However, the second variant results in a 1990 population larger than that of the original model 1 by 158,000,000, or 12 percent and the population at

ages under 20 is larger by 159,000,000, or 26 percent. Thus, even if the PRC could reduce fertility at a phenomenally successful rate without lowering mortality at all, the difference in population growth after two decades would not be spectacular, whereas, if the PRC succeeds in reducing mortality but fails to reduce fertility, the increased population growth, particularly in the younger age groups, would certainly be significant.

What these models suggest is that, barring catastrophe or spectacular changes in contraceptive technology and in the means of political coercion, even the most successful family limitation effort is not likely to provide much relief from population pressure in the PRC until mortality has completed its transition to the lower levels characteristic of developed countries. On the other hand, the failure to make significant progress in family limitation while continuing to reduce mortality levels can only increase the rate of population growth in the short run and the severity of the attendant population problems. Taking into account the experiences of the three birth control campaigns and the implications of the population models, there is no reason to expect any great change in China's demographic prospects in the immediate future.

GENERAL NOTE

In the footnotes to this paper, the following abbreviations are used:

CB.....	American Consulate General, Hong Kong, <i>Current Background</i> .
CCP.....	Chinese Communist Party.
KCN.....	<i>Chung-kuo ch'ing-nien (China Youth)</i> .
KCNP.....	<i>Chung-kuo ch'ing-nien pao (China Youth Daily)</i> , Peking.
CKFN.....	<i>Chung-kuo fu-nü (Women of China)</i> .
CPPCC.....	Chinese People's Political Consultative Conference.
ECMM.....	American Consulate General, Hong Kong, <i>Extracts from China Mainland Magazines</i> .
HCKFN.....	<i>Hsin Chung-kuo fu-nü (Women of New China)</i> .
JMJP.....	<i>Jen-min jih-pao (People's Daily)</i> , Peking.
KJJP.....	<i>Kung-jen jih-pao (Daily Worker)</i> , Peking.
KMJP.....	<i>Kuang-ming jih-pao</i> (usually not translated), Peking.
NCNA.....	New China News Agency.
NPC.....	National People's Congress.
PCJP.....	<i>Pei-ching jih-pao (Peking Daily)</i> , Peking.
PRC.....	People's Republic of China.
SCMM.....	American Consulate General, Hong Kong, <i>Selections from China Mainland Magazines</i> .
SCMP.....	American Consulate General, Hong Kong, <i>Survey of China Mainland Press</i> .

Part IV. EXTERNAL RELATIONS

THE INTERNATIONAL TRADE OF THE PEOPLE'S REPUBLIC OF CHINA

By A. H. USACK and R. E. BATSavage

SUMMARY

The international trade of the People's Republic of China (PRC) is a closely controlled state monopoly within the centrally planned economy. Trade is an important ingredient in China's program to transform itself into an advanced industrial nation with a powerful military establishment—a major power both in Asia and the world. Imports include: (a) capital goods embodying advanced technology necessary for industrial development, and (b) important industrial materials that are in short supply domestically. Politically, trade is used as a means of extending Chinese influence and obtaining recognition in both the Communist and the non-Communist worlds.

The first decade of the PRC, from 1950 to 1959, was marked by the "lean to one side" policy and dependence on the U.S.S.R. and Eastern Europe for support in industrial development. Two-thirds of China's trade was with the Communist world. Trade was dominated by the exchange of foodstuffs, raw materials, and textiles for machinery and equipment and industrial materials. Total trade (imports plus exports) grew from \$1.2 billion in 1950 to \$4.3 billion in 1959. The U.S.S.R. was China's largest trade partner and the major supplier of complete industrial installations and technical assistance. Soviet financial aid was relatively small, however, totaling \$430 million in long term credits. The willingness of the U.S.S.R. and Eastern Europe to accept large amounts of Chinese agricultural products, minerals, and textiles enabled China to pay for the import of machinery and technology. Trade with the non-Communist countries was relatively constant in the first half of the period, in part because of Western trade controls imposed during the Korean war. This trade grew in the second half of the decade, with imports being generally limited to goods not available or in short supply in the Communist countries.¹

The decade of the sixties produced dramatic shifts in both the direction and composition of China's trade. The break with the U.S.S.R. led to a complete reversal in the direction of trade; by 1970, 80 percent of China's trade was with the non-Communist countries. The collapse of the Great Leap Forward in 1960 caused a sharp drop in total trade as export capacity fell and as imports of capital goods were cut back. At the same time, food shortages in the early sixties forced the government to begin large-scale imports of grain and chemical fertilizer from the non-Communist countries. The overall volume of trade fell to \$2.7 billion in 1962, then moved upward again as the economy recovered. The disruptions of the Cultural Revolution provided only a brief setback to trade in 1967-68 and by 1970 total trade reached \$4.2 billion, near the peak level of 1959.

¹ For a more detailed discussion of this period and the years 1961-65 see Robert L. Price, "International Trade of Communist China, 1950-65", in *An Economic Profile of Mainland China* (studies prepared for the Joint Economic Committee, Congress of the United States), vol. 2, 1967.

China's trade for the period 1965-70 thus reflects the economic recovery that occurred through 1966, the adverse effects of the Cultural Revolution in 1967-68, and the subsequent revival of economic growth. The largest increases in this period were with the developed countries of the non-Communist world, especially Japan (up 79 percent) and Western Europe (up 56 percent). Japan and Western Europe have become China's major sources of capital goods and modern technology. From 1963 to 1966 China contracted for more than 50 complete plants from the developed non-Communist countries. Trade with the less developed non-Communist countries also has grown in recent years primarily due to increases in Chinese exports to this area. Trade with Hong Kong and Macao, China's largest export market, reached a peak of \$405 million in 1966 and again approached this level in 1970.

The portion of China's trade with the Communist world declined to only 20 percent in the 1960's, principally because trade with the U.S.S.R. dwindled to \$47 million in 1970. Trade with the Far Eastern Communist countries and Cuba fell slightly in the second half of the decade. In contrast, Chinese trade with Eastern Europe has risen more than 50 percent since 1965. Trade with Rumania has more than doubled in this period, and Rumania is now China's leading trade partner in Eastern Europe.

The changeover to non-Communist trading partners was accompanied by important shifts in the commodity composition of Chinese imports. Grain and chemical fertilizer are now major import items costing China between \$400 million to \$500 million each year. Imports of machinery and equipment are down from the levels of the late 1950's as a result. China gets all of its imports of grain, rubber, textile fibers, and textile yarn and fabric, and 95 percent or more of its imports of iron and steel, nonferrous metals, and chemical fertilizer from non-Communist countries. The Communist countries contribute a significant portion of imports in the case of machinery and equipment (35 percent), foodstuffs other than grain (93 percent), and crude materials other than rubber and textile fibers (47 percent).

The traditional Chinese export mix of foodstuffs, crude materials, textiles, and light manufactures has not changed radically over time. In 1965, exports of foodstuffs exceeded imports for the first time since 1960; by 1970, exports of foodstuffs were almost double imports. Exports of oilseeds and nonferrous metals have remained depressed in recent years as production has barely kept up with internal needs.

The international financial policy of China is conservative. The balance of payments has been favorable in most years with imports, foreign aid expenditures, and debt repayments being more than compensated for by export earnings, overseas remittances, and receipts of foreign credits. The PRC has at no time incurred large financial obligations, and since the break with the U.S.S.R. has avoided long-term credits altogether. Short- and medium-term commercial credits have been extended by non-Communist countries for purchases of grain, fertilizer, and complete plants. China liquidated its debt to the Soviet Union by 1965 and currently has only commercial indebtedness to non-Communist countries which amounts to \$300 to \$400 million at any one time. Reserves of gold and foreign exchange have been built up since the early 1960's and at the end of 1970 were roughly \$700 million, an adequate sum in view of the current volume of China's trade.

In 1971 China's trade reached an all-time high of \$4.5 billion. Exports showed the greatest increase; the growth of imports was held in check following the sharp surge in 1970. Trade with the non-Communist countries rose, even though trade with the developed countries in this group declined. Trade with Hong Kong jumped sharply, and China's search for industrial raw materials and political allies resulted in a significant increase in trade with the less developed countries. Trade with the Communist countries rebounded as trade with the U.S.S.R. more than doubled and large increases occurred in trade with Rumania.

The continued growth of the Chinese economy in the Fourth Five-Year Plan (1971-75) should be accompanied by further increases in China's trade. Assuming that the conservative financial policy continues, growth in trade will depend largely on China's export capabilities. This is likely to be a slow process because many of the mineral and agricultural raw materials that are in greatest demand abroad are in short supply at home. Improved Chinese relations with a number of countries and increasing Western interest in the China market will lead to increases in trade but in the short term overall growth will be slow. In particular, the reopening of Sino-United States trade probably will have more political than economic importance in the near future.

I. BASIC FEATURES OF CHINESE TRADE, 1950-71

A. Trade and the Centralized Economy

1. THE AIMS OF TRADE

The international trade of the People's Republic of China (PRC) is used as an instrument by Peking to foster its overall political and economic goals—to make China a strong unified nation capable of exercising leadership in Asia and the world. Foreign trade is conducted as a state monopoly within the planned economy and is an important factor in transforming China into a modern industrial state. Imports are directed at acquiring capital goods which embody up-to-date technology for the development of China's industrial base and its defense industries. Imports also are used to overcome serious shortfalls and bottlenecks in domestic production.

A prevailing theme in China's foreign trade policy is economic independence. Peking resolutely avoids long-term foreign debt by scaling imports to the available volume of exports. Further, China attempts to become self-sufficient in key branches of industry and technology through copying foreign equipment and developing its own S & T capabilities. In addition, since the break with the U.S.S.R. and the withdrawal of Soviet aid the Chinese have avoided becoming dependent on one country as a source of imports and have in recent years practically eliminated the use of foreign technicians in China.

Foreign trade is a small component of China's economy—exports amount to only 2 percent of GNP. Import plans are drawn up in view of foreign exchange availabilities, and the fulfillment of export plans has priority over domestic consumption. Trade with the Communist countries is bilateral and imbalances are settled in goods. Trade with

the non-Communist countries is for the most part multilateral and settled in hard currency. Deficits with the developed countries are financed by earnings from the less developed countries and Hong Kong.

Although economic gain is the primary concern, political considerations have also affected China's trade policy. The "lean to one side" policy of the fifties and the subsequent reorientation of China's trade to the non-Communist countries following the Sino-Soviet rift were both influenced by ideology. Trade has been used as a lure for recognition from the developed countries and as a means of extending Chinese influence to the less developed countries. For instance, following Canadian recognition in 1971 China implied that its wheat contracts with Canada to the exclusion of Australia were a means of rewarding friends. On the other hand, China has not allowed its opposition to the Sato government to block Japan's emergence as its largest trading partner. And West Germany, which does not recognize China, is China's leading trading partner in Western Europe.

2. ORGANIZATIONAL STRUCTURE

The Ministry of Foreign Trade is responsible for conducting China's foreign trade. Since 1956 it has enjoyed a monopoly position. The ministry draws up the national import and export plans, conducts external trade relations, and signs trade agreements and contracts on behalf of the government. Subordinate to the ministry are state trading corporations which handle the actual import and export operations. These corporations serve as the middlemen between Chinese producers and end-users and the foreign trading firms. At present there are seven corporations, each dealing in specific groups of commodities. Table 1 lists these corporations and gives their areas of responsibility.

TABLE 1.—China: Foreign trade corporations and their areas of responsibility

<i>Name</i>	<i>Area of Responsibility</i>
China National Chemicals Import and Export Corp.	Chemicals, rubber, petroleum, fertilizers, pharmaceuticals.
China National Native Produce and Animal Byproducts Import and Export Corp.	Tea, coffee, tobacco, forest products, spices, furs, bristles, feathers, casings, hides, and leathers.
China National Light Industrial Products Import and Export Corp.	General merchandise, paper, toys, sporting goods, china, jewelry, and precious stones.
China National Textiles Import and Export Corp.	Textile yarn, fabrics, manmade and natural fibers, clothing, and knitwear.
China National Cereals, Oils and Foodstuffs Import and Export Corp.	Meat, grain, fruits, vegetables, fish, sugar, beverages, and animal feed.
China National Machinery Import and Export Corp.	Machinery, transport equipment, bearings, instruments, spare parts, and complete plants.
China National Metals and Minerals Import and Export Corp.	Ferrous and nonferrous metals, ores, minerals, coal, cement, and hardware.
Complete Plant Export Corp.	Export of whole plants, usually under aid agreements.
Sinofracht Chartering and Shipbroking Corp.	Chartering of vessels and booking of shipping space for Chinese imports and exports.
Foreign Trade Transportation Corp.	Arrange customs clearance and delivery of import/export cargoes by land, sea, and air. Arranges marine and other insurance.

In addition to the import-export corporations there are agencies which handle insurance, ship chartering, and other services. Joint shipping companies have been formed with Poland, Albania, and Tanzania. The Bank of China, with its overseas branches in Hong Kong, Singapore, and London and its correspondent relationships with other banks, provides much of the commercial financing, letters of credit, and payment facilities for Chinese trade.

A prominent feature of Chinese trade with non-Communist countries is the Canton Trade Fair held each spring and fall. Although these fairs are officially designated as export commodities fairs, both import and export contracts are concluded, accounting for 30 percent to 50 percent of China's annual foreign trade. The fairs give traders an opportunity to meet with representatives of the state trading corporations and provide the Chinese with some economic leverage by bringing the many buyers and sellers together in a competitive atmosphere. Negotiations on some large contracts, for example steel imports, are continued after the fair closes. China also obtains some political mileage from the fairs by selective issuance of invitations required for attendance.

Other major portions of trade are concluded under trade agreements signed annually with all the Communist countries and several of the non-Communist countries and through high-level negotiations with foreign suppliers. These latter negotiations are for major commodity imports, such as grain and fertilizer, and for large purchases, such as whole plants or aircraft.

B. Economic Trends and Foreign Trade

Because China's foreign trade is an integral part of the centralized economy, it has followed closely the ups and downs of the Chinese economy. Figure 1 shows the pattern of Chinese trade against the background of the major periods in China's economic history. Trade (exports plus imports) grew rapidly from \$1.2 billion in 1950 to \$3.1 billion in 1957 as economic order was restored on the Mainland and a successful 5-year plan was implemented. The policy of "lean to one side" coupled with the Korean war trade restrictions imposed by the Western nations made trade with the Communist countries the dominant feature of this period. With the attempt at rapid industrialization during the Great Leap Forward, trade shot up to \$4.3 billion in 1959. The economic collapse following the Great Leap and the withdrawal of Soviet aid in 1960 caused trade to plummet to \$2.7 billion by 1962. Trade with the Communist countries accounted for most of the decrease as non-Communist trade held steady. The recovery of the economy from 1962 to 1966² was marked by a complete reversal in the orientation of Chinese trade because of the continued Sino-Soviet dispute. By 1966 total trade had recovered to nearly the 1959 level, but trade with the Communist countries had dropped to \$1.1 billion. China turned to the developed West as a source of industrial equipment, grain, and fertilizer imports to bolster agriculture. Whereas in 1959 Communist trade accounted for about 70 percent of the total, by 1966 it had fallen to about 25 percent.

² The political purges of the Cultural Revolution were already in high gear in 1966 although the economic effects were not to be felt until 1967.

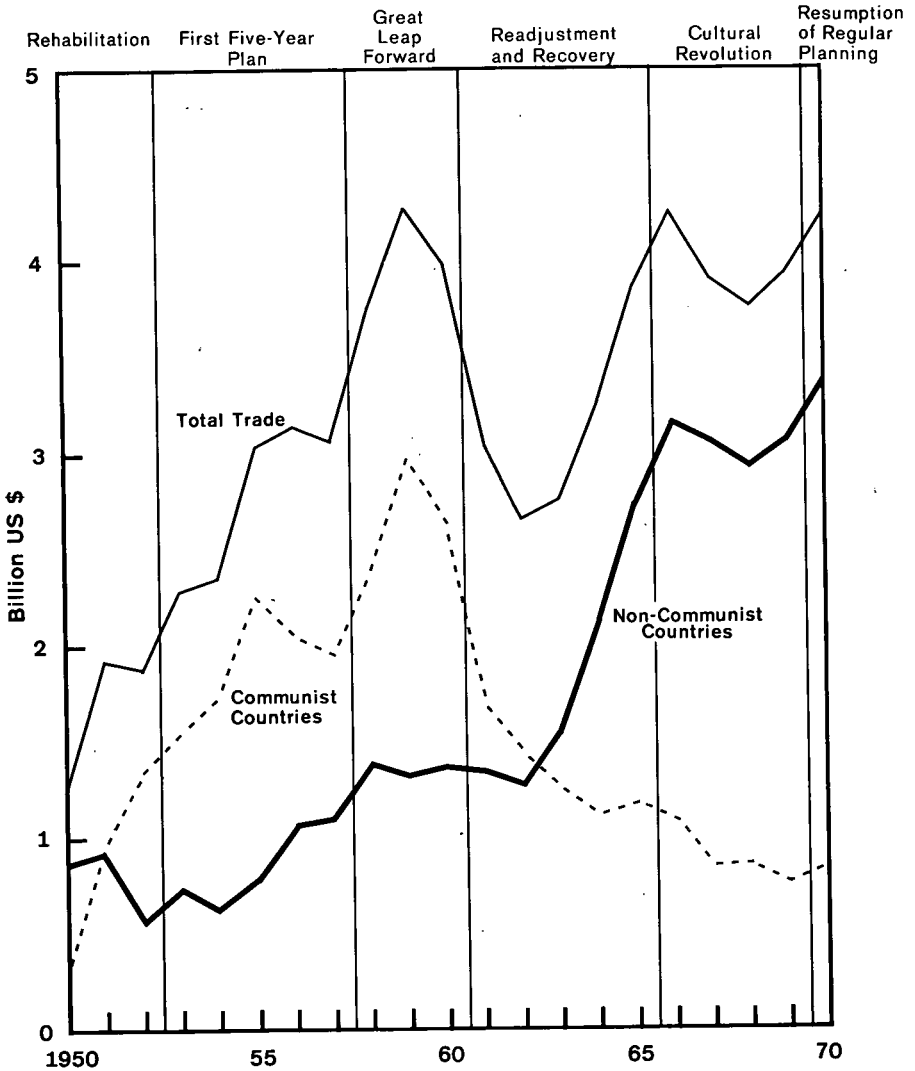


Figure 1. China: Trade and Economic Trends

The recovery was short circuited in 1967-68 by the disruptions of the Great Proletarian Cultural Revolution. Foreign trade was affected adversely by the fall in industrial production, delays in transport, and the purges of bureaucrats in the Ministry of Foreign Trade. Also, Red Guard rampages in 1967 against foreign embassies and the harrasing of foreigners damaged trade relations with trading partners. During this period both Communist and non-Communist trade declined, and total trade dipped to \$3.8 billion in 1968.

Internal order was restored by the People's Liberation Army (PLA), and the disturbances began to wane in 1969. Trade turned back upward and again approached the 1959 peak level of \$4.3 billion in 1970. In 1971, China's general economic momentum continued, and trade finally broke through to a new peak level of approximately \$4.5 billion, with imports of \$2.2 billion and exports of \$2.3 billion. The Chinese diplomatic offensive has contributed to an expansion of trade relations with the non-Communist world, and trade relations with the Soviet Union improved after several years of stagnation.

C. Financing International Trade

1. BALANCE OF PAYMENTS

China's trade and payments relations with Communist countries are bilateral. Since any trade imbalances that might occur are usually matched by credits or settled in goods the following year, these accounts have little effect on Chinese reserves of gold and foreign exchange. A trade imbalance or a delivery of aid between Communist countries represents a flow of resources and an opportunity cost, but it usually does not cause an expenditure of hard currency as in the case of a non-Communist country.

China's balance of payments with the non-Communist world has been of particular importance since the shift in China's trade. Previous to this shift, imports were financed by export earnings supplemented by overseas remittances. Following the collapse of the Leap, the need for large-scale grain and fertilizer imports led China to seek short-term credits from the non-Communist countries. The recovery of exports starting in 1963 and the trade surpluses in 1965 and 1966 improved the balance of payments with the non-Communist countries. Grain and fertilizer credits have continued through the sixties although these are now largely offset by repayments. The disruption of exports during the Cultural Revolution was a setback for the non-Communist balance of payments and in 1968 imports were cut back. The sharp rise in imports in 1970 again produced a large trade deficit. And, again in 1971 the Chinese quickly adjusted by pushing exports and holding back on imports.

2. RESERVES OF GOLD AND FOREIGN EXCHANGE

Since the immediate post-Leap period, when reserves dropped sharply, China's international reserve position has improved rapidly and is now above the levels of the late fifties (see table 2).

TABLE 2.—CHINA: RESERVE POSITION, 1960, 1962, AND 1965-70¹

(In million of U.S. dollars)

	Beginning reserves	Changes			Year-end reserves
		Foreign exchange balance ²	Gold purchases ³	Gold production ⁴	
1960 total.....	530	-150	0	35	415
Gold.....	80		0	35	115
Foreign exchange.....	450	-150	0		300
1962 total.....	355	-60	0	25	320
Gold.....	140		0	25	165
Foreign exchange.....	215	-60	0		155
1965 total.....	350	75	0	25	450
Gold.....	170		115	25	310
Foreign exchange.....	180	75	-115		140
1966 total.....	450	190	0	25	665
Gold.....	310		35	25	370
Foreign exchange.....	140	190	-35		295
1967 total.....	665	-80	0	25	610
Gold.....	370		0	25	395
Foreign exchange.....	295	-80	0		215
1968 total.....	610	50	0	25	685
Gold.....	395		70	25	490
Foreign exchange.....	215	50	-70		195
1969 total.....	685	145	0	25	855
Gold.....	490		20	25	535
Foreign exchange.....	195	145	-20		320
1970 total.....	855	-160	0	25	720
Gold.....	535		0	25	560
Foreign exchange.....	320	-160	0		160

¹ Data have been rounded to the nearest \$5,000,000.² The net errors and omissions in China's balance of payments with the non-Communist countries are assumed to represent the changes in China's foreign exchange balances. Methodology for China's balance of payments is based on "Communist China's Balance of Payments, 1950-65," in *An Economic Profile of Mainland China* (Studies prepared for the Joint Economic Committee, Congress of the United States), vol. 2, 1967.³ Gold purchases are derived from Annual Bullion Review, Samuel Montagu and Co. Ltd., London, various years.⁴ Gold production is based on the assumptions contained in "Communist China's Balance of Payments" cited above, p 49.

Additions to holdings of foreign exchange come from trade surpluses with the non-Communist world, from remittances of foreign currency by overseas Chinese which may total roughly \$100 million each year, and from other earnings, such as profits from PRC-owned businesses and investments in Hong Kong. Gold reserves have been built up from China's small domestic gold production and from purchases of monetary gold from non-Communist countries. Gold purchases, while they do not increase total reserves, represent Peking's decision in the sixties to reduce the amount of its reserves held as foreign currency balances apparently in reaction to the Western monetary crises and the political and military crisis in Southeast Asia.

3. INTERNATIONAL INDEBTEDNESS

China points with pride to the fact that it is free of long-term foreign debt. After the break with the Soviet Union, China rapidly liquidated its debts to the U.S.S.R. By generating steady trade sur-

pluses with the U.S.S.R., China was able to repay the \$1.4 billion in long-term Soviet credits, the sugar loan, and other medium-term debts by 1965, well ahead of schedule. Credits received from the non-Communist developed countries have consisted of 6- to 18-month commercial credits for imports of grain and fertilizer and medium-term credits for complete plant imports. Repayments on these commercial credits now largely offset new drawings each year and since 1965 China's outstanding indebtedness to the non-Communist countries has ranged from \$300 to \$400 million. Because China has an excellent credit reputation, substantial long-term credits will certainly be available if China should decide to expand imports in this manner.

4. CURRENCY USED IN TRADE SETTLEMENTS

The bulk of China's trade with non-Communist countries is denominated in Western currencies. Trade with Japan, China's largest partner, is conducted in sterling; Swiss francs and West German marks are widely used in settlements with many other countries. Since 1968, China has made limited use of its currency—the Renminbi or RMB—in contracts with Western traders, but the international use of RMB remains largely a matter of prestige for the Chinese. The RMB is not a convertible currency and its value is arbitrarily set by China.

II. INTERNATIONAL TRADE, 1950-64

A. The Period of Dependence on the U.S.S.R. and Eastern Europe

Following the restoration of order in the economy in the early 1950's China embarked on a program of rapid industrialization. The period 1950-59 was marked by close economic cooperation with the U.S.S.R. and Eastern Europe and trade became oriented to the Communist countries (see table 3).

TABLE 3.—CHINA: DIRECTION OF FOREIGN TRADE¹

[In millions of dollars²]

Year	Total trade			Communist countries			Non-Communist countries		
	Turnover	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports
1950.....	1,210	620	590	350	210	140	860	410	450
1951.....	1,900	780	1,120	975	465	515	920	315	605
1952.....	1,890	875	1,015	1,315	605	710	575	270	305
1953.....	2,295	1,040	1,255	1,555	670	885	740	370	370
1954.....	2,350	1,060	1,290	1,735	765	970	615	295	320
1955.....	3,035	1,375	1,660	2,250	950	1,300	785	425	360
1956.....	3,120	1,635	1,485	2,055	1,045	1,010	1,065	590	475
1957.....	3,055	1,615	1,440	1,965	1,085	880	1,090	530	560
1958.....	3,765	1,940	1,825	2,380	1,280	1,100	1,385	660	725
1959.....	4,290	2,230	2,060	2,980	1,615	1,365	1,310	615	695
1960.....	3,990	1,960	2,030	2,620	1,335	1,285	1,370	625	745
1961.....	3,020	1,530	1,495	1,685	965	715	1,335	560	775
1962.....	2,675	1,525	1,150	1,410	915	490	1,265	605	660
1963.....	2,770	1,570	1,200	1,250	820	430	1,525	755	770
1964.....	3,220	1,750	1,470	1,100	710	390	2,120	1,040	1,080
1965.....	3,880	2,035	1,845	1,165	650	515	2,715	1,385	1,330
1966.....	4,245	2,210	2,035	1,090	585	505	3,155	1,625	1,530
1967.....	3,895	1,945	1,950	830	485	345	3,065	1,460	1,605
1968.....	3,765	1,945	1,820	840	500	340	2,925	1,445	1,480
1969.....	3,860	2,030	1,830	785	490	295	3,075	1,540	1,535
1970.....	4,220	2,050	2,170	825	480	345	3,395	1,570	1,825

¹ Data are based on reports of China's trading partners and have been adjusted to show China's exports f.o.b. and China's imports c.i.f.

² Rounded to the nearest \$5,000,000. Because of rounding, components may not add to the totals shown.

1. SUPPORT FOR THE INDUSTRIAL BUILDUP IN CHINA

The major impetus to the drive for industrial development was furnished by large-scale imports of machinery and equipment, much of it in the form of complete industrial installations. The Soviet Union was the chief supplier of complete plants. During the decade agreements were signed with the U.S.S.R. for the construction of 291 major industrial installations in China (see table 4). By the end of 1959, equipment valued at \$1.35 billion had been delivered and about 130 projects were completed. Agreements were also signed with Eastern European countries for the construction of at least 100 major projects and about two-thirds of these were completed by 1959. In addition to supplying equipment for these installations the Soviet Union provided China with valuable technical aid including: (a) blueprints and technical information; (b) some 10,000 Soviet technicians and advisers; and (c) training for 15,000 Chinese technical and academic students in the U.S.S.R. Soviet financial aid during this period was relatively small. Of the \$1.4 billion in Soviet loans extended to China, only \$430 million were specifically for economic development purposes.

TABLE 4.—CHINA: SOVIET PROJECT CONSTRUCTION AGREEMENTS, 1950-59

Date of agreement	Economic credits ¹ (million U.S. \$)	Number of projects	Value of complete sets of equipment ^{1 2} (million U.S. \$)
February 1950.....	300	50	(3)
September 1953 ⁴	0	91	⁵ 1,300
October 1954.....	130	15	100
April 1956.....	0	55	625
August 1958.....	0	47	(3)
February 1959.....	0	78	1,250
Total.....	430	⁶ 291	3,275

¹ Converted from rubles at the official rate of exchange of 4 rubles to 1 U.S. dollar.

² Including technical assistance related to the project.

³ Not available.

⁴ An agreement signed to deliver equipment for a total of 141 projects.

⁵ This sum includes the value of equipment and technical assistance for all of the 141 projects.

⁶ The Chinese announced in April 1959 that the 211 major Soviet-assisted projects agreed on through April 1956 were reduced in number to 166 as a result of merging of some projects during their construction. Thus, the total of 336 projects was reduced to 291.

Source: Robert L. Price, "International Trade of Communist China, 1950-65," An Economic Profile of Communist China, Joint Economic Committee, Congress of the United States, February 1967, vol. II, p. 591, table 6.

As a result of this flow of machinery and equipment and technical assistance from the U.S.S.R. and Eastern Europe, China made swift progress in industrialization. Production in heavy industry from 1952 to 1959 expanded at an average annual rate of 25 percent. Imports of technology not only developed China's basic industry but also laid the groundwork for the production of sophisticated items such as jet aircraft, large electrical generating equipment, and machine tools. Soviet technical information and Soviet training of Chinese technicians provided a base upon which the advanced weapons program of the 1960's was ultimately developed. The withdrawal of Soviet aid in mid-1960 was a serious shock to the Chinese economy already overstrained by the Great Leap Forward. About 20 percent of the Soviet projects begun before the 1958 agreement were incomplete and most of those agreed upon in 1958 and 1959 were still in the planning stages.

2. TRADE FLOWS

Trade with the Communist countries grew rapidly during the 1950's from \$350 million in 1950 to almost \$3 billion in 1959. The U.S.S.R. was China's leading trade partner throughout the decade and in 1959, the peak year, accounted for 69 percent of China's trade with the Communist countries and 48 percent of China's total trade (see table 5). Likewise, China became one of the U.S.S.R.'s leading trading partners accounting for about 15 to 20 percent of total Soviet trade from 1955 to 1959. Machinery and equipment dominated Chinese imports from the U.S.S.R. while Chinese exports consisted largely of foodstuffs, industrial raw materials, and consumer goods, mainly textiles and clothing (see table 6).

TABLE 5.—CHINA: TRADE WITH THE COMMUNIST COUNTRIES, 1950-59¹

[In millions of U.S. dollars]

	Total		U.S.S.R.		Eastern Europe ²		Other ³	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
1950.....	210	140	190	135	15	5	5	-----
1951.....	465	515	305	445	140	65	20	5
1952.....	605	710	415	550	165	155	25	5
1953.....	670	885	475	690	150	190	45	5
1954.....	765	2,270	550	720	130	240	85	10
1955.....	950	1,300	645	1,055	200	235	105	10
1956.....	1,045	1,010	745	715	200	265	100	30
1957.....	1,085	880	750	545	245	285	90	50
1958.....	1,280	1,100	880	635	290	410	110	55
1959.....	1,615	1,365	1,100	955	350	325	165	85

¹ Data are rounded to the nearest \$5,000,000.² Includes Albania but excludes Yugoslavia.³ Consists of Yugoslavia, North Vietnam, North Korea, and Mongolia.TABLE 6.—CHINA: COMMODITY COMPOSITION OF TRADE WITH THE U.S.S.R., 1958-59¹

[In millions of U.S. dollars]

	1958	1959
Total imports.....	634.0	954.5
Machinery and equipment.....	318.0	597.5
Of which: Complete plants.....	166.2	399.8
Industrial materials.....	173.4	176.3
Of which:		
Petroleum.....	92.4	117.7
Ferrous metals.....	60.8	48.0
Nonferrous metals.....	15.8	6.4
Consumer goods.....	9.2	6.6
Of which: Food.....	1.1	.5
Other merchandise.....	17.0	12.3
Unspecified.....	116.4	161.4
Total exports.....	881.2	1,100.0
Industrial materials.....	233.3	277.2
Of which:		
Ores and concentrates.....	74.0	73.3
Ferrous metals.....	19.2	7.6
Nonferrous metals.....	48.9	54.9
Textiles.....	37.5	91.6
Consumer goods.....	483.0	644.4
Of which:		
Food.....	230.1	219.1
Fabrics and clothing.....	158.4	306.3
Other merchandise.....	160.7	171.6
Unspecified.....	4.0	7.2

¹ Figures based on Vneschniaia Torgovlia S.S.S.R. za 1965 god, Ministerstvo Vneshnei Torgovi S.S.S.R. (Moskva, 1965) and other volumes. Imports and exports are f.o.b. Because of rounding, components may not add to the totals shown.

During the first half of the decade China's trade deficits were funded by long-term Soviet economic credits and short-term clearing credits. After 1955 China ran a surplus in trade with the U.S.S.R. so that over the decade China's net trade deficit with the U.S.S.R. amounted to only \$390 million. Soviet willingness to accept large amounts of Chinese raw materials and consumer goods was an important factor because it allowed China to pay on the spot for much of the machinery and equipment.

Sino-East European trade grew rapidly from a negligible base and by 1959 accounted for 15 percent of China's total trade (see table 5). Of the trade with these seven countries, East Germany and Czechoslovakia accounted for about 65 percent and Poland and Hungary for almost 30 percent. Chinese trade deficits were probably financed through short-term clearing credits and perhaps some longer term credits, although no long-term credits are specifically known to have been extended to China by Eastern European countries.

Eastern Europe ranked second to the U.S.S.R. as a supplier of machinery and equipment to China. From 1950 to 1959 China imported about \$1.7 billion worth of machinery and equipment from Eastern Europe, approximately 40 percent of total Chinese imports of machinery and equipment. As with the Soviet Union, China was able to pay for most of these goods through exports of raw materials and foodstuffs to Eastern Europe.

Trade with the other Asian Communist countries was a small part of China's trade over the decade (see table 5). This trade was based on China's economic assistance to North Korea, North Vietnam, and Mongolia with much of China's export surpluses representing aid deliveries. This produced the anomaly of China receiving development aid from the U.S.S.R. while conducting an aid program of its own.

In the period 1950 to 1955 China's trade with the non-Communist countries fell to about 25 percent of China's total trade. During the second half of the decade trade with the non-Communist countries rose as Western restrictions on trade with China were relaxed and China sought alternate courses of supply for industrial goods not readily available from the Communist countries. However, in 1959 the \$1.3 billion in trade with the non-Communist world still represented only about 30 percent of China's total trade.

B. The Changeover to Non-Communist Trading Partners

The early sixties saw the deepening of the Sino-Soviet rift and the radical shift in the direction of China's trade (see table 7). The withdrawal of Soviet aid in 1960 and the collapse of the Great Leap Forward were serious blows to the Chinese economy and forced a retrenchment in foreign trade. From 1960 to 1962 exports fell as agricultural and industrial production declined, and imports were cut back sharply. Following the recovery of the economy, trade with the Communist countries continued to decline as China reoriented its trade to the non-Communist countries.

TABLE 7.—CHINA: TRADE WITH THE COMMUNIST AND NON-COMMUNIST COUNTRIES, 1960-64¹

[In millions of U.S. dollars]

	Communist countries				Non-Communist countries ²			
	Total	U.S.S.R.	Eastern Europe	Other ³	Total	Developed countries	Less-developed countries and Hong Kong and Macao ⁴	
1960:								
Exports.....	1,335	850	310	175	625	240	245	140
Imports.....	1,285	815	335	135	745	505	235	(⁵)
1961:								
Exports.....	965	550	145	270	560	220	225	115
Imports.....	715	365	160	190	775	600	175	(⁵)
1962:								
Exports.....	915	515	105	295	605	210	260	140
Imports.....	490	235	65	190	660	475	185	(⁵)
1963:								
Exports.....	820	415	115	290	755	265	305	185
Imports.....	430	185	50	195	770	580	190	(⁵)
1964:								
Exports.....	710	315	100	295	1,040	415	350	270
Imports.....	390	135	60	195	1,080	685	395	(⁵)

¹ Rounded to the nearest \$5,000,000. Due to rounding, components may not add to the totals shown.² Consists of North Korea, North Vietnam, Mongolia, Albania, Yugoslavia, and Cuba.³ Data have been adjusted for leads and lags and to show China's exports f.o.b. and China's imports c.i.f.⁴ Excludes reexports of China origin goods to third countries.⁵ Negligible.

Chinese trade with the Communist countries during this period generally reflected the political leanings in the Sino-Soviet dispute. Trade with the U.S.S.R. declined from \$1.7 billion in 1960 to \$450 million in 1964. China maintained a sizable export surplus with the U.S.S.R. in order to liquidate its debt to the Soviet Union. Deliveries of complete plants dropped sharply after 1960; much of the machinery and equipment purchased from the U.S.S.R. was spare parts and replacements for Soviet-made equipment. Sino-East European trade also plummeted and reached a low point in 1964.

Trade with the other Communist countries showed a mixed pattern as a result of the Sino-Soviet dispute. Total trade with the Asian Communist countries declined as economic relations with Mongolia and North Korea deteriorated because of their political leanings toward the U.S.S.R. Albania broke with the Soviet Union and became China's ally in the Sino-Soviet dispute. As a result, trade with Albania rose rapidly over the insignificant levels of the fifties to about \$85 million. Sino-Cuban trade quickly grew to \$180 million in 1964, following the establishment of the Castro government as China competed with the U.S.S.R. as an aid donor.

The changeover to non-Communist trading partners during the sixties was rapid; by 1963 China's trade with the non-Communist countries was greater than that with the Communist countries. This period also registered some changes in the commodity composition of trade (see table 8). In 1964 China imported much greater quantities of foodstuffs, less machinery and equipment, and almost no petroleum. The Chinese export mix did not change so greatly, although foodstuffs and textiles became less important and exports of light manufactures grew considerably.

TABLE 8.—CHINA: COMMODITY COMPOSITION OF TRADE, 1959 AND 1964¹

	1959			1964		
	Total	Communist	Non-Communist	Total	Communist	Non-Communist
Total imports.....	2,060	1,365	695	1,470	390	1,080
Foodstuffs.....	20	10	10	580	80	500
Grain.....				475	0	475
Crude materials, fuels and edible oils.....	445	200	245	375	95	280
Petroleum.....	120	120				
Chemicals.....	155	35	120	115	10	105
Fertilizer.....	70		70	65	0	65
Manufactures.....	1,195	945	250	390	195	195
Machinery and equipment.....	980	910	70	180	115	65
Other.....	250	180	70	10	10	0
Total exports.....	2,230	1,615	615	1,750	710	1,040
Foodstuffs.....	835	540	295	420	95	325
Crude materials, fuels, and edible oils.....	495	365	130	320	90	230
Chemicals.....	90	70	20	65	30	35
Manufactures.....	810	640	170	885	485	400
Textiles and clothing.....	620	500	120	495	305	190
Other.....				60	10	50

¹ Data are rounded to the nearest \$5,000,000.

1. GRAIN AND FERTILIZER IMPORTS

Food shortages at the beginning of the decade forced China to import large quantities of grain for the first time. Grain imports became a regular feature of Chinese imports reaching a peak of 6.8 million tons in 1964 (see table 9). Canada and Australia were the major suppliers and France, Argentina, and Mexico minor suppliers.

Imports of chemical fertilizer also became a major feature of China's trade during this period and imports have continued to rise since 1964 (see table 9). These imports are part of China's program for development of the agricultural sector and have been used to supplement domestic fertilizer production. Most of the purchases come from Japanese and West European producers.

TABLE 9.—CHINA: IMPORTS OF GRAIN AND CHEMICAL FERTILIZER FROM THE NON-COMMUNIST COUNTRIES, 1961-70¹

Year	Grain		Chemical fertilizer	
	Million metric tons	Millions U.S. dollars	Million metric tons	Millions U.S. dollars
1961.....	6.2	435	1.0	40
1962.....	5.3	370	1.0	40
1963.....	5.7	400	2.0	85
1964.....	6.8	475	1.2	65
1965.....	5.7	400	2.3	145
1966.....	5.8	400	2.5	155
1967.....	4.2	295	4.3	200
1968.....	4.4	305	4.0	200
1969.....	4.0	260	4.1	205
1970.....	4.7	280	4.3	230

¹ Values are c.i.f. and are rounded to the nearest \$5,000,000.

These large scale imports of grain and fertilizer placed a sizable burden on the Chinese economy. The annual expenditure of \$400-\$500 million on these two items restricted China's ability to import capital goods. This can be seen by comparing the levels of machinery and equipment imports of the late fifties with those of the sixties.

2. INDUSTRIAL REVIVAL—COMPLETE PLANTS

With the recovery of the economy underway in 1963 China began to buy complete plants from the non-Communist developed countries. During the period 1963-66 contracts for more than 50 complete industrial installations worth more than \$200 million were signed with Japan and Western Europe. Delivery has probably been completed on these installations. Most of these plants were for the chemical and steel industries; some were financed through medium-term credits and included the services of Western technicians. The acquisition of complete plants from the developed West has not only added to China's productive capacity, but also has provided China with up-to-date technology and possibly with prototypes to copy.

III. HIGHLIGHTS OF TRADE SINCE 1964

A. Total Trade 1965-71

Trade data for 1965-71 reflect the economic recovery that occurred through 1966, the adverse effects of the Cultural Revolution in 1967-68, and the revival of economic growth since then. (See table 10 for trade by area and country, 1965-70.) Overall trade for 1965-71 is shown in the following tabulation (in millions of U.S. dollars):

Year	Total trade	Imports	Exports
1965.....	3,880	1,845	2,035
1966.....	4,245	2,035	2,210
1967.....	3,895	1,950	1,945
1968.....	3,765	1,820	1,945
1969.....	3,860	1,830	2,030
1970.....	4,220	2,170	2,050
1971 (preliminary).....	4,500	2,200	2,300

By 1966 total trade was nearly to the peak level of \$4,290 million that was attained in 1959. Chinese exports were hard hit in 1967 due to dislocations in Chinese industry and transportation and declined by \$265 million. On the other hand, imports dropped by only \$85 million as the Chinese continued to fulfill their import commitments. In order to correct the trade imbalance that had occurred in 1967 the Chinese reduced imports and maintained the same level of exports in 1968 despite the continuation of disruptions caused by the Cultural Revolution. This trend continued into 1969 when restoration of order provided the impetus for a sizable increase in exports and in total trade. An upsurge in industrial production and capital construction was the prime force in the large increase in Chinese imports in 1970. Chinese exports did not keep up with imports and a deficit of \$120 million was incurred. In 1971 China's trade reached an all-time high and adjustments in trade with the non-Communist developed countries helped bring about a surplus of around \$100 million on their current trade account.

TABLE 10.—CHINA: TRADE BY AREA AND COUNTRY, 1965-70¹

[Millions of U.S. dollars]

Area and country	1965			1966			1967			1968			1969			1970		
	Total	Im-ports	Ex-ports	Total	Im-ports	Ex-ports	Total	Im-ports	Ex-ports	Total	Im-ports	Ex-ports	Total	Im-ports	Ex-ports	Total	Im-ports	Ex-ports
Total, all countries.....	3,880	1,845	2,035	4,245	2,035	2,210	3,895	1,950	1,945	3,765	1,820	1,945	3,860	1,830	2,030	4,220	2,170	2,050
Non-Communist countries.....	2,715	1,330	1,385	3,155	1,530	1,625	3,065	1,605	1,460	2,925	1,480	1,445	3,075	1,535	1,540	3,395	1,825	1,570
Developed countries.....	1,495	920	575	1,855	1,140	715	1,980	1,345	635	1,870	1,250	620	1,930	1,245	685	2,230	1,555	675
East Asia and Pacific.....	710	450	260	765	435	330	820	520	300	725	465	260	830	550	280	1,040	740	300
Of which:																		
Japan.....	478	257	221	631	331	300	569	303	266	567	345	222	654	415	239	855	600	255
Australia.....	220	190	30	121	96	25	232	203	29	147	115	32	165	128	37	175	135	40
Western Europe.....	650	350	300	875	510	365	1,030	720	310	960	625	335	945	565	380	1,015	660	355
Of which:																		
West Germany.....	137	72	65	217	135	82	296	231	65	272	196	76	280	202	78	270	200	70
United Kingdom.....	152	75	77	178	96	82	203	135	68	141	70	71	211	132	79	212	143	69
France.....	102	63	39	159	111	48	142	102	40	170	119	51	110	45	65	154	97	57
Italy.....	87	53	34	113	61	52	138	89	49	126	83	43	128	71	57	132	76	56
Netherlands.....	43	19	24	44	16	28	39	16	23	57	33	24	64	40	24	58	33	25
Switzerland.....	29	17	12	40	24	16	40	25	15	38	23	15	36	17	19	41	23	18
Sweden.....	26	14	12	36	22	14	63	49	14	50	34	16	34	18	16	33	17	16
North America.....	135	120	15	215	195	20	130	105	25	185	160	25	155	130	25	175	155	20
Of which: Canada.....	133	118	15	215	195	20	130	105	25	185	160	25	156	129	27	176	154	22
Less developed countries.....	860	405	455	895	385	510	775	260	515	730	230	500	805	290	515	790	285	525
Southeast Asia.....	320	75	245	290	80	210	315	75	240	300	70	230	335	110	225	270	60	210
Of which:																		
Malaysia and Singa- pore **.....	125	10	115	145	45	100	185	50	135	220	55	165	260	105	155	190	50	140
Indonesia **.....	110	40	70	60	10	50	60	10	50	40	5	35	45	5	40	35	5	30
Near East and South Asia.....	270	150	120	350	150	200	285	120	165	270	100	170	295	110	185	310	130	180
Of which:																		
Egypt.....	71	43	28	76	37	39	47	24	23	37	20	17	29	18	11	34	21	13
Ceylon.....	61	38	23	80	35	45	72	37	35	72	34	38	86	41	45	86	40	46
Pakistan.....	60	43	17	65	38	27	67	36	31	53	25	28	53	27	26	61	31	30
Latin America.....	110	105	5	110	105	5	15	10	5	10	(¹)	10	(¹)	10	(¹)	15	5	10
Africa.....	160	75	85	145	50	95	160	55	105	150	60	90	165	70	95	195	70	125
Hong Kong and Macao ³	360	5	355	405	5	400	310	(¹)	310	325	(¹)	325	340	(¹)	340	375	5	370
Of which: Hong Kong.....	342	3	339	380	3	377	292	1	291	311	1	310	327	1	326	359	5	354

Communist countries.....	1,165	515	650	1,090	505	585	830	345	485	840	340	500	785	295	490	825	345	480
U.S.S.R. ¹	415	190	225	320	175	145	105	50	55	95	60	35	55	25	30	45	20	25
Far East ²	220	90	130	230	80	150	240	60	180	240	60	180	200	55	145	190	65	125
Eastern Europe.....	205	110	95	270	140	130	245	135	110	275	135	140	265	120	145	320	160	160
Of which:																		
East Germany.....	51	26	25	68	36	32	69	34	35	65	37	28	63	30	33	78	42	36
Rumania.....	49	27	22	66	34	32	72	39	33	84	41	43	81	39	42	108	50	58
Poland.....	44	19	25	53	30	23	48	29	19	56	25	31	41	18	23	50	26	24
Czechoslovakia.....	32	19	13	46	22	24	33	19	14	46	21	25	59	26	33	56	31	25
Other.....	325	125	200	270	110	160	240	100	140	230	85	145	265	95	170	270	100	170
Of which:																		
Cuba.....	223	100	123	173	87	86	152	79	73	137	61	76	146	66	80	145	70	75
Albania ³	95	25	70	95	25	70	85	20	65	95	25	70	115	25	90	115	25	90

¹ Data are based on official statistics of trading partners, where available. These statistics were adjusted to show China's imports c.i.f. and China's exports f.o.b. (See app. A, Methodology.) Data for individual countries, except where noted, are rounded to the nearest \$1,000,000. All other data are rounded to the nearest \$5,000,000. Because of rounding, components may not add to the totals shown.

² Rounded to the nearest \$5,000,000.

³ Starting in 1966, data for Malaysia and Singapore have been reported separately. However, almost all of China's exports to Malaysia probably are re-exported through Singapore and thus are double counted in the official statistics. To eliminate this double counting, estimates of China's exports to Malaysia and Singapore include only those imports reported by Singapore. The few exports that go directly to Malaysia are probably roughly compensated for in total trade to the area by re-exports

through Singapore to Indonesia which have been reported as imports from China by both countries.

⁴ Official statistics from Indonesia are believed to include re-exports of Chinese goods from Hong Kong and Singapore as there have been no known direct imports of Chinese goods since 1966. (See app. A, Methodology.)

⁵ Less than \$2,500,000.

⁶ Net of entrepot trade with third countries.

⁷ Includes North Korea, North Vietnam, and Mongolia. As no official data on trade with China are reported by these countries, the figures are rough estimates based on miscellaneous and incomplete trade data and information on the extension and implementation of Chinese credits and grants. Commercial trade is assumed to have been balanced between exports and imports.

The Cultural Revolution affected foreign trade primarily through reducing the availability of commodities for export due to both production and transportation problems. One of the clearest indications of the effect of internal problems was the large reduction in coal exports to Japan—China's coal industry was particularly hard hit by labor problems in 1967–68. On the whole, however, there was little change in the commodity composition of exports (see table 11). A secondary effect was the reduction of imports in order to balance trade. The Chinese increased imports of some commodities, however, partly to overcome shortages caused by disruptions in domestic production. Among these commodities were chemical fertilizers, iron and steel products, and nonferrous metals (see table 12). The continued increase in imports of these commodities in 1969–70 seems to indicate that longer term considerations were responsible, but imports of nonferrous metals and fertilizers show signs of falling off in 1971–72 and the large steel imports in 1970 may well be related to new construction anticipated at the beginning of the new 5-year plan. Machinery and equipment imports fell sharply from \$455 million in 1966 to \$275 million in 1968, reflecting the falloff in capital construction and the hiatus in new contracts for complete plants. The rural sector was not badly affected by the Cultural Revolution and grain imports were reduced during this period. The following tabulation shows the percent various commodities comprised of imports and exports in 1965, 1968, and 1970:

Category	1965	1968	1970
IMPORTS			
Foodstuffs.....	28	23	16
Grain.....	22	17	13
Crude materials, fuels, and edible oils.....	20	16	17
Rubber.....	4	5	4
Textile fibers.....	10	5	5
Chemicals.....	13	17	15
Fertilizer.....	8	11	10
Manufactures.....	38	43	51
Textile yarn and fabric.....	2	2	2
Iron and steel.....	8	15	18
Nonferrous metals.....	3	7	10
Machinery and equipment.....	18	15	18
Other.....	1	1	1
EXPORTS			
Foodstuffs.....	26	28	32
Animals, meat, and fish.....	10	9	10
Grains.....	6	7	5
Fruits and vegetables.....	5	7	8
Crude materials, fuels, and edible oils.....	20	21	21
Oilseeds.....	4	4	3
Textile fibers.....	4	5	5
Crude animal materials.....	4	5	6
Chemicals.....	4	4	5
Manufactures.....	45	44	42
Textile yarn and fabric.....	14	14	17
Clothing.....	9	9	8
Iron and steel.....	4	1	2
Nonferrous metals.....	2	1	1
Other.....	5	3	(1)

1 Negligible.

TABLE 11.—CHINA: COMMODITY COMPOSITION OF EXPORTS, 1965-70¹

	[In millions of U.S. dollars]					
	1965	1966	1967	1968	1969	1970
Total.....	2, 035	2, 210	1, 945	1, 945	2, 030	2, 050
Foodstuffs.....	530	615	510	535	615	645
Of which:						
Animals, meat, and fish.....	205	230	170	175	210	215
Grains.....	115	150	140	130	115	110
Fruit and vegetables.....	105	120	125	140	175	170
Crude materials, fuels, and edible oils.....	405	480	440	415	450	430
Of which:						
Oilseeds.....	80	90	90	85	75	65
Textile fibers.....	75	105	100	90	120	100
Crude animal materials.....	75	90	75	100	130	115
Chemicals.....	75	90	85	85	90	105
Manufactures.....	915	920	850	850	820	860
Of which:						
Textile yarn and fabric.....	295	305	250	270	310	340
Clothing.....	190	185	170	180	195	155
Iron and steel.....	85	90	70	25	35	40
Nonferrous metals.....	40	40	35	25	35	25
Other.....	110	105	60	60	55	10

¹ Data are rounded to the nearest \$5,000,000. Estimates are based on data reported by trading partners. Where data are incomplete, as for most of the less developed countries and for many of the Communist countries, estimates are based on fragmentary information from trade agreements and press reports, and on commodity breakdowns available for earlier years.

TABLE 12.—CHINA: COMMODITY COMPOSITION OF IMPORTS, 1965-70¹

	[In millions of U.S. dollars]					
	1965	1966	1967	1968	1969	1970
Total.....	1, 845	2, 035	1, 950	1, 820	1, 830	2, 170
Foodstuffs.....	520	510	380	410	350	355
Of which: Grain.....	400	400	295	305	260	280
Crude materials, fuels, and edible oils.....	375	340	320	300	310	360
Of which:						
Rubber.....	70	85	75	85	145	80
Textile fiber.....	190	150	150	100	90	110
Chemicals.....	230	250	285	315	310	330
Of which: Fertilizer.....	145	155	200	200	205	230
Manufactures.....	695	910	945	775	850	1, 115
Of which:						
Textile yarn and fabric.....	40	35	45	40	30	45
Iron and steel.....	145	225	325	265	275	390
Nonferrous metals.....	50	55	85	125	225	210
Machinery and equipment.....	330	455	380	275	240	395
Other.....	25	25	20	20	10	10

¹ Data are rounded to the nearest \$5,000,000. Estimates are based on data reported by trading partners. Where data are incomplete, as for most less developed countries and for many of the Communist countries, estimates are based on fragmentary information from trade agreements and press reports and on commodity breakdowns available for earlier years.

B. Changes in Direction of Trade

Table 13 shows the share of China's total trade with various areas in 1965 and 1970. Non-Communist countries accounted for an even larger proportion of China's trade in 1970 than in 1965 as trade with the Communist countries, especially with the U.S.S.R., fell further.

Trade with most of the areas of the non-Communist world increased—Latin America and Southeast Asia being exceptions. The decline in trade with Latin America is accounted for by the fact that China no longer imports corn from Argentina. The breaking off of relations with Indonesia and a consequent decline in trade account for the decrease in Southeast Asia. The largest increases were with the developed countries, especially with Japan and with Western Europe. Despite the general decline in trade with Communist countries, Eastern Europe's share of China trade rose slightly during this period.

TABLE 13.—CHINA: PERCENT OF TOTAL TRADE BY AREA, 1965 and 1970

Area	1965	1970
Non-Communist countries.....	70	80
Developed countries.....	39	53
East Asia and Pacific.....	18	25
Western Europe.....	17	24
North America.....	4	4
Less developed countries.....	22	19
Southeast Asia.....	8	6
Near East and South Asia.....	7	7
Latin America.....	3	Negl.
Africa.....	4	5
Hong Kong and Macao.....	9	9
Communist countries.....	30	20
U.S.S.R.....	11	1
Far East.....	6	5
Eastern Europe.....	5	8
Other.....	8	6

In 1971 trade with the Communist countries rebounded, as trade with the U.S.S.R. more than doubled and large increases occurred in trade with Rumania. Trade with non-Communist countries also rose, even though trade with the developed countries declined. Trade with Hong Kong jumped sharply and China's search for industrial raw materials and political allies in the less developed countries resulted in a significant increase in trade with these countries.

C. Commodity Composition of Trade

The shift from foodstuffs to manufactures highlighted China's imports in 1965-70 (see table 12). Iron and steel products and non-ferrous metals were the primary recipients of the increase in manufactures; iron and steel imports nearly tripled and nonferrous metals imports more than quadrupled. Fertilizer imports also increased significantly as China continued to depend on foreign supplies for a large part of its fertilizer needs. Textile fiber imports declined, mostly because of a large reduction in raw cotton imports. Declines in imports of raw cotton reflect improvements in domestic production.

Foodstuffs exports surpassed imports for the first time since 1960 in 1965 and by 1970 exports were almost double imports. Other categories of exports did not change significantly from 1965 to 1970. Textile fiber and textile yarn and fabric exports have been increasing but clothing exports declined. Exports of oilseeds and nonferrous metals remained depressed throughout the period as China's production barely kept up with internal needs (see table 11).

IV. TRADE WITH NON-COMMUNIST COUNTRIES SINCE 1964

China gets all of its grain, rubber, textile fibers, and textile yarn and fabric and 95 percent or more of its iron and steel products, nonferrous metals products, and chemical fertilizer from non-Communist countries.³ These countries also are the source of the bulk of China's imports of machinery and technology, including specialized machinery, precision instruments, special steels and other metals which are undoubtedly of importance to its modern weapons program. The surge in imports of strategic materials in recent years suggest that the Chinese may have been doing some contingency stockpiling.

TABLE 14.—CHINA: ESTIMATED COMMODITY BREAKDOWN OF TRADE WITH COMMUNIST AND NON-COMMUNIST COUNTRIES IN 1970¹

Commodity category	Non-Communist countries	Communist countries
Total exports.....	1,570	480
Foodstuffs.....	555	90
Of which:		
Animals, meat, and fish.....	195	20
Grains.....	80	30
Fruits and vegetables.....	145	25
Crude materials, fuels, and edible oils.....	370	60
Of which:		
Oilseeds.....	65	0
Textile fibers.....	90	10
Crude animal materials.....	80	35
Chemicals.....	80	25
Manufactures.....	555	305
Of which:		
Textile yarn and fabric.....	260	80
Clothing.....	70	85
Iron and steel.....	15	25
Nonferrous metals.....	15	10
Other.....	10	0
Total imports.....	1,825	345
Foodstuffs.....	285	70
Of which: Grain.....	280	0
Crude materials, fuels, and edible oils.....	280	80
Of which:		
Rubber.....	80	0
Textile fibers.....	110	0
Chemicals.....	320	10
Of which: Fertilizer.....	230	(?)
Manufactures.....	930	185
Of which:		
Textile yarn and fabric.....	45	0
Iron and steel.....	370	20
Nonferrous metals.....	200	10
Machinery and equipment.....	255	140
Other.....	10	0

¹ Data are rounded to the nearest \$5,000,000. Estimates are based on data reported by trading partners. Where data are incomplete, as for most less developed countries and for many of the Communist countries, estimates are based on fragmentary information from trade agreements and press reports and on commodity breakdowns available for earlier years.

² Less than \$2,500,000.

The Chinese have diversified their sources of imports in recent years and are no longer dependent on a single source for particular products as they were in the 1950's. They get fertilizer from Japan, Western Europe, and the Near East; grain from Canada, Australia, and France; and natural rubber from Malaysia and Ceylon. And they still buy considerable quantities of machinery from Communist countries as well as from Western Europe and Japan.

³ Table 14 shows estimates of the commodity breakdown of China's trade with Communist and non-Communist countries in 1970.

Large trade deficits with the developed countries have been offset to a large extent by trade surpluses with the less developed countries and with Hong Kong and Macao (see table 15). The years in which this offset has not taken place—1967 and 1970—have brought action by the Chinese to redress the situation by holding back on imports and/or pushing exports.

TABLE 15.—CHINA: BALANCE OF TRADE WITH NON-COMMUNIST COUNTRIES, 1965-70¹

[In millions of U.S. dollars]

	1965	1966	1967	1968	1969	1970
Developed countries.....	-345	-425	-710	-630	-560	-880
Western Europe.....	-50	-145	-410	-290	-185	-305
Japan.....	-36	-31	-37	-123	-176	-345
Canada, Australia, and New Zealand.....	-259	-249	-263	-217	-199	-230
Less developed countries.....	50	125	255	270	225	260
Southeast Asia.....	170	130	165	160	115	150
Near East and south Asia.....	-30	50	45	70	75	50
Latin America.....	-100	-100	-5	10	10	5
Africa.....	10	45	50	30	25	55
Hong Kong and Macao.....	350	395	310	325	340	365
Total, non-Communist countries.....	55	95	-145	-35	5	-255

¹ Individual country data are rounded to the nearest \$1,000,000; all other data are rounded to the nearest \$5,000,000.

A. The Developed Countries

Trade with the developed non-Communist countries (the countries of Western Europe, Japan, Australia, New Zealand, and Canada) comprises about 50 percent of China's total trade. These countries provide two-thirds of China's imports but only take one-third of her exports. The developed countries provide almost all of China's grain and fertilizer imports, and over 80 percent of China's imports of manufactures (see table 16).

TABLE 16.—CHINA: COMMODITY COMPOSITION OF TRADE WITH NON-COMMUNIST COUNTRIES, 1970¹
(U.S. dollars in millions)

Commodity category	Total non-Communist countries	Developed countries ²										Less developed countries ³
		Total ³	Japan	Western Europe					Canada	Australia	Hong Kong and Macao ⁴	
				Total ⁴	West Germany	United Kingdom	France	Italy				
Exports.....	1,570	675	255	355	70	69	57	56	22	40	370	525
Foodstuffs.....	555	140	67	65	16	14	15	3	4	2	220	195
Of which:												
Animals, meat, and fish.....	195	55	33	25	1	6	12	1	(?)	1	125	15
Grains.....	80	5	3	5	(?)	2	(?)	0	0	0	23	50
Fruits and vegetables.....	145	50	26	20	6	3	1	2	4	1	37	60
Crude materials, fuels, and edible oils.....	370	285	123	155	39	23	18	36	1	4	25	60
Of which:												
Oilseeds.....	65	50	42	10	1	(?)	1	2	0	(?)	3	10
Textile fibers.....	90	90	36	55	4	8	9	28	0	(?)	2	0
Crude animal materials.....	80	60	6	50	22	8	5	2	(?)	1	8	10
Chemicals.....	80	55	23	30	5	9	6	4	1	2	10	15
Manufactures.....	555	195	42	105	10	23	18	13	16	32	115	245
Of which:												
Textile yarn and fabric.....	260	80	16	40	3	7	4	9	2	22	35	145
Clothing.....	70	30	10	10	1	1	(?)	1	8	6	15	25
Iron and steel.....	15	(?)	(?)	(?)	0	0	(?)	0	0	0	6	10
Nonferrous metals.....	15	15	(?)	15	2	0	6	0	0	(?)	0	(?)
Other metals.....	10	(?)	(?)	(?)	(?)	(?)	(?)	(?)	0	0	2	10

See footnote at end of table.

TABLE 16.—CHINA: COMMODITY COMPOSITION OF TRADE WITH NON-COMMUNIST COUNTRIES, 1970 1—Continued
[U.S. dollars in millions]

Commodity category	Total non-Communist countries	Developed countries 2										Less developed countries 6
		Total 3	Japan	Western Europe					Canada	Australia	Hong Kong and Macao 5	
				Total 4	West Germany	United Kingdom	France	Italy				
Imports.....	1,825	1,555	600	660	200	143	97	76	154	135	5	265
Foodstuffs.....	285	280	0	20	0	(7)	20	0	132	129	0	5
Of which:												
Grain.....	280	280	0	20	0	0	20	0	132	129	0	(4)
Crude materials, fuels, and edible oils.....	280	50	15	25	5	6	1	(7)	3	9	0	230
Of which:												
Rubber.....	80	(8)	0	(8)	0	(7)	0	0	0	0	0	80
Textile fibers.....	110	20	7	10	4	5	(7)	(7)	0	1	0	90
Chemicals.....	320	315	147	165	48	12	8	41	0	(7)	(7)	5
Of which:												
Fertilizer.....	230	230	97	130	(10)	(10)	(10)	(10)	0	0	0	(9)
Manufactures.....	930	900	437	440	147	125	67	35	19	4	5	25
Of which:												
Textile yarn and fabric.....	45	40	15	25	7	1	2	13	0	0	1	5
Iron and steel.....	370	370	249	120	77	10	5	3	(7)	(7)	(7)	(9)
Nonferrous metals 11.....	200	190	28	140	29	70	4	0	19	3	(7)	10
Machinery and equipment.....	255	255	120	135	23	13	54	18	(7)	0	2	0
Other 12.....	10	10	(7)	10	(7)	(7)	1	0	0	(7)	0	0

1 Figures rounded to nearest \$5 million for total developed countries, total Western Europe, and less developed countries, and to the nearest \$1 million for individual countries. Because of rounding, components may not add to the totals shown. Figures are adjusted to reflect Chinese imports c.i.f. and Chinese exports f.o.b.

2 Adjusted official figures except total Western Europe and Australia (see footnotes 4 and 5).

3 Total of Japan, Western Europe, Canada, Australia, and New Zealand.

4 Sum of adjusted official figures for Austria, Belgium-Luxembourg, Denmark, Finland, France, West Germany, Ireland, Italy, Netherlands, Norway, Sweden, Switzerland, and United Kingdom.

5 Exports are official data for Hong Kong plus estimates for Macao. Imports are estimates.

6 Estimates based on very limited information. Complete commodity breakdowns are available for 1970 for only a small number of countries and partial breakdowns are available for a few others. Es-

timates for the remainder are based on prior years' information and on information available on trade in particular commodities.

7 Less than \$500,000.

8 Less than \$2.5 million.

9 Freight adjustment was made independently, based on information on actual shipping costs.

10 Complete information on fertilizer imports by country is not available.

11 Data for nonferrous metals include official country data plus an estimate of nonferrous imports, especially copper, that are sold to China through the London Metals Exchange but have not been reported by the exporting country as sales to China.

12 Includes unreported trade.

The developed countries take about two-thirds of China's exports of crude materials and about half of her exports of chemicals and nonferrous metals and would take much larger amounts of these items if they were available. Any significant increase in Chinese exports to the developed countries, then, depends on China making such commodities as coking coal, petroleum, oilseeds, textile fibers, antimony, tungsten, mercury, and tin available.

1. JAPAN: THE LARGEST TRADING PARTNER

In 1965 Japan became China's leading trading partner and since that time Sino-Japanese trade has nearly doubled as shown below:

CHINA: TRADE WITH JAPAN, 1965-70¹

[In millions of U.S. dollars]

	Exports	Imports	Total
1965.....	221	257	478
1966.....	300	331	631
1967.....	266	303	569
1968.....	222	345	567
1969.....	239	415	654
1970.....	255	600	855

¹ Data are based on official Japanese statistics together with Chinese goods re-exported from Hong Kong and have been adjusted to show China's imports c.i.f. and China's exports f.o.b.

In 1970, trade with Japan was 20 percent of China's total trade; Japanese trade was 1.4 times greater than trade with Hong Kong, China's second leading trading partner. Sino-Japanese trade increased to about \$925 million in 1971. China's exports to Japan rose substantially with imports remaining near the 1970 level in keeping with Peking's policy of reducing its trade deficit.

In 1970 Japan was the most important source of China's imports of iron and steel (64 percent of the total), chemical fertilizer (42 percent), and machinery and equipment (30 percent). These three categories comprise nearly 80 percent of China's imports from Japan. Crude materials and foodstuffs are the most important Chinese exports; Japan takes about two-thirds of China's oilseed exports and more than one-third of China's exports of textile fibers.

Although Chinese trade accounts for only a small share of Japan's total trade—slightly over 2 percent in 1970—trade in certain commodities, such as chemical fertilizers, has been significant to Japan. A number of concessions have been made by the Japanese in hopes of increasing trade with China. However, the Chinese do not wish to increase their already large trade deficit with Japan. Thus large increases in Japan's sales to China must be linked to increases in Chinese exports. If the Chinese decide to resume exports of coking coal—which the Japanese are anxious to buy—and if the Chinese provide petroleum and additional oilseeds and foodstuffs, Sino-Japanese trade could be increased considerably in the 1970's.

2. WESTERN EUROPE: ANOTHER IMPORTANT SUPPLIER

Trade with Western Europe accounted for about one-fourth of China's total trade in 1970. Four of China's 10 leading trading partners are in Western Europe—West Germany (3d), the United

Kingdom (4th), France (8th), and Italy (10th). Like Japan, imports from Western Europe are concentrated in the products of modern industry—fertilizer, steel, nonferrous metals, machinery, and transport equipment. In 1970 Western Europe accounted for 57 percent of China's imports of chemical fertilizer, 31 percent of iron and steel, 67 percent of nonferrous metals, 34 percent of machinery and equipment, and 56 percent of textile yarn and fabric. These five categories comprise 83 percent of China's total imports from Western Europe. Again like Japan, most of China's exports to Western Europe consisted of manufactures and crude materials. In 1970, Western Europe took 55 percent of China's exports of textile fibers and 43 percent of China's exports of crude animal materials.

The commodity composition of Chinese imports from individual countries of Western Europe fluctuates from year to year. Nonetheless, China depends on particular countries for some types of commodities. For examples, France has been the only source in Western Europe for grain. Chemical fertilizers are imported mainly from the international consortium NITREX which is comprised of nine firms in West Germany, Netherlands, Italy, Belgium, Austria, Norway, and France. West Germany is by far China's largest source of iron and steel in Western Europe—over \$75 million worth in 1970. The United Kingdom and West Germany have been the major source of nonferrous metals, but in 1971 imports from the United Kingdom dropped off sharply as China purchased more of its copper directly from producing nations, mainly Chile, Peru, and Zambia. France was the major source of machinery and equipment in 1970 and 1971 due to large deliveries of trucks to China. Switzerland and Italy are the most important sources of metalworking machine tools in Western Europe; and Switzerland and West Germany provide sizable quantities of scientific instruments. The United Kingdom and West Germany are major sources of chemical fibers.

As to the commodity composition of China's exports to individual countries in Western Europe, textile fiber and textile yarn and fabric (mostly silk) comprise nearly two-thirds of China's exports to Italy but are much less significant in exports to the other countries. Exports to France feature animal, meat, and fish products. The United Kingdom buys relatively large amounts of Chinese chemicals, and France, nonferrous metals.

In the next few years Sino-Western European trade will continue to face three problems: (a) Western Europe's competitive position vis-a-vis Japan, particularly in bulk commodities such as steel and fertilizer where lower transport costs give Japan a considerable advantage; (b) the continued large Chinese trade deficit; and (c) the difficulties of increasing exports of traditional Chinese products to developed countries. However, China is likely to purchase many of the products of West European technology to implement the new 5-year plan, in part because Peking is unwilling to depend on a single source of imports. Thus, Sino-Western European trade should continue to rise at a moderate rate, and Western Europe should continue to be an important factor in China's total trade.

3. CANADA AND AUSTRALIA: GRAIN SUPPLIERS

Canada and Australia are China's leading grain suppliers. Trade with these countries depends largely on the success of the annual grain negotiations. In 1970, grain shipments from the two countries were nearly equal, but no grain contract was signed with Australia for 1971. Thus trade with Australia in 1971 fell by at least \$100 million from its 1970 level. In the last couple of years Canada has been selling larger amounts of nonferrous metals—mostly nickel, aluminum, and zinc—to China while Australia was a major source of pig iron in 1971. China will probably continue to require the products of Australia and Canada—they show no signs of discontinuing grain imports and a healthy Chinese economy can use the raw materials available in these two countries. On the other hand, neither country is a major importer of Chinese products—total Chinese exports to the two countries were \$62 million compared to \$289 million in imports in 1970—because the market for Chinese products is small.

B. Hong Kong and Macao: Principal Source of Hard Currencies

Hong Kong, China's second leading trading partner, is China's most important source of hard currency earnings—about \$600 million net in 1970. Earnings from trade, including entrepot trade, comprise about three-fourths of China's total hard currency earnings from Hong Kong. In 1970 China's exports to Hong Kong were \$354 million while its imports were only about \$5 million; thus, China earned \$349 million net in hard currency from this trade. In addition, Hong Kong re-exports substantial quantities of China-origin goods to third countries. These re-exports were \$113 million in 1970. The remainder of China's hard currency earnings from Hong Kong consist of remittances from overseas Chinese and earnings from PRC-owned businesses and investments in Hong Kong. Earnings from Hong Kong went up substantially in 1971—to more than \$700 million net.

China's trade with Macao is similar to that with Hong Kong. In 1970 China exported about \$16 million worth of goods to Macao while imports were insignificant.

Thirty-four percent of China's exports of foodstuffs go to Hong Kong and Macao; 60 percent of China's exports to these enclaves consist of foodstuffs (figures exclusive of re-exports). Most of the remaining exports are textiles and light manufactures.

C. Less Developed Countries: Large Trade Surplus

A large trade surplus with the less developed countries also helps China to offset its trade deficit with the developed countries. Since China last imported corn from Argentina in 1966, this trade surplus has been between \$220 and \$260 million annually (see table 15). Most of the surplus is generated in trade with Southeast Asia. China also has a significant surplus in its trade with the Near East and South Asia and with Africa.

In 1970, trade with the less developed countries comprised 19 percent of China's total trade—exports to these countries were 26 percent of China's total exports and imports were 12 percent of total imports. Trade was still below the peak levels attained in 1965 and 1966. However, in 1971, there was a sharp increase in trade led by increases in China's imports from Latin America (nonferrous metals, nitrates, and fishmeal) and by increased exports to Africa, South Asia, and Southeast Asia. The increase in nonferrous metals imports was largely a result of the changeover from importing through the London Metals Exchange to direct imports from producing countries. The increase in China's exports is closely related to expanded aid to countries such as Pakistan, Tanzania, and the Sudan.

Though total trade with the less developed countries has not fluctuated greatly since 1965, trade with individual countries and areas has changed sharply between 1965 and 1970 (see table 17). These diverse movements in trade can be traced mainly to changes in political relations between China and the particular country. Thus trade has fallen off drastically with Indonesia, Cambodia, Burma, Egypt,

TABLE 17.—CHINA: TRADE WITH THE LESS DEVELOPED COUNTRIES, 1965 AND 1970¹

[In millions of U.S. dollars]

	1965			1970		
	Total	Exports	Imports	Total	Exports	Imports
Southeast Asia:						
Malaysia and Singapore ²	123	116	7	190	141	49
Indonesia ²	109	67	42	33	28	5
Cambodia.....	21	14	7	5	4	1
Burma.....	44	25	19	1	1	(³)
Other.....	25	25	(³)	37	37	(³)
Total.....	320	245	75	270	210	60
Near East and South Asia:						
Ceylon.....	61	23	38	86	46	40
Pakistan.....	60	17	43	61	30	31
Egypt.....	71	28	43	34	13	21
Iraq.....	21	16	5	27	19	8
Syria.....	23	6	17	27	9	18
Kuwait.....	13	13	(³)	21	19	2
Other ⁴	22	19	3	52	42	10
Total.....	270	120	150	310	180	130
Latin America:						
Argentina.....	90	(⁵)	90	3	1	2
Other.....	18	4	14	9	7	2
Total.....	110	5	105	15	10	5
Africa:						
Tanzania.....	16	5	11	40	33	7
Sudan.....	22	6	16	30	10	20
Nigeria.....	18	16	2	27	26	1
Algeria.....	8	5	3	21	11	10
Morocco.....	23	11	12	20	12	8
Ghana.....	23	17	6	12	9	3
Uganda.....	21	3	18	4	2	2
Other.....	29	24	5	43	23	20
Total.....	160	85	75	195	125	70
Grand total.....	860	455	405	790	525	265

¹ Data are adjusted (see appendix A, Methodology) from figures reported in the Department of Commerce value series on free world exports and imports to Communist countries unless otherwise stated. Country data are rounded to the nearest \$1,000,000, totals to the nearest \$5,000,000. Because of rounding, components may not add to the totals shown.

² See footnote 3, table 16 and appendix A, Methodology.

³ Estimate based on data for other years.

⁴ Based on partial data for the year.

⁵ Less than \$500,000.

⁶ Includes Spain and Portugal.

and Ghana while expanding with Malaysia and Singapore, several Near Eastern countries including Kuwait, and with Tanzania, Algeria, the Sudan, and Nigeria. Trade with Latin America began shooting up in 1971 on the basis of trade agreements with Peru, Chile, and Guyana.

China's exports to the less developed countries consist largely of manufactures and foodstuffs; imports are predominantly crude materials, mostly rubber and textile fiber. Of China's total exports in 1970, exports to the less developed countries comprised a significant share of grain (45 percent), textile yarn and fabric (43 percent), fruits and vegetables (35 percent), and iron and steel (25 percent). Imports of crude materials, which comprised 87 percent of China's imports from these countries in 1970, were about 64 percent of China's total imports of such commodities. All of China's imports of rubber and four-fifths of the imports of textile fibers originated in the less developed countries.

V. TRADE WITH COMMUNIST COUNTRIES SINCE 1964

China's trade with the Communist countries appears to have bottomed out at about \$800 million each year in 1967-70 and is again on the upswing (see table 10). Increases in trade in 1971—mostly with the U.S.S.R., Rumania, and Yugoslavia—brought total trade up to well over \$900 million. More than one-half of China's imports from Communist countries consist of manufactures, mostly machinery and equipment (see table 14). Other significant imports from Communist countries are sugar, minerals, and metals.

A large share of China's exports to Communist countries consists of textile products. Other major exports include foodstuffs, crude animal materials, and miscellaneous manufactures. The market for these products in other Communist countries has been built up over the years and is likely to continue. As with the non-Communist countries, China's exports of mineral products have been at a low level since 1960.

A. The U.S.S.R.: Up From the Depths

China's trade with the U.S.S.R. fell to a low of \$47 million in 1970, about 2 percent of the peak level attained in 1959. In November 1970, however, for the first time since 1967, China and the U.S.S.R. signed a trade agreement. This agreement called for trade to increase to from \$135 to \$145 million in 1971. Actual trade probably was at the upper end of the range. Although details of the commodities exchanged are not available, China purchased AN-24 turboprop aircraft, MI-8 helicopters, and IL-62 long-range jet aircraft from the Soviet Union in 1971 indicating that aircraft made up a sizable portion of the increase in China's imports. China's exports probably consisted mostly of textile products, foodstuffs, and crude materials as in former years.

B. Eastern Europe: On the Upswing

China's trade with Eastern Europe has increased considerably in recent years and is likely to continue to grow in the near future. A large part of the increase has been with Rumania—total trade with Rumania increased from \$49 million in 1965 to \$108 million in 1970⁴

⁴ China also provided about \$25 million worth of goods to Rumania in 1970 as flood relief.

and probably reached at least \$140 million in 1971. Trade with Poland, Czechoslovakia, and East Germany has also gone up since 1965. Despite the increases, total trade with Eastern Europe in 1970 was still less than half the peak level of \$700 million achieved in 1958. Preliminary reports for 1971 suggest an increase of 10 percent.

Sino-East European trade, which is kept roughly in balance each year, enables both sides to conserve their hard currency earnings to buy the higher technology goods of the non-Communist countries. Eastern Europe's exports to China are mainly transport equipment and industrial machinery. This machinery and equipment supports important segments of China's industrialization effort. Some of the imports are important for maintaining or expanding production in the plants that these countries helped China to build in the 1950s. The cost to China of these replacements and parts is much less than if they had to be made domestically. In return for these exports; Eastern Europe is willing to accept Chinese textiles, meat products, and crude materials.

In February 1971, China signed a trade agreement for 1972-75 with Rumania. This is the first long-term agreement signed with an East European country since the 1950's. Since then trade had been conducted on the basis of annual protocols. The long-term agreement with Rumania calls for an unspecified increase in goods exchanges and is to "form the backbone of exchanges" between the two countries. Trade is being bolstered by shipment of Chinese commodities to Rumania on loans agreed to in November 1970 and October 1971 (which may amount to \$200 to \$300 million).

C. Albania: Special Relationship

Since 1960 when Albania first supported China's challenge to Soviet hegemony in the Communist movement, China's trade with its ally in Europe has been at a high level. A large part of this trade in effect has been Chinese aid—the difference between Chinese exports and imports. China supplies almost the whole gamut of Albania's needs, including machinery and equipment, iron and steel, nonferrous metals, and consumer goods. In turn, Albania is a staunch supporter in the Sino-Soviet dispute and a source of chrome ore, a strategic commodity.

D. Other Communist Countries

China's trade with North Vietnam has been falling off since 1968 because of a reduction in aid deliveries following the cooling down of the Vietnam war. On the other hand, Sino-North Korean trade has been expanding. Trade with Mongolia amounts to only a few million dollars each year. Overall, then, trade with the Asian Communist countries is somewhat below the peak levels of 1967-68 but currently is slowly rising.

Trade with Cuba consists mainly of Chinese imports of Cuban sugar in exchange for rice. China also imports a small amount of nickel from Cuba and exports soya beans and some other foodstuffs. Trade is well below the 1965 peak level, having steadied at \$135 to \$145 million annually between 1968 and 1971.

After years of strain, Sino-Yugoslav relations suddenly turned for the better in 1969, and trade increased from less than \$2 million that

year to about \$7 million in 1970 and about \$20 million in 1971. Exports to Yugoslavia consist of traditional Chinese products while imports consist of metal products, chemicals, and machinery. Trade will probably be expanded further as agreements have been concluded on Yugoslav exports of ships, ship engines, and aluminum. One shipyard alone has contracted to export four ships to China worth \$36 million. In 1969, in addition to signing a trade and payments agreement, an agreement was reached on the use of the Yugoslav port of Rijeka for the transit of goods in Sino-East European trade. Invisible receipts by Yugoslavia for the use of this port totaled about \$8 million in 1970.

VI. OUTLOOK

The level of China's international trade in the next few years, assuming the mood of China's leadership does not change greatly from the present, will depend largely on China's export capabilities. Although the Chinese could use greater amounts of foreign goods, the regime will almost certainly continue to restrict purchases abroad in order to keep trade roughly in balance. China's foreign exchange and gold reserves are not adequate to sustain large deficits for any length of time, and Peking has given no indication of intention to incur long-term indebtedness. Chinese exports are likely to grow at a slow pace because the demand for many of the readily available commodities is limited and commodities that are in greatest demand abroad seem to be in short supply in China at present. Therefore, total trade seems likely to grow at a fairly slow pace in the short term.⁵ Although long-term growth could be fairly rapid, a strong effort would be required to develop export markets and to increase production of those industrial raw materials—especially coking coal, petroleum, and metals—needed by the developed countries.

A. China's Internationalism and Effects on Trade

By moderating its international stance and by establishing diplomatic relations with a number of countries, China has laid the groundwork for substantial increases in trade with certain countries. These include Burma, Malaysia, and the Philippines in Asia; Chile, Peru, and Guyana in South America; Italy, Rumania, and Yugoslavia in Europe; and several countries in Africa and the Near East. Some of the trade expansion with these countries will be at the expense of other countries; for example, an unknown portion of China's copper imports are being shifted from the United Kingdom to Chile, Zambia, and Peru.

Chinese economic and trade delegations have been touring many countries, most prominently in Western Europe. While China is using these delegations to enhance its political posture, significant orders for machinery and transport equipment are likely to be placed. Also, after a hiatus of several years, China may well purchase complete plant equipment from Western Europe and Japan in the next year or so. Japanese sources reported in 1971 that the Chinese had filed inquiries for complete plants to produce ethylene oxide, vinylon, and painting materials.

⁵ The devaluation of the U.S. dollar in late 1971 may cause the value of China's trade as measured in current U.S. dollars to jump as much as 10 percent in 1972 with a physical flow of goods identical to that of 1971.

Another result of China's more relaxed foreign policies is a renewed interest in the Chinese market and in Chinese products by Japanese and Western businessmen. Examples of this phenomenon are the large number of businessmen who attended the fall Canton Fair in 1971 (6,000 to 8,000) and a recent visit to China of a high-level delegation of Tokyo businessmen—earlier in the year a similar delegation from the Kansai (Osaka-Kobe) area visited China. An exhibit of Chinese products was held in Yugoslavia in 1971, and one is scheduled to be held in Japan in 1972. Also, a number of countries have set up or are planning to set up exhibits in China, including France, Japan, Canada, and Sweden.

B. Possibilities for Trade With the United States

Some of the most significant developments in 1971 were related to changes in Sino-United States relations. One of these changes—the lifting of the U.S. trade embargo in April 1971—permitted commercial transactions between U.S. firms and Chinese trading corporations for the first time in two decades. Sino-United States trade in 1971, however, remained very small, totaling only about \$5 million. There were no known exports from the United States to China, and imports of Chinese foodstuffs, art materials, rugs, and curios came to the United States via Hong Kong and other countries. Some minor purchases of U.S. goods were made through subsidiaries of U.S. companies or indirectly through third parties.

Further developments in Sino-United States trade relations took place in early 1972 as a result of President Nixon's trip to China. Just prior to the trip, a further relaxation of U.S. controls on trade with China was announced, placing China in the same export control category as the U.S.S.R. and Eastern Europe. In the meantime, RCA announced the sale of a communications satellite ground station worth \$2.9 million to be installed in Shanghai in time for the President's trip. This marked the first major direct sale to China since the U.S. embargo was lifted.

The joint communique issued at the end of the President's visit stated, "Both sides view bilateral trade as another area from which mutual benefit can be derived * * *. They agree to facilitate the progressive development of trade between their two countries." The major development thus far has been the indication that U.S. businessmen would be invited to the Canton Fair. Further discussions regarding expansion of United States-China trade will undoubtedly take place at the Sino-United States talks being held in Paris.

Prospects for Sino-United States trade over the next few years depends to some considerable extent on policy decisions by both countries. For example, Chinese purchases from the United States depend on how China weighs its political objectives versus its desire for high technology goods available only in the United States, such as advanced computers and certain kinds of oil-drilling equipment. And, the availability of some items will depend on U.S. decisions regarding licensing of products for export to China. U.S. imports of Chinese goods are likely to continue to grow, even if much of this trade should continue to come via third countries. The level of these imports after several years of growth is impossible to determine,

but should they reach a per capita level equal to recent Canadian per capita imports from China, the result would be a flow of Chinese goods of about \$200 million annually. China could make good use of a matching flow of U.S. machinery, or wheat, if Peking so desired.

C. Export Potential

A major problem China will face if it is to increase its imports and conduct a larger foreign aid program is the expansion of its exports. The heart of the problem is the limited range of the export mix, which is dominated by foodstuffs, crude materials, textiles, and light manufactures, and which has changed only gradually over the People's Republic of China's history. The area of major concern is the non-Communist countries where trade is not conducted under bilateral agreements.

Exports to the developed Western countries face limited demand for traditional Chinese products such as bristles, feathers, and hog casings, as well as for raw silk, and silk and cotton textiles, which are being replaced by synthetics. Japan is somewhat of an exception because it provides a good, even though slowly expanding, market for many of these traditional Chinese goods. As for foodstuffs, Japan is a major customer, although it no longer imports rice; food exports to Western Europe must face the barriers of the Common Market. Besides textiles—including clothing—Chinese exports of manufactured goods consist largely of glassware, pottery, furs, wood and paper products, cement, bicycles, sewing machines, toys, office supplies, and other light manufactures. These are generally low-quality goods and meet with limited consumer acceptance in the markets of the developed countries.

The less developed non-Communist countries and Hong Kong have provided China with its best export markets. Exports to these countries consist primarily of foodstuffs and manufactures. Increased demand for Chinese foodstuffs in response to growing populations in the less developed countries will probably be moderated by increased food production in these countries. Chinese manufactured goods have enjoyed great popularity in the less developed world due to their low prices. However, as these countries develop their domestic industries, they will produce many of the same type goods, which will then compete with Chinese imports.

There are several possibilities for China to expand its exports. China may begin to sell more finished and semifinished goods rather than raw materials, since such products earn more for the same volume of raw materials. Also, there are indications from buyers at the recent Canton Fairs that the Chinese have become more amenable to buyer's demands on product specifications in order to make their goods more acceptable in developed markets. A number of the ancient Chinese skills, for example, in ceramics and textiles, can be revived to satisfy Western buyers of luxury goods. Another approach would be to offer larger amounts of industrial raw materials such as coking coal, petroleum, and nonferrous metals for which there is a large demand in the industrial West. At present it appears that China is only producing enough of these materials for its own industrial needs. The prospects for China inviting foreign development of its resources in return for

exports of raw materials as the U.S.S.R. has done with Japan in Siberia seem remote at present in light of current Chinese policy. In fact, Premier Chou En-lai has specifically disavowed any interest in this kind of arrangement. The recent Chinese diplomatic offensive and exchanges of trade delegations and trade fairs may help to open new markets, and the expanded foreign aid program should increase exports as these credits are drawn.

D. The Question of Long-Term Credits

In view of China's limited international reserves and export capabilities any sizable increase in imports would require the receipt of long-term credits. Such would be the case if China began the large scale importing of whole plants for the current 5-year plan. The receipt of long-term credits would be a marked departure from the current conservative financial policy. However, China has a good international financial reputation and if long-term credits were sought they would be available. West European countries have been willing to extend long-term credits for several years now and recently Japan has taken steps to void the Yoshida Letter, a commitment to Taiwan by the then Premier Yoshida to prohibit Export-Import Bank financing of Japanese exports to China.

APPENDIX

METHODOLOGICAL SUPPLEMENT: MERCHANDISE TRADE OF CHINA

I. SOURCES

A. Non-Communist Countries

The raw data used to estimate China's trade consist of official trade statistics published by China's trading partners. Most of this data is compiled by the U.S. Department of Commerce in the *Value Series* and the *Country-by-Commodity Series*. The *Directions of Trade*, a statistical publication of the International Monetary Fund, contains information on the trade of some of the less developed countries whose volume of trade with China is too small to be included in the Commerce Department statistics or whose data is published with an extensive time lag. For countries whose trade data are not available, fragmentary press reports and items in such publications as the *China Trade Report* concerning trade agreements are used to estimate the volume of trade.

B. Communist Countries

Trade data for the U.S.S.R. and the East European Communist countries are available in their official statistics. Press reports concerning trade and aid agreements and published statements of government officials provide fragmentary information on which to base estimates of trade with Cuba, Albania, North Korea, and North Vietnam.

II. ADJUSTMENTS

A. Freight Charges and Leads and Lags

Since the trade data published by non-Communist trading partners normally shows imports c.i.f. and exports f.o.b., freight (including insurance) charges must be subtracted from the import figures to obtain the value of China's exports on an f.o.b. basis, and at the same time freight charges must be added to the partner's export figures to obtain the c.i.f. cost of imports to China. In addition, the partner's import figures are recorded at the date of receipt of the goods, which lags behind the date of China's actual export of the goods. Similarly, the partner's exports are reported before receipt of goods by China, and an adjustment

must be made for this lead. Consequently, the partner's export figures must be lagged and the import figures must be "led" forward in time to adjust these data to represent the proper timing of China's imports and exports. For example, Western Europe's December import data lags roughly 2 months behind the date the goods actually were exported from China, that is, Western Europe's December imports are actually China's October exports. At the same time, Western Europe's August exports are actually China's October imports.

The closure of the Suez Canal in 1967 introduced changes in the adjustments of freight and for leads and lags. There was a 2-week break in deliveries and subsequent delays in moving freight. The leads and lags increased from 1 to 2 months for some countries in the Near East on the Mediterranean side of the Suez Canal.

The adjustments to the current export data of China's trading partners used to obtain the value of China's calendar year (N) imports are:

Area	Length of lead	Period of partner's data equivalent to China's calendar year (N)	Freight adjustment (percent)
Western Europe.....	2 months	November, N-1 to October, N.....	1 +15
Western Hemisphere.....	1 month	December, N-1 to November, N.....	2 +10
Africa.....	2 months	November, N-1 to October, N.....	+10
East Asia and Pacific.....	1 month	December, N-1 to November, N.....	2 +5
Except: Japan, Hong Kong, Macao.....	None	January, N to December, N.....	+5
Near East and South Asia.....	1 month	December, N-1 to November, N.....	+5
Except: Mediterranean countries.....	2 months ³	do.....	+15
Communist countries ⁴	None	January, N to December, N.....	None

¹ The freight adjustment was 10 percent before 1967 and 13.5 percent in 1967 and 1968.

² Separate adjustments have been made for grain imports from Australia, Canada, and Argentina that are based on actual freight charges in a given year.

³ Prior to the closing of the Suez Canal there was roughly a 1-month lead between the time goods were reported as exports to China and the time at which China actually received the goods as imports. The closing of the Suez Canal in June 1967 caused an immediate 2-week break in deliveries and a longrun change to roughly a 2-month lead. Goods shipped in June and normally adjusted to be shown as China's imports in July were not received until August. Thus, China's imports in July were recorded as zero for the following countries: Jordan, Malta, Syria, Turkey, Egypt, and other Near East countries on the Mediterranean side of the Suez Canal. As a result China's calendar year imports in 1967 were equivalent to 11 months of exports from these countries.

⁴ Data for the Communist countries are not presented in their published statistics on a monthly basis. The official year-books provide only annual data. Consequently, no attempt has been made to adjust for leads or lags. In addition, Communist countries show imports and exports f.o.b. border. Thus, the import figures shown by China's trading partners do not need to be adjusted to obtain the f.o.b. value of China's exports. Because of lack of relevant data, the Communist partner's export figures also are not adjusted even though the cost to China might include freight charges for the imports. In the past, the U.S.S.R. accounted for the bulk of this trade and much of the volume was overland trade. Thus, China's imports, which were valued f.o.b. border, would involve additional freight charges as domestic costs in its own currency. Eastern Europe, however, now accounts for much of China's trade with the Communist countries, and a large portion of this trade travels by sea. Thus, China's imports probably should include some adjustment for freight charges.

Adjustments to import data of China's trading partners to show the values of China's calendar year (N) exports are:

Area	Length of lag (months)	Period of partner's data equivalent to China's calendar year (N)	Freight adjustment (percent)
Western Europe.....	2	March, N to February, N+1.....	1 -15
Western Hemisphere.....	1	February, N to January, N+1.....	2 -10
Africa.....	2	March, N to February, N+1.....	-10
East Asia and Pacific.....	1	February, N to January, N+1.....	2 -5
Except: Japan, Hong Kong, Macao.....	0	January, N to December, N.....	-5
Near East and South Asia.....	1	February, N to January, N+1.....	-5
Except: Mediterranean countries.....	1	March, N to February, N+1.....	1 -15
Communist countries.....	0	January, N to December, N.....	0

¹ Before 1967 freight adjustments were based on estimates of costs for individual commodities. In 1967-68 a flat rate of 13.5 percent was used which was based on average rates of about 10 percent before the Suez Canal was closed and on additional costs due to the canal closure.

² Canada, Australia, and the United States report imports f.o.b. country of export. Since freight charges are not included in the import data of these countries, no freight charge adjustment is necessary to determine the f.o.b. value of China's exports.

³ Prior to the closure of the Suez Canal, imports recorded by these countries lagged roughly 1 month behind the date of export from China. Thus, China's June exports would normally appear in the July import statistics of the trading partner. The closure of the canal, however, caused a 2-week break in deliveries and increased the time lag. Consequently, China's June exports actually were included in the July and August imports of the partners. (The July figures were sharply reduced below normal levels.) Subsequently, China's July exports are assumed to appear as September imports of its trading partners, and this 2-month lag is expected to continue until the canal reopens. China's 1967 calendar year exports were thus equivalent to the import statistics of its trading partners for 13 months. After that, the statistics for 12-month periods with a 2-month lag corresponded to China's calendar year exports.

B. Other Adjustments

Two other major problems in deriving estimates of China's imports and exports are double-counting and unrecorded trade. Hong Kong re-exports of China-origin goods are subtracted from Hong Kong's imports from China and counted as imports from China by the final recipients. Hong Kong has published statistics on re-exports by country since 1967 and estimates for 1965-66 were based on the later data. For example, though Taiwan and Panama report no trade with the PRC, re-exports through Hong Kong amounted to \$1.7 million and \$2.69 million, respectively, in 1970. These figures have been included as China's exports to the two countries in this paper. Re-exports to Indonesia, however, are apparently included in the semiofficial data reported by that country so they were not added to the reported data. There also appears to be a significant amount of re-exports of Chinese goods through Singapore. While the volume and destination of Singapore's re-exports of Chinese goods cannot be calculated with any degree of accuracy, it is believed that most of the re-exports go to Malaysia. Thus all of Singapore's imports from China are recorded as Chinese exports to Singapore/Malaysia and official data for Malaysian imports from China are not counted.

CHINESE FOREIGN AID

By LEO TANSKY

I. SUMMARY AND CONCLUSIONS

Since 1953, the People's Republic of China (PRC) has made available a minimum of \$5.6 billion of economic and military aid. More than 35% of this total was committed during 1970-71. Approximately \$3.1 billion of the total extensions since 1953 have gone to Communist countries and \$2.5 billion to Third World¹ countries. Drawings by aid recipients totaled about \$3.7 billion at the end of 1971.

In the broad sense, Peking extends aid to both areas for the same purpose—to expand and consolidate its influence. As between areas, however, the motivations and tactics differ. The Third World is non-Communist and less stable politically and contains a wide variety of interests vital to the West. Chinese aid to these countries has been dispensed in order to establish and expand Peking's influence, to purvey Communist ideology and support radical regimes, and to undermine Western and, in recent years, Soviet influence.²

The PRC's aid programs in other Communist countries were originally designed to strengthen friendly regimes and to cement political relations. As Peking's hostility toward Moscow increased, the purpose of the programs shifted—to undermine Soviet influence by offering political and economic leverage to receptive Communist governments. This objective underlies recent Chinese concentration on the more independent East European countries. Peking has continued to aid Albania, has extended aid to Rumania for the first time, and has attempted to improve relations with "revisionist" Yugoslavia. New Chinese aid commitments to North Korea and North Vietnam also are designed to strengthen Peking's influence relative to Soviet influence.

The cost of foreign aid—as measured by the net outflow of men, machinery, materials, and weapons—now runs at least \$400 million annually, equal to about one-third of 1% of China's GNP. A large share of this outlay consists of semi-skilled construction workers who are in plentiful supply in China. Another large share, however, is represented by skilled personnel and by military goods, industrial materials, and simple machinery which could be used profitably in China. On balance, if the magnitude and outlays associated with foreign aid are weighed against the benefits, the costs of aid have been small relative to the political returns.

¹ The terms Third World and less developed countries are used interchangeably in this paper and include the non-Communist countries of Asia, except Japan; Africa, except the Republic of South Africa; and Latin America.

² Although the magnitude of Chinese economic aid to each area has been roughly the same, the discussion in this paper centers on Third World countries because the program there is more unique, has had greater political impact, and is of greater general interest.

II. ECONOMIC AID TO THIRD WORLD COUNTRIES

A. Magnitude and Direction

Since 1956, the Chinese have extended almost \$2.2 billion of economic aid to 28 less developed countries (LDCs) of the Third World. About 35% has been used.³ Nearly 55% of the total extended was made available during 1970-71 (see Table 1). Approximately one-half of the total aid committed since 1956 has gone to Africa. More than 40% has gone to Pakistan, Somalia, Tanzania, and Zambia. Almost one-fifth of the total is committed to a single project—the Tanzania-Zambia (Tan-Zam) Railroad. About 10% of total Chinese aid has been grant aid, consisting largely of commodities, foreign exchange, and medical, educational, and cultural equipment. The remainder is in the form of long-term, no-interest loans.

TABLE 1.—CHINA: EXTENSIONS OF ECONOMIC AID TO LESS DEVELOPED COUNTRIES, BY AREA, 1956-71
(In millions of dollars)

	1956-71	1956-60	1961-64	1965	1966	1967	1968	1969	1970	1971
Total.....	2, 196	180	543	73	118	52	54	(¹)	709	467
Africa.....	1, 112	26	247	27	41	22	0	0	454	295
East Asia.....	281	76	87	18	43	0	0	0	0	57
Latin America.....	44	0	0	0	0	0	0	0	0	44
Middle East.....	275	20	125	0	15	21	12	(¹)	43	39
South Asia.....	484	58	84	28	19	9	42	0	212	32

¹ Less than \$500,000.

THE EARLY YEARS, 1956-60

The Chinese economic aid program has grown by fits and starts. The severe fluctuations in the annual level of new commitments have stemmed mainly from political developments both in China and in the Third World. The program can be divided roughly into four phases. The first period, 1956-60, was one of slow development and growth in which the Chinese and Soviets appeared to be pursuing parallel aims. Aggregate Chinese extensions during those years totaled only about \$180 million and were provided to seven countries—Cambodia, Ceylon, Egypt, Guinea, Indonesia, Nepal, and Yemen (then under the Imamate). Although the Chinese held that aid should be provided only to revolutionary and anti-Western regimes, few countries met that criterion at the time.

ACCELERATION AND COMPETITION, 1961-64

During the second stage, 1961-64, the magnitude and distribution of Chinese aid expanded rapidly. About \$545 million was extended to 16 countries. Although the largest share was committed during 1963-64, the political groundwork for expanding economic relations was developed in the earlier years of the period. During these years, the emphasis of the Chinese aid program shifted to Africa—an emphasis that still obtains—as many new African states achieved independence and became receptive to Peking's overtures. About half of Chinese extensions in those years went to African nations, pri-

³ Not too much should be made of the low expenditure ratio. No country can implement project-type aid rapidly in the LDCs. Moreover, sizable drawings cannot yet be expected on the large extensions of 1970-71.

marily to countries like Algeria, Congo, Ghana, Mali, Somalia, and Tanzania which seemed to fit Peking's revolutionary criteria.

These years also witnessed the surfacing of the Sino-Soviet conflict and the struggle of the two Communist giants for influence in Third World countries. As the struggle intensified, Chinese aid commitments soared. Extensions climbed from \$12 million in 1962 to \$88 million in 1963 and jumped to \$311 million in 1964. This surge in Chinese aid commitments was accompanied by polemical exchanges between the two countries, as each sought to demean the other's program. For example, Chinese Premier Chou En-lai toured Africa around the beginning of 1964 and hit hard on the themes that the U.S.S.R. was ready to sell out Africa's interests in order to achieve accommodation with the West, that Soviet aid was costly, and that aid from Moscow carried dangerous strings. Seeking to make the most of China's limited capacity to provide economic assistance and to contrast unfavorably the Soviet aid effort, Chou put forward eight principles guiding China's aid policy, as follows:

1. Aid is dispensed on the basis of equality and mutual benefit;
2. The recipient's sovereignty is respected and no special privileges are sought;
3. Credits are provided interest-free or at a low rate of interest;
4. Chinese aid seeks to help the recipient become self-reliant;
5. Projects selected will require less investment and yield quick returns;
6. The best quality equipment will be provided at "international market prices;"
7. In rendering technical assistance, the Chinese will make certain that the personnel of the recipient country fully master such techniques; and
8. Chinese technicians will have the same standard of living as their job counterparts in the recipient country.

In other forums, the Chinese cautioned the Afro-Asian countries about becoming dependent on Soviet aid, complaining that Moscow had "even gone so far as to cancel aid, withdraw experts, and tear up contracts as a means of applying pressure."⁴ The Soviets, for their part, attacked what they regarded to be the poor record of implementation of Chinese aid and its "low technical level."⁵

While the upswing in Chinese extensions and the polemics between the two countries left the appearance of competition, in reality, China's meager resources prevented it from engaging in any meaningful economic aid competition. The U.S.S.R. extended more than \$1 billion of aid to LDCs during that period, but the largest part went to countries already receiving sizable amounts of Soviet aid, countries which were not likely to be swayed by Chinese offers. Only about \$325 million of Soviet extensions went to African countries—the only area where the Chinese offered any real challenge to Soviet influence—and more than 70% of that was allocated to Algeria as part of Moscow's overall Arab policy. Thus, while the Chinese programs may have affected the timing of some Soviet extensions, they did not significantly affect the pattern or magnitude of Soviet aid.

⁴ *Peking Review*, July 3, 1964, p. 20.

⁵ *Izvestia*, July 12, 1964, p. 4.

SETBACKS AND DECLINE, 1965-69

The Chinese aid programs eventually encountered various political setbacks and declined sharply in 1965-69. New aid commitments averaged only \$60 million annually during those years and generally went to countries already receiving Chinese aid. New commitments fell to almost nothing in 1969.

The general receptivity to Chinese aid in many LDCs began to diminish early in 1965. A series of military coups ushered in a number of regimes less inclined to extensive relations with the Communist countries. The repercussions of the abortive coup in Indonesia in 1965 cost the PRC its chief ally (and largest aid recipient) among the LDCs. Africans, in particular, began to attack Chinese activities. Many of them had become concerned over frequent Chinese references to the "excellent revolutionary prospects" in Africa as well as Chinese support for dissident African movements. Several African countries severed relations with Peking, others expelled Chinese personnel for dealing with opposition elements. The onset of the Cultural Revolution (1966-69) in China accelerated the decline in the economic aid program as Peking became preoccupied with internal affairs.⁶

THE NEW LOOK, 1970-71

The Chinese began to emerge from their self-imposed diplomatic isolation during 1969 and by 1970 were moving aggressively to recoup their diplomatic losses. During 1970-71, the Chinese extended nearly \$1.2 billion of economic aid to the LDCs. These commitments represent almost 55% of their total extensions since 1956. Included in Chinese peak extensions of nearly \$710 million in 1970 were more than \$400 million for the Tan-Zam Railroad and some \$200 million to Pakistan. Smaller amounts went to Ceylon, Guinea, Sudan, and Yemen (Aden). More than \$465 million were extended in 1971, with Somalia receiving about \$110 million. Sizable credits also were extended to Mauritania, Sudan, and Ceylon, and Peking revived \$57 million of unused credits to Burma in an effort to repair relations with Rangoon. Ethiopia, Peru, Chile, and Iraq received their first Chinese aid commitments, a total of some \$170 million in economic credits. Ceylon received a \$25 million hard currency credit, the largest single Communist foreign exchange aid to a Third World country.

Peking not only increased its aid sharply during the past two years but it also moderated its tactics in Third World countries in an effort to remove the subversive taint many countries associated with Chinese aid. Ideological rhetoric gave way to the pragmatic consideration of expanding Chinese influence. The Chinese have come to realize that the tactics of the early 1960's undermine their efforts to establish a long-term presence and that it is difficult to have normal state-to-state relations while rendering aid to dissident groups seeking to overthrow the host government. In this sense, they are where the Soviets were when they launched their aid program in the mid-1950s. Thus, Peking is making compromises with monarchies and military juntas and is courting such non-revolutionary regimes as those in

⁶ This is not to imply that aid ceased. The close relations with Pakistan and Tanzania developed during these years and ongoing programs continued. Peking, however, did not initiate any major policy initiatives in the Third World, but merely attempted to maintain existing footholds.

Iran, Kuwait, Turkey, and Ethiopia. Peking even has warmed to the Numayri regime in Sudan, which decimated the Sudanese Communists in mid-1971.

China's renewed efforts to gain respectability through its aid programs again have elicited a sharp response from Moscow. The Soviets again have attacked Chinese aid with claims that "the effectiveness of this aid is, in practice, very low" and that its technical level is poor because the "present technical level of China's own industry is such that * * * it is hardly in a position to render highly qualified assistance. * * *" In a new twist, Moscow claims that "the main purpose of Chinese credits is to ensure widening of exports of Chinese goods to the Asian and African markets."⁷ One Soviet journal states that "Peking has been trying to make its policy look respectable. Interference in domestic affairs has been less crude, it has been covered up carefully with smiling Yuan diplomacy."⁸

B. Character of Aid

The overwhelming share of Chinese aid has been extended for the construction of transportation facilities or has been provided as commodities and foreign exchange. About 40% of total aid has been allocated for the construction of railroads and roads using labor-intensive techniques. The Chinese extended more than \$400 million for the Tan-Zam Railroad, the largest single Communist financial commitment for an LDC aid project. The project involves the construction of an 1,100-mile railway from the Zambian copperfields to the port of Dar-es-Salaam in Tanzania. The Chinese also have built roads in Nepal, Pakistan, Yemen (Aden), and Yemen (San'a) and are to build roads in Somalia and Sudan.

About one-third of total Chinese aid has been in the form of commodities and foreign exchange. This contrasts with less than 5% of Soviet aid allocations for this category. Twenty-four countries have received such Chinese aid, which goes mainly to finance deficits in their budgets, to fund their trade deficits, and to cover some of the local costs of Chinese aid projects.

Of the balance of Chinese aid, some 15% has been obligated for light industrial projects, featuring textile mills, plywood and paper factories, food processing plants, agricultural implement plants, and other small enterprises requiring a minimum of imported raw materials. The only heavy industrial project undertaken by the Chinese is a heavy machine building complex in Pakistan. About 7% has been committed for agricultural and multipurpose projects, with the balance channeled into such miscellaneous projects as sports stadiums, conference halls, schools, hospitals, theaters, and hotels.

C. Terms of Repayment

The repayment terms of Chinese aid are almost unbeatable. All Chinese credits are extended without interest and are repayable in goods over 10-30 years after grace periods of 5-10 years. The Tan-Zam Railroad agreement, for example, calls for repayment over 30 years beginning in 1983. Repayment of the hard currency credit to Ceylon

⁷ *Radio Moscow*, June 26, 1971.

⁸ *Novoye Vremya*, No. 30, July 23, 1971, pp. 18-19.

also will begin in 1983. These terms contrast with Soviet credits which usually are for 12 years at 2.5% and Western official credits which currently average 30 years at 3% interest.

D. Chinese Financing of Local Costs

One of the advantages of Chinese economic aid is that their programs often provide long-term financing to cover the local costs of their projects. The rate at which an aid recipient accumulates local funds to finance its share of a project often determines the pace of progress on that project. The availability of such financing has contributed to the rapid implementation of many Chinese projects. Perhaps half the credit for the Tan-Zam Railroad, for example, will be used to import Chinese goods to be sold locally to generate funds for the Tanzanian share of the project. The U.S.S.R., on the other hand, often has encountered serious delays on projects it undertakes in many LDCs because it does not permit its credits to be used to finance local costs and it rarely provides goods to be sold domestically to raise the local currency.

E. Technical Assistance

ECONOMIC TECHNICIANS

The Chinese characteristically flood their aid projects with large numbers of their own personnel. The labor intensive character of Peking's aid also has contributed to the rapid implementation of many Chinese projects. This extensive use of Chinese technicians avoids many labor problems encountered under Western and Soviet programs which depend on local workers to perform all but the highly skilled and professional jobs.

* The number of Chinese technicians employed in LDCs has grown to sizable magnitudes over the years, rising from some 25 technicians in 1957 to an estimated 18,700 in 1971 (See Table 2). Prior to 1963, most Chinese technicians were employed in a few Asian countries. Since that time, the overwhelming share has been sent to African countries.

TABLE 2.—*Chinese economic technicians in less developed countries*¹

1957.....	25	1965.....	4,950
1958.....	85	1966.....	5,150
1959.....	850	1967.....	4,565
1960.....	975	1968.....	3,590
1961.....	1,415	1969.....	4,950
1962.....	815	1970.....	8,110
1963.....	470	1971.....	18,700
1964.....	2,160		

¹ Minimum estimates of persons present for a period of 1 month or more.

The number of Chinese technicians employed annually in the LDCs has fluctuated sharply and has been determined largely by activities connected with a few labor-intensive construction projects. During the height of construction of the San'a-Al Hudaydah road in Yemen in 1961, for example, more than 70% of all Chinese technicians in the LDCs were employed in Yemen. The growth of the number in the LDCs in 1964-66 was largely a function of the level of construction of a road in Nepal and several plants in Guinea and Mali. As work on

the Tan-Zam Railroad accelerated in 1970, the number of technicians in LDCs rocketed from an estimated 4,950 in 1969 to 18,700 in 1971, 14,000 of whom were employed on the railroad.

The large influx of Chinese technicians is made possible by their low cost. Peking bears all the foreign exchange costs, such as transportation and salaries, of the technicians. The LDC is required to pay only the local costs to maintain Chinese technicians, and these are covered by the Chinese credit.⁹ Since Peking requires that its technicians live at a standard comparable to that of their local counterparts, these expenditures are kept to a minimum. Local cost outlays for Chinese technicians are estimated at an average of \$55 per month per man.

TECHNICAL AND ACADEMIC TRAINING

In contrast with the large number of Chinese technicians sent to the LDCs, only 750 LDC technical personnel have trained in China. Most of them came from Cambodia and Yemen. About 700 Third World students—largely from Africa—had gone to China at the time Chinese universities were closed to foreigners in 1966. When the Chinese accept trainees and students, they usually pay for their accommodations and training expenses in China, while the LDC is charged for travel to and from China, internal travel, and pocket money for the trainee. Basic monthly expenses per trainee run around \$60–\$70.

F. Trade With the Less Developed Countries

As China's economic aid to the LDCs has grown, its trade with these countries also has increased (see Table 3). Trade rose from about \$245 million in 1956 to a peak of \$895 million in 1966. Although trade subsequently declined, it still has averaged about \$775 million annually. Since the mid-1960's, the LDCs have accounted for about 20% of total Chinese trade. China constantly runs a surplus in its trade with the LDCs, most of which is settled in hard currency. During 1967–70, these surpluses averaged an estimated \$250 million annually.

The commodity composition of Chinese trade with the LDCs has changed little over the past decade. Exports to the LDCs have consisted mainly of foodstuffs, textiles, fuels, edible oils, and clothing.

TABLE 3.—CHINESE TRADE WITH THE LESS DEVELOPED COUNTRIES, 1960–70

[In millions of dollars]

Year	Total Trade	Chinese Imports	Chinese Exports
1960	480	235	245
1961	400	175	225
1962	445	185	260
1963	495	190	305
1964	745	395	350
1965	860	405	455
1966	895	384	510
1967	775	260	515
1968	730	230	500
1969	805	290	515
1970	790	265	525

Source: U.S. Department of Commerce "Value Series." Data are adjusted to reflect Chinese imports c.i.f. and Chinese exports f.o.b. (See App. A of "International Trade of the People's Republic of China," this volume).

⁹ Local costs usually include board, pocket money, medical care, insurance, local transportation, and office facilities.

East Asian countries generally have accounted for most of Chinese-LDC trade. When political factors in the mid-1960's caused economic relations with Burma, Cambodia, and Indonesia to decline, Chinese-LDC trade shifted to the Middle East and South Asia. In recent years, China's most important LDC trading partners have been Ceylon, Egypt, Malaysia, Pakistan, and Singapore; in 1968-70 they accounted for 55% of Chinese trade with the LDC's.

III. ECONOMIC AID TO COMMUNIST COUNTRIES

The best available estimates place commitments of Chinese economic aid to other Communist countries at a minimum of \$2.2 billion through 1971 (see Table 4). The Communist countries currently receiving aid are Albania, North Korea, North Vietnam, and Romania. Cuba, Hungary, and Mongolia received Chinese aid commitments totaling nearly \$275 million during 1956-60, but have received no new aid extensions since that time.

TABLE 4.—CHINA: EXTENSIONS OF ECONOMIC AID TO OTHER COMMUNIST COUNTRIES, 1953-71

	[In millions of dollars]				
	Total	1953-65	1966-69	1970	1971
Total.....	2, 189	1, 224	540	325	100
Albania.....	359	164	195	(1)	.....
Cuba.....	100	100	.....	.....	.....
Hungary.....	58	58	.....	.....	.....
Mongolia.....	115	115	.....	.....	.....
North Korea.....	330	330	.....	.....	.....
North Vietnam.....	962	457	345	60	100
Romania.....	265	.....	.....	265	.....

¹ Large credit of unknown magnitude for 1971-75 development plan.

² Large credit of unknown magnitude for 1971-76 development plan.

The largest recipient of Chinese economic aid has been North Vietnam. Peking has committed nearly \$1 billion to Hanoi, most of which has been delivered. The aid extended during 1955-64 was primarily for modernizing North Vietnam's transportation and communications networks, for expanding its irrigation facilities, and for constructing industrial installations. Hanoi's requirements were altered sharply by the war, particularly during the bombing phase. Chinese aid during these years consisted largely of unrequited exports to meet shortfalls of foodstuffs and other goods and to repair bomb damage. The aid inflow during 1966-69 is estimated at an average of about \$85 million annually.¹⁰ North Vietnam apparently again began to receive substantial commitments of development aid from China during 1970-71.

Albania, because of its antipathy to Moscow, is the only other Communist country that has continued to receive annual inputs of Chinese economic aid. Since 1955, Albania has received commitments of at least \$359 million of aid from the PRC, almost all of which has been delivered. The larger share has been provided since 1966. Most of the aid has been used to cover Albania's trade deficit with China and with Western countries. The deficits have represented primarily imports of machinery and equipment with which the Chinese have built various light and heavy industrial projects in Albania. Under a

¹⁰ Soviet economic aid during these four years is estimated at about \$210 million annually.

credit of unknown magnitude extended in 1970, Peking has agreed to construct some 30 additional industrial installations, largely for exploiting Albania's mineral and petroleum resources.

North Korea is the third largest Communist recipient of Chinese economic aid. China made available a total of \$330 million in aid during 1953-60. Peking is not known to have extended additional aid until 1970 when the Chinese agreed to provide an unknown quantity of aid for North Korea's Six Year Plan (1971-76). The aid will be used largely for the construction of transportation and fuel storage facilities and light industrial installations.

As part of the effort to develop closer relations with the more independent East European countries, Peking extended about \$265 million of aid to Rumania in 1970. China's first aid to that country was a \$21 million grant in June for flood relief. In November, the Chinese extended a development credit of \$244 million. Under the credit, the Chinese will construct ceramics, glass, food processing, and other light industrial projects.

IV. CHINESE MILITARY AID

Chinese military aid, in contrast to its economic aid, has gone to only a handful of countries. North Vietnam, the largest recipient, has received an estimated \$750 million of Chinese military aid since 1955,¹¹ the bulk of it since 1966. Peking's military aid to North Vietnam has featured ground forces equipment, ammunition, and various support equipment. Deliveries of Chinese arms to indigenous guerrilla forces in Cambodia, Laos, and South Vietnam are handled and controlled by the North Vietnamese.

The only other Communist countries that have received sizable amounts of Chinese arms are Albania and North Korea. The magnitude of this aid, however, is not known. Peking has been the sole supplier of arms to Albania since the early 1960's. The Chinese have provided almost all the materiel for Albania's ground forces and have equipped and trained Albania's naval forces. The Chinese have not provided any significant amount of military aid to North Korea since early in 1969, but an agreement to provide such aid may have been signed in 1970.

The Chinese have provided only small quantities of military aid to Third World countries, probably no more than \$350 million in total since the mid-1950's.¹² Perhaps as much as three-fourths of the total has gone to Pakistan, which has been receiving Chinese arms since 1965. Pakistan has received MIG jet fighters, IL-28 jet light bombers, light and medium tanks, and a wide variety of ground forces, communications, and support equipment.

Tanzania is the only non-Communist country that is almost completely dependent on China for arms and training. Since 1964, Tanzania has received perhaps \$40 million of Chinese military aid commitments. The equipment being delivered includes MIG jet fighters, light tanks, patrol boats, and various ground forces and support equipment. The Chinese also are constructing naval and air facilities in Tanzania.

¹¹ Soviet military aid to North Vietnam during the same period is estimated at some \$1.7 billion.

¹² In contrast, the Soviet military aid program in the LDCs totals about \$9 billion.

The balance of Chinese military aid has consisted of some \$25 million to Indonesia (during the late 1950's), perhaps \$15 million to Cambodia (until Sihanouk's ouster), and smaller amounts to Congo, Ghana, Guinea, and Mali. The magnitude of arms moving clandestinely to "liberation groups," particularly in Africa, has not been significant. Moreover, much of this traffic moves with the approval of the country in which guerrilla groups are harbored—for example southern African groups in Tanzania and Zambia.

V. PROSPECTS

Foreign aid is likely to continue to serve as a major instrument of Peking's foreign policy. It will remain an important tool for strengthening relations with Communist regimes which are inclined to pursue policies independent of the Soviet Union. In the Third World, foreign aid has already enabled China to establish a strong presence in many Afro-Asian countries and to broaden the base of communication between Peking and the less developed countries. At present, it appears to be the only effective tool available for expanding Chinese influence in these countries and for countering that of other major powers.

The volume of new aid commitments undoubtedly will fluctuate with political and economic changes both inside and outside the PRC. In the near term, Peking is unlikely to extend its aid program to Communist countries other than those currently receiving aid. Most of these other countries are too closely controlled by Moscow and/or require assistance of a technological level not available in China.

Chinese aid to Third World countries will continue to emphasize projects which are labor-intensive. They are low in cost—as measured by the loss to China's own economy—and can be completed quickly. The geographical focus of Chinese aid will continue to be the Black African countries. Only in this area can Peking effectively challenge Soviet influence. The aid requirements—in terms of technology and costs—of most of these countries easily can be met by China. Moreover, Moscow's primary Third World interests are elsewhere and the Soviets are not likely to press too hard in Africa to outdo the Chinese. More Chinese aid may flow to Asian, Middle Eastern, and Latin American countries but not on a scale to rival Soviet aid.

When the Sino-Soviet struggle for influence in Third World countries first emerged, the issue centered on whether the USSR or the PRC would carry the mantle of leadership of the "liberation movement." The struggle, at least for the Chinese, now has shifted to winning allies and counterweights because Peking considers the USSR as a real threat to China's security. This does not mean that Peking has abandoned support for liberation movements. As a minimum it will aid those movements popular among Afro-Asian countries (in southern Africa, for example). Elsewhere, however, state-to-state relations will take precedence, as has been evidenced by Peking's neutral attitude toward recent dissident activities in Ceylon, Ethiopia, and Pakistan.

TABLE 5.—CHINA: EXTENSIONS OF ECONOMIC AID TO LESS DEVELOPED COUNTRIES, BY COUNTRY 1956-71

[In millions of U.S. dollars]

	Total	1956-60	1961-64	1965	1966	1967	1968	1969	1970	1971
Total.....	2,196	180	543	73	118	52	54	(1)	709	467
Africa.....	1,112	26	247	27	41	22	0	0	454	295
Algeria.....	92		52							
Central African Republic.....	4		4							40
Congo.....	25		25							
Ethiopia.....	84									
Ghana.....	40		40							84
Guinea.....	66	26			30					
Kenya.....	18		18						10	
Mali.....	55		42	10	3					
Mauritania.....	25									
Somalia.....	132		20	2	(1)	5				20
Sudan.....	82									110
Tanzania.....	256		46		8				42	40
Uganda.....	15			15					201	1
Zambia.....	218					17			201	
East Asia.....	281	76	87	18	43	0	0	0	0	57
Burma.....	84		27							
Cambodia.....	92	49			43					57
Indonesia.....	105	27	60	18						
Latin America.....	44	0	0	0	0	0	0	0	0	44
Chile.....	2									
Peru.....	42									2
Middle East.....	275	20	125	0	15	21	12	(1)	43	39
Egypt.....	106	5	80			21				
Iraq.....	39									
Syria.....	16		16							39
Yemen (Aden).....	55									
Yemen (San'a).....	59	15	29		15		12	(1)	43	
South Asia.....	484	58	84	28	19	9	42	0	212	32
Afghanistan.....	28			28						
Ceylon.....	85	26	15							
Nepal.....	62	32	9		19				12	32
Pakistan.....	309		60			9	2		200	

1 Less than \$500,000.

APPENDIX

NOTE ON SOURCES

The detailed information on Chinese foreign aid contained in this study is drawn from numerous official and non-official publications available to the public. A primary source of information concerning China's program in the LDCs—aid extensions, drawings on credits, technical assistance, and military aid—is the annual reviews of the Communist aid programs published by the Bureau of Intelligence and Research of the U.S. Department of State. The last of the series, "Communist States and Developing Countries: Aid and Trade in 1970," was published in September 1971.

Official publications, journals, and newspapers from LDCs and Communist countries also have been invaluable sources. Much of the discussion of Chinese aid to Communist countries during 1953-65 is based on Robert L. Price, "International Trade of Communist China, 1950-65" in *An Economic Profile of Mainland China*, Joint Economic Committee of the Congress, February 1967, pp. 589-90.

Among the academic discussions containing information on Chinese foreign aid, the most useful are the following: Alexander Eckstein, *Communist China's Economic Growth and Foreign Trade*, McGraw-Hill, New York, 1966; George T. Yu, *China and Tanzania: A Study in Cooperative Interaction*, University of California, Berkeley, 1970; and Bruce Larkin's *China and Africa, 1949-1970. The Foreign Policy of the People's Republic of China*, University of California, Berkeley, 1971.

