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AN ECONOMIC PROFILE OF MAINLAND CHINA

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Part III. POPULATION AND MANPOWER RESOURCES

POPULATION GROWTH AND DISTRIBUTION IN MAINLAND CHINA

BY

JOHN S. AIRD

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POPULATION GROWTH AND DISTRIBUTION IN MAINLAND CHINA

I. Sources of Information and Data [1]

The analysis of current demographic trends in Mainland China is essential to an understanding of China's principal social and economic problems and to an assessment of China's role in world affairs. Yet any such analysis is hampered from the start by the fact that demographic data for China are few and unreliable, and all efforts to estimate the size and rate of growth of China's population are fraught with considerable uncertainty.

The relevant information necessarily originates in Mainland China. The data come from censuses, surveys, and reporting systems which were planned, organized, supervised, and implemented by personnel of various agencies and special committees of the central or local governments. Information on data collecting methods and field operations is obtained mainly from directives, progress reports, discussions of experimental work, criticisms of officials, and reviews by statisticians, many of which are carried in the daily press or in technical journals. Information about conditions in China that either reflect or influence demographic trends comes from a much greater variety of sources, including the observations of foreign visitors. However, most of the sources of information on China are Chinese. This means, in effect, that we must see China first through Chinese eyes, and only then can we evaluate what we have seen in the light of worldwide demographic and economic experience.

Our dependence upon Chinese sources constitutes a major limitation on what can be done in analyzing demographic circumstances and trends. So far as data are concerned, the limitations are threefold: (1) the Chinese Communists have not collected very much demographic data in the 17 years since they gained complete control of the mainland in 1949; (2) much of the data they have actually collected have not, for one reason or another, been released; and (3) the data that have been released show some signs of internal inconsistencies and defective methods of collection, and it is reasonable to infer that more complete data would contain evidence of further deficiencies.

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[1] In footnote references, certain commonly used source designations have been abbreviated for convenience as follows:

American consulate general, Hong Kong:
- *Current Background* — *CB*
- *Extracts from China Mainland Magazines* — *ECMM*
- *Survey of China Mainland Magazines* — *SCMM*
- *Survey of China Mainland Press* — *SCMP*

Jen-min jih-pao (People's Daily), Peking — *JMJP*
Kuang-ming jih-pao, Peking — *KMJP*
New China News Agency — NCNA

This is not to suggest that official population data from Mainland China since 1949 are worthless, but rather to indicate that they may not be taken at face value.

Some inferences about defects in official data can be drawn from what is known of the methods and concepts employed in their collection and compilation, but here again there are complications. Although the texts of the central directives and instructions are available for most of the major demographic investigations conducted by the Chinese Communists, very few of the local directives are available. Local authorities were permitted in most cases to make their own adaptations of the central directives as required by local conditions, provided that all such modifications were cleared with the central authorities before being implemented. Hence, it is possible that in some areas the field instructions may have differed in important particulars from the original plan. In the case of the population registers set up after the 1953 census, almost nothing is known of the way in which local authorities tackled the formidable problem of updating the census records. In the case of the important experimental investigations of vital rates, which took place prior to the 1953 census, neither the central instructions nor the details of the field operations are described in any known source.

Whatever methods of investigation were ultimately decided upon at the local levels, there remains the critical question of how they were actually carried out. It must be assumed that in Mainland China, as in any other country, not all of the centrally devised procedures are fully understood and faithfully followed throughout the land. The more complex the instructions, the greater the likelihood that they will be misunderstood and incorrectly applied. The more difficult the task, the greater the likelihood that local officials and field personnel will devise more convenient expedients of their own if circumstances permit. The larger the scale of operations, the less the likelihood that supervision can be close or continuous. Serious derelictions were discovered and subjected to critical review in the press during several of the major investigations. Whether there were other derelictions, perhaps more serious, that were not detected and therefore not subject to exposure and reprimand, or whether the public review of the instances disclosed inhibited other infractions are both matters of inference. All that these materials indicate for certain is that neither observance nor evasion of the directives was total.

CHINESE COMMUNIST DEMOGRAPHIC INVESTIGATIONS

The Chinese Communists have thus far made six major efforts at collecting demographic data since coming to power. Listed in chronological order these are: (1) The land reform population investigations conducted by local cadres[1] under the direction of the Rural Work Department of the Chinese Communist Party, which began prior to 1949 in rural areas under Communist control and continued until early in 1953; (2) the urban population registers set up in major cities from 1949 through 1953 by the municipal departments of public security

[1] The term "cadre" (*kan-pu*) is applied to any technical or administrative functionary of the Chinese Communist Party, of the central or local governments, or of any other economic or political enterprise or organization.

under central direction; (3) the experimental vital registration carried out by the Ministry of Health between 1950 and 1954 in a sample of rural and urban areas; (4) the national population census taken during 1953 and 1954 by a committee consisting of personnel from a number of Government agencies under the general direction of the Ministry of Interior; (5) the rural population registers set up during the 1954–56 period on the basis of census records by the Ministry of Interior and maintained from 1956 at least until 1958 under the authority of the Ministry of Public Security; and (6) a field count of some kind undertaken during the summer of 1964 by the Ministry of Public Security.

The Land Reform Population Investigations.—The population data collected during the land reform investigations were an incidental by-product of an effort the primary purpose of which was to effect an economic, social, and political transformation of the countryside. Proclaiming the principle of Sun Yat-sen that "The people who till the land shall own it," the Chinese Communists declared in 1947 their intention of abolishing the rights of landownership by landlords, shrines, temples, schools, and institutions, and of redistributing the confiscated lands among the landless and land-poor peasants, together with livestock, houses, farm implements, grain stocks, and other properties.[2] It was expected that the peasants, once possessed of the title to these lands, would greatly increase their production, thus supplying the basis for a general economic advance. However, there is little doubt that the land reform was intended also to win political support for the Chinese Communist Party among the peasant masses and to destroy whatever political opposition the landlords and wealthy peasants might have mounted against the new regime. To secure the proper political effects it was essential that the lands and properties be distributed on what would be recognized as an equitable basis. This meant that it was necessary to conduct a survey of land, property, households, and population among the peasants within each village (*hsiang*) before the distribution could begin.

As the land reform population and economic surveys proceeded, it became apparent that the rural population was much larger than had originally been supposed on the basis of old population records inherited from the Republic of China reports of 1947 and 1948. The progress reports during 1951, 1952, and 1953 indicated steadily rising figures from an initial total of around 400 million, based on the 1947 population reports, to 409, 430, and finally to "over 470" million peasants. Although Teng Tzu-hui and the Party's rural work department, which directed land reform operations, were evidently quite confident of the validity of these figures, there were many indications that other officials in Peking distrusted them.

The distrust was probably due in part to the circumstances under which the figures were obtained. Despite the importance attached to land reform and the extensive planning and experimentation in preparation for it, the movement seems to have been in a state of chronic disorder from 1949 until its conclusion in 1953. The political

[2] "Basic program of the Chinese Agrarian Law, passed by the Nationwide Agrarian Conference of the Chinese Communist Party, Sept. 13, 1947," NCNA, North Shensi, Oct. 13, 1947; cited in Frank C. Lee, "Land Distribution in Communist China," *Pacific Affairs*, vol. XXI, No. 1, March 1948, pp. 30–32.

turmoil caused by the movement was at times acute, and the administrative problems within the Party chain of command were also severe, for the newly expanded staff of cadres was not able to implement effectively the Party's ambiguous directives and reportedly alternated between overzealousness and lassitude. Statistical work was also in a state of confusion, partly because local cadres were overburdened with demands from higher echelons for impossibly detailed statistical reports and partly because of the lack of statistical standards, trained statisticians, and central supervision.

However, the fact that the new population totals were much higher than those from the 1947 reports should not have occasioned surprise. The 1947 figures were probably defective and certainly out of date. Since there was no reason to suspect that the 1947 figures had exaggerated the actual size of the rural population, even the crudest of counts during land reform would probably have come up with larger figures.

The Urban Population Registers.—Meanwhile, the urban population registers, which were being set up in the major cities during these same years, also found larger populations than had been shown by the old figures. For some reason, the central authorities were less distrustful of these totals, and the unsystematic efforts of various government agencies to compile new total population figures for China during this period consisted largely in adding new urban population figures to old rural figures. However, the urban population totals, though probably a better representation of the actual size of the city populations than previous figures, were also defective.

The urban registration system was essentially a police activity; demographic investigation was not its primary purpose. From the beginning, the registers served as a means of apprehending or placing under surveillance deserters from the Communist and Nationalist armies, refugees from land reform, and former members of the Kuomintang who had sought to lose themselves in the cities. Later, they were used as a basis for rationing, school admissions, welfare claims, control of employment, control of migration, and other administrative purposes. The system depended upon the willingness of a people, traditionally distrustful of the police and wary of having anything to do with official records, to come to the police stations voluntarily to report changes in household composition. The administrative functions which were tied to the system did not seem to strengthen it much. There was some increase in registration following the imposition of food and cloth rationing in 1954, but at least a part of the increase was probably falsification in order to inflate rationing claims. Apparently there were other ways to obtain the necessities which were being rationed, however, and evasions were soon more serious than falsifications. In 1955, the campaign to exclude dependents of urban workers and other unwanted migrants from the cities resulted in large-scale dropouts from the registers as the expellees returned to the cities from which they had been expelled without reporting in at the police stations as required by regulations. The same problem occurred during the second major drive to reduce urban populations which was mounted during the early 1960's. There are still reports of large numbers of "black men" (unregistered residents) in the major urban centers.

Because the urban population registers lapsed repeatedly and needed frequent updating by police field checks, it must be assumed that the population totals drawn from them actually understated the size of the city population by a significant margin. The new municipal population figures were, like the land reform figures for the rural populations, widely quoted in the local press. The rural and urban figures were combined to produce new provincial totals, which were compiled in some of the atlases published in China between 1950 and 1953. Curiously, however, the new totals were not cited or otherwise publicly noted by the central authorities. Although it was subsequently revealed that the Ministry of Interior and the State Statistical Bureau had prepared their own compilations of these figures in 1952 and 1953,[3] the population figures authorized for general use in central agencies and in the provinces were still basically the 1947 compilation of *pao-chia* figures, which added to a total of less than 500 million.[4] Contrary to what has sometimes been asserted without benefit of documentation, there was never any sign of eagerness on the part of the Chinese Communist leaders to welcome a large population total. In fact, there is evidence of distinct reluctance to believe that the population could be as large as reported. A part of this evidence consists of the attitude of the Party toward the experimental investigations of vital rates conducted by the Ministry of Health during these years.

Experimental Vital Registration.—Experimental vital registration was initiated in a few areas in 1950. Its coverage was subsequently extended until, by the spring of 1953, it included a total of 77 registration areas with a population of 7,660,000. Of these areas, 58 were urban and only 19 were rural. The data were expected to indicate the level of birth, death, natural increase, and infant mortality rates and to provide some further information on causes of death. Presumably the Ministry of Health would not have ventured into so delicate an area as the measurement of population increase without authorization from government or Party leaders. But if there was some curiosity in high places about the growth of population there was also some anxiety about its possible implications. At the end of 1952, the Ministry of Health, which was anxious to acquire vital registration as part of its regular responsibilities, asked permission to expand the coverage of its experiments, and in the spring and summer of 1953 its officials drafted separate sets of regulations for vital registration in the urban and rural experimental areas. However, the number of experimental areas was reduced in October 1953, and in November 1954 the Ministry of Health was ordered by the State Statistical Bureau to terminate its investigations and to rely henceforth on the agencies responsible for "household control" work for its data on births and deaths.[5]

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[3] S. K. Krotevich, "The All-China Population Census of 1953"; in Moscow Institute of Economics and Statistics, *Poslevoenniye perepisi naseleniya* (*Postwar Population Censuses*), State Statistical Publishing House, Moscow, 1957, pp. 93–94.

[4] The situation was indicated by a Hong Kong Communist newspaper at the end of 1952 in response to a reader's query: "Latest Population Figures of China: 483,687,862," *Hsin-wan pao*, Hong Kong, Dec. 7, 1952; translated in *SCMP*, No. 466, Dec. 12, 1952, p. 18. The paper noted that the figures it quoted had been "promulgated for adoption and use throughout China in March 1950," but that "it was specified that if there were to be a more scientific investigation in the future, revision would be made."

[5] State Statistical Bureau, "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. 592–954.

One of the two reasons given for the November 1954 order was that vital legislation in urban registration areas had resulted in a duplication of function between the Ministry of Health and the Ministry of Public Security. This overlap was said to have imposed a great inconvenience on the people, who were required to report first to the local health office and wait for the district health investigator to certify the cause of death before they could go to the local security police office to secure a death certificate and a burial permit. The second reason for discontinuing the experimental work was that placing vital registration under the Health Ministry implied that birth, death, and natural increase rates were biological rather than socio-economic phenomena and thus gave encouragement to Malthusian view about population increase. What this peculiar argument actually signifies is not clear, but it certainly implies some concern lest the results of the vital rates studies lend support to those persons in China who drew pessimistic conclusions from high population growth rates.[6]

The 1953 Census.—Toward the end of 1952 it was apparently decided that the question of China's population must be resolved once and for all in preparation for the First Five-Year Plan which was to begin with 1953. Early in the spring of 1953 notice was given that a census would be taken throughout the country as of June 30, 1953, in conjunction with the registration of voters for the country's first national elections. The data from the census were to be used for national economic planning; hence, it was argued, the census would serve the interests of the people. As the preliminary steps of developing plans, setting up local census organizations, training census cadres, and testing investigation methods went forward, a massive propaganda campaign was unleashed to acquaint the people with the reasons for the census and to encourage their cooperation.

It was not expected that the census taking would be completed on or about the census reference date. According to the time schedule contained in the original census directives, which were issued on April 3, 1953, the greater part of the work would take place after the census date, the field work would be completed by the end of September 1953, and the final reports were to be in Peking by November 15. Almost immediately, however, census work fell behind schedule. Some units were slow in getting started; others began with such energy that agricultural work was disrupted and the peasants alienated, with the result that the census efforts had to be halted. In still other areas, flood and famine relief work had to be given first priority. Early in June, the central authorities ordered a slowdown so that food production would not be hindered. Most census work was suspended during the summer months and not resumed until late in the fall. By the end of 1953, the census had reached only 29 percent of the estimated population of China. In the early spring of 1954, local authorities were ordered to give census and elections work a higher priority so that it could be completed before the start of spring planting. Yet there were some areas which had not finished census taking in April 1954, more than a year after the original census directives were issued.

[6]Ku Wei-lin, "My Knowledge About the Termination of Vital Statistics Experimental Work." *T'ung-chi kung-tso t'ung-hsin* (*Statistical Work Bulletin*), No. 1, Jan. 25, 1955, pp. 36–37.

Moreover, there were complications in the organization and management of fieldwork and in the execution of the directives. Although the details required by the census were kept simple so that the information sought could be collected without undue difficulty, it was apparent early in the experimental period that some of the cadres were unable to understand and follow the instructions they had been given. All that was required of the census registrars was that they record the address of the household, the names, ages, sex, and ethnic status of all its members, and their relationship to the head of the household, and that all particulars be recorded as they were on June 30, 1953. If the interview took place before that date, there was to be a second check afterward to take account of any changes that might have occurred in the interim. Only the households and household members classified as "permanent residents" were to be included. Persons formerly members of the household and still members of the family who had since moved elsewhere were not to be counted. Persons who had been present less than 6 months and did not intend to remain were classed as temporary residents and were not to be counted. The assumption was that someone would report them in the place where they maintained permanent residence. Age on June 30, 1953, was to be recorded as of the Western method of reckoning; a conversion chart giving Western equivalents for Chinese lunar and animal-year ages was supplied to registrars. All of the definitions and procedures which were thought to be complex or unfamiliar were spelled out in detail in the initial census directives. The cadres were expected to study the directives and acquire experience in the course of experimental fieldwork and thus to equip themselves for the main effort.

However, there were many unanticipated complications. Residence turned out to be very hard to determine in some cases, and as the period of census taking dragged on and on, it became increasingly difficult to record all particulars as of June 30. There was also some confusion over the fact that the census was to include all permanent residents of whatever age while the voter registration was to include all persons aged 18 years and over regardless of whether or not they were permanent residents, except for those disqualified for political reasons or mentally or physically incapable of participating in the elections.

When the census results were finally announced in November 1954, the official notice claimed that local units containing a total population of 53 million had checked the accuracy of their census work and found that the overall rate of omissions was 0.255 percent and the rate of double counting was 0.139 percent. The net undercount of 0.116 percent would have made the Chinese Communist census the most accurate large-scale head count in the history of the world. The claim was both preposterous and foolish. Since the central authorities had not specified in their directives what sort of accuracy checks were to be carried out, they had no way of knowing whether the checks were, in fact, independent of the original enumerations or were little more than a boast of infallibility on the part of local census cadres. What seems to have happened is that some areas conducted actual recounts and found a large number of errors, while other areas either made no checks or went through ineffective motions and turned in reports of 100 percent accuracy. Since the "checks" of the latter

type evidently preponderated and since all reported instances of omissions and duplications were added together and divided by the total population in the areas reporting, the official accuracy figures are apparently an average of a little bit of honesty and a large amount of self-deception. By endorsing and publishing impossible claims, the regime appeared guilty at least of credulousness if not of fraud in the eyes of foreign statisticians, and the census effort, which might have been received with respect, was discounted for having vaunted too much. The total count could not possibly have been that accurate, and similarly exaggerated claims about the accuracy of the age data which were advanced in later years must also be rejected.[7]

The Rural Population Registers.—After the census taking was completed the authorities apparently decided to adopt a recommendation made toward the end of 1953 at a national civil affairs conference that the census records be made the basis for setting up population registration in rural areas to complement the system already in operation for some years in most of the cities. Efforts to establish rural population registers under the local departments of civil affairs were initiated in the fall of 1954, but the task had to be carried out with local funds and without central supervision, an indication of the low priority attached to it by the central authorities. The general regulations for registration on a countrywide basis were not issued until July 2, 1955, and their implementation in some areas was delayed until 1956. By the time the first of the rural areas had begun to comply with the regulations, the census records were already out of date, hence a new field check of some kind was necessary. To save effort and costs, the new check was usually combined with other administrative tasks requiring field investigations, with the result that whatever biases or other shortcomings were introduced by the administrative purposes became a permanent part of the registration records.

Soon after the rural registers were established, they began to encounter the same difficulties which had plagued the urban registers. It was one thing to mobilize a large force of cadres and activists to march the peasants to registration centers to report during a one-time census; it was quite another thing to get the same population to report to registration centers on their own initiative whenever there had been a change in household composition. Many people simply could not be convinced that it mattered whether the birth and death of an infant was recorded. If death occurred to an older child or an adult relative, the grieving parent or head of household sometimes found the requirement of having the name of the departed struck from the family register too painful to endure. Besides, especially after the public security police took over all registration, rural as well as urban, in January 1956, the manners of the registration clerks were often reported as either negligent or abusive toward the people who tried to comply with the regulations. According to accounts in 1956, the records were not maintained with thoroughness at any time following their establishment. Annual local and provincial population reports

[7] A more complete evaluation of the 1953 census methods and results is given in U.S. Bureau of the Census, *The Size, Composition, and Growth of the Population of Mainland China*, by John S. Aird, International Population Statistics Reports, Series P–90, No. 15, Washington, D.C., 1961, pp. 11–29 and 65–77.

were seldom submitted on time, and national population totals were seldom available within 6 months of the end of the year. The last official population total based on registration to be issued by the state statistical bureau was that for yearend 1957, which did not appear until September 1959. In January 1958, the Ministry of Public Security issued a new set of registration regulations, and in the next few years several municipal and provincial figures were released, but no new national figures. During the Great Leap Forward and the food crisis of 1959–62, population reporting on a nationwide basis seems to have disintegrated. The semiofficial *People's Handbook* is still publishing the 1957 yearend population total as the latest available in all its annual issues to the present.

The 1964 Police Check.—In the summer of 1964, there seems to have been one more effort to restore the defunct population registers and to derive from them at the same time a current total population figure. This investigation, which has sometimes been referred to as a "census," apparently was another field check by the security police, similar to those made in the cities in the early 1950's. No coverage of this effort was given by press or radio. Posters apparently were put up in some cities calling upon the population to cooperate. In view of the precautions taken by the regime to avoid drawing attention to the fact that an effort at restoring the registers was underway, some Hong Kong observers surmised that if the new population total was extremely high, the Chinese Communist leaders might prefer not to publish it. Subsequently, rumors of indefinite origin circulated in Peking to the effect that the authorities were surprised by the size of the figure reported.

In the latter part of 1964, Edgar Snow reported that Mao Tse-tung, in reply to a question about the size of the population, told him that "some people" thought it was 680 or 690 million but that he himself did not believe it could be that large. Snow then asked whether it were not possible to derive a population total from rationing records, and Mao answered that this could not be done because these records had been falsified by the people in order to claim larger rations.[8] These remarks would imply that at the end of 1964 the Chinese Communist leaders were thinking of a population total below 700 million and that Mao's personal inclination was to put it lower still. In midsummer 1966, however, the figure of 700 million was restored to currency by being cited in the communique issued after the Eleventh Plenary Session of the Eighth Central Committee, at which Mao himself was said to have presided.[9]

If the Chinese leaders no longer have population data in which even they can place any trust, the fact seems to have caused little official concern since the end of the food crisis of 1959–62. A second birth control drive was activated in 1962, but it lost much of its initial impetus by 1964, and appears to have been assigned a rather low priority among the current objectives of Party and Government. Some remarks

[8] Edgar Snow, "Interview With Mao," *The New Republic*, Feb. 27, 1965, p. 20.

[9] "Communique of the Eleventh Plenary Session of the Eighth Chinese Communist Party Central Committee," NCNA (English language dispatches), Peking, Aug. 13, 1966. A figure of 700 million as of 1966 is far below the trend of previous official figures. It cannot be rationalized with them except by assuming a major reduction of natural increase or perhaps even a net loss of population during the crisis of 1959–62. It is unlikely that the demographic consequences of that period were as severe as this would imply. The figure is probably best understood as a rhetorical figure not congruent with earlier statistical data on population.

about population elicited from high officials in interviews with foreign visitors in the past few years suggest that the Chinese leaders are confident of a longrun solution of the problem and feel no compulsion now to adopt emergency measures. Even the fact that China is supposed to have begun her Third Five-Year Plan in 1966 does not seem to have resulted in any renewed effort to get reliable national statistics on the population or the economy in general.

The full explanation of this anomaly would have to be sought in the domestic political situation of Mainland China as it is currently unfolding, which is too complex to explore here. However, it may be noted that since 1958 the faction within the Chinese Communist Party which has held the commanding positions in the higher councils has been generally distrustful of statistical objectivity and of the kind of professionalism required to sustain it. Its members prefer unquestioning loyalty and trust in Party policies. In the current stuggle for a "cultural revolution," which has laid greater emphasis on orthodox political faith than ever before in the history of the Communist regime in China, it is unlikely that the collection of demographic data will be resumed. Study of the population of contemporary China must therefore begin with an analysis of the data collected and published during the First Five-Year Plan period (1953–57).

LIMITATIONS OF OFFICIAL POPULATION DATA

The limitations of official population data pose a number of problems. First, the published figures are for the most part too incomplete to permit a detailed analysis of inherent biases and distortions, hence there is little that can be done to adjust them so that they may be used as corrected empirical data. Second, the original investigations failed to gather information on some essential aspects of population growth and change, such as age-specific birth and death rates and migration rates for local areas, without which there can be no thorough study of differential growth and redistribution of the population and therefore no effective evaluation of provincial and rural-urban population data. Third, the demise of population data collection after 1957 means that, as the brief period of statistical record becomes more remote in time, the connections between the present structure and trends and whatever demographic profile can be synthesized out of the data for the 1953–57 period becomes more tenuous with each passing year.

The lack of data means also that many standard features of descriptive demography cannot be covered in a review of the population of China. For example, there are very few statements that can be made about demographic characteristics of different regions and provinces or of rural and urban populations. Though data on age and sex composition apparently were collected and reported for local units during the 1953 census and should have been available also from the population registers for some later years, these data have not been released. The one official publication which may have contained them [10] seems

[10] The publication was entitled *Chung-hua jen-min kung-ho-kuo 1953-nien jen-k'ou tiao-ch'a tzu-liao* (*Data from the 1953 Population Census of the Chinese People's Republic*). It was issued by the State Statistical Bureau and printed by the Statistical Press in Peking in 1958. A prepublication notice appeared in *T'ung-chi yen-chiu* (*Statistical Research*), No. 2, February 23, 1958, p. 30, and an advertisement for the volume appeared in *T'ung-chi kung-tso* (*Statistical Work*), No. 11, June 14, 1958, p. 30.

not to have emerged from China, and so far as is known, has never been cited in any other study or article published within China. Information on family structure was contained in the census and registration records, and the latter could certainly have provided details on age at marriage and on age-specific and parity-specific birth rates and age-specific death rates. Registration should also have recorded the information needed to trace the direction and volume of migratory movements and to indicate the demographic characteristics of migrants. Apparently, such information as this remained implicit in the records, either because no authorization, personnel, or funds were granted for its extraction and processing, or because the analysis of data from the census and registration records might have revealed defects to the discredit of the data collection operations and the persons responsible for them.

Especial difficulty is encountered in using official data to trace demographic changes over time. The problem here is that demographic measurement was not uniform, and the trends apparent in the data may be partly or wholly due to changes in the completeness or coverage of the data. This applies to figures for the total population and for the population of particular provinces and municipalities. It also applies to birth, death, and natural increase rates. Official data for the total population of China and the proportions rural and urban, based partly on the census and registration reports and partly on estimation, the methods and assumptions of which are not explained, have been issued by the State Statistical Bureau (see table 1), but the figures have been affected to an indeterminable degree by the disintegration of the registration system.

The rates of population growth implicit in these figures are probably below the actual rates because of the evasion of registration by persons

TABLE 1.—*Size and rate of growth of the population of Mainland China: by urban and rural residence, 1949–56*

[Absolute figures are in thousands and relate to the end of the year]

Year	Total		Urban		Rural	
	Number	Percent increase during year	Number	Percent increase during year	Number	Percent increase during year
1949 [1]	541,670		57,650		484,020	
1950 [1]	551,960	1.90	61,690	7.00	490,270	1.29
1951 [1]	563,000	2.00	66,320	7.50	496,680	1.31
1952 [2]	574,820	2.10	71,630	8.00	503,190	1.31
1953 [3]	587,960	2.29	77,670	8.43	510,290	1.41
1954 [4]	601,720	2.34	81,550	4.99	520,170	1.94
1955 [4]	614,650	2.14	82,850	1.59	531,800	2.24
1956 [5]	627,800	2.14	89,150	7.60	538,650	1.29

[1] The total population estimates for 1949, 1950, and 1951 were based on the assumption that natural increase rates for the years 1950, 1951, and 1952 were 1.9, 2.0, and 2.1 percent, respectively. The urban estimates rest on an assumption of urban growth rates of 7.0, 7.5, and 8.0 percent for the same years.

[2] Derived from administrative reports from the provinces and municipalities adjusted to the end of the year.

[3] Based on the census figures for June 30, 1953.

[4] Registration figures.

[5] Based on incomplete registration reports supplemented by estimates. The rate of increase for the urban population was set at 7.6 percent on the strength of the fact that those cities which had reported showed an increase of 7.66 percent.

Source: "Data on China's Population From 1949 to 1956," *T'ung-chi kung-tso* (*Statistical Bulletin*), No. 11, June 14, 1957; translated in *ECMM*, No. 91, July 22, 1957, pp. 22–25.

expelled from urban areas who returned to the cities without official permission and because of general neglect of registration on the part of the public and registration officials alike.[11]

The distortions in the total population figures are undoubtedly a net product or average of the various distortions in the component totals for provinces, municipalities, and smaller units, some of which must exhibit much greater margins of error. One cannot be sure that the biases in figures for any two provinces or two municipalities are of the same magnitude or in the same direction. Hence, comparisons of figures may be made only in very general terms. Though distributions of the population by province and major municipality are available for yearend 1954 and yearend 1957 as well as for the census date, and some figures for individual provinces and municipalities are available for other years, assumptions about relative rates of growth are hazardous because of uncertainties about boundary definitions and the varying completeness of registration from one year to another. The figures for single years quoted in speeches by Chinese Communist officials cannot be trusted, because the speechmakers are often imprecise as to dating and coverage of the figures they use.

The official vital rates figures (see table 2) seem to have been based on a sample of reporting areas in which urban areas predominated, and there is no reason to expect that a heavily urban sample could provide an estimate of the levels of fertility and mortality in the whole of China. Presumably, the sample data were used initially because vital registration was not set up in the rest of the country until 1955–56, and even then there is reason to doubt whether reporting was universal. It is not unlikely that many reporting areas produced manifestly defective figures which the central authorities regarded with distrust. The failure to indicate whether the vital rates for 1956 and 1957 were based on a sample or on complete reports may be an indication of official embarrassment on this point. However, even if the areas reporting were fairly successful in securing public cooperation and maintaining records, what little information is available suggests that the resulting figures are at best a defective measure of birth and death rates for the whole country or for the sample areas.[12] The downward trend in the birth rate and at least a part of the reduction in the death rate shown in the official figures were probably due to increasing underregistration of both births and deaths.

For the reasons indicated, it is generally inadvisable to take official data from Mainland China at face value or to incorporate them uncritically into analyses the results of which may be affected by their biases. Except where the plausibility of the official data is under examination or where the object is to find out what conclusions might have been reached by Chinese Communist officials who relied on these figures, it may be better for most analytical purposes to use estimates in lieu of the official data.

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[11] For further discussion of the evidence on these points, see U.S. Bureau of the Census, *op. cit.*, pp. 31–45, and sec. I of John S. Aird, "Population Growth in Mainland China," in *Economic Trends in Communist China*, edited by Alexander Eckstein, T. C. Liu, and Walter Galenson, Aldine Press, Chicago (to be published in 1967).

[12] Vital rates for several major municipalities and the increase rates for the total population showed some fluctuation in 1954, the year in which the general food grain rationing system was instituted, which may be attributed to the registration in that year of births previously unregistered or to a temporary improvement in the completeness of registration. The rates subsequently returned to lower levels. (See the discussion in U.S. Bureau of the Census, *op. cit.*, pp. 36–40.)

TABLE 2.—*Official crude birth, death, and natural increase rates for Mainland China, 1952–57*

Year	Birth rate	Death rate	Natural increase
1952	37.0	18.0	19.0
1953	37.0	17.0	20.0
1954	37.0	13.0	24.0
1955	35.0	12.4	22.6
1956	32.0	11.4	20.6
1957	34.0	11.0	23.0

Source: S. Chandrasekhar, *China's Population: Census and Vital Statistics*, Hong Kong, Hong Kong University Press, 1959, p. 50.

In the following pages several series of estimates are presented which substitute assumed figures for the official data on the age-sex distribution obtained in the census of 1953, and the official birth, death, and natural increase rates for 1953–57, and some alternate magnitudes are recommended in place of the 1953 census population total. Since, for all practical purposes, official data end with 1957, estimates and projections for subsequent years are based entirely on alternate assumptions as to the demographic consequences of recent economic developments in China and the prospects for the future. Discussions of the distribution of population by region, by rural and urban residence, and by ethnic status necessarily depend on official data, since there is little basis for the substitution of estimates, and the conclusions are therefore only tentative.

II. ESTIMATES AND PROJECTIONS OF THE TOTAL POPULATION BY AGE AND SEX

Preparing estimates and projections of the population by age and sex requires a base population total or a range of totals, a pattern of distribution by age and sex for the base year, and a series of measures of fertility, mortality, and migration for all of the years for which figures are to be provided. For Mainland China, the most obvious choice for a base year is 1953, since the census of that year is probably the nearest thing to an actual enumeration of the population that China has ever had. This does not mean that the census total will suffice as the base population for all estimates and projections. The methods and circumstances of the census taking, the findings of some of the more conscientious postenumeration checks, and the general tendencies of census taking as indicated by census experience elsewhere all suggest that the true figure was probably higher than the one reported to Peking.[13] For some purposes a magnitude corresponding to the census total as of midyear 1953 may still have its applications, hence, in the estimates and projections presented here, the census total is retained as one alternative base population. For analyses which require estimates of the actual population of Mainland China during these years, it is advisable to test the hypotheses and conclusions using

[13] Further discussion of the biases inherent in the census methods and the reasons for suspecting other circumstantial influences toward a net undercount is presented in John S. Aird, "The Present and Prospective Population of Mainland China," in Milbank Memorial Fund, *"Population Trends in Eastern Europe, the U.S.S.R. and Mainland China,"* New York, 1960, pp. 98–104; U.S. Bureau of the Census, *op. cit.*, pp. 15–20; and John S. Aird, "Population Growth in Mainland China." (See note 11.)

population figures which contain allowance for probable undercount in the census. For this reason, alternate base totals representing undercounts of 5, 10, and 15 percent in the census are presented here. In the long run, the accumulating effects of alternate assumptions about rates of increase have more influence on the size of the projected population than does the size of the base in 1953, but in the short run, and certainly for the years from 1953 to the present, the size of the base population is a major determinant of the size of the projected total and of all component groups by age and sex.

THE 1953 CENSUS AGE-SEX STRUCTURE

The age-sex distribution obtained in the 1953 census was never released in an official publication, so far as is known. The official communique of November 1, 1954, gave only the totals for each sex among the population "directly surveyed" (574,205,940 out of the reported total of 582,603,417), and the number of persons 18 years old or older, 80 to 99 years, and 100 years and older.[14] An article in the Peking *People's Daily* on the same date gave the further information that children at ages 0 to 4 amounted to 15.6 percent of the total population and children 5 to 9 years of age constituted another 11 percent.[15] All other information on the census age-sex distribution comes to us indirectly by way of papers and articles by Chinese scholars, who were apparently given access to unpublished age-sex data during the comparatively openhanded years at the end of the First Five-Year Plan period. Sex ratios for a series of irregular age groups covering the whole population were made public in a paper by Tai Shih-kuang presented at the Indian Statistical Institute meetings in Calcutta in December 1956,[16] and an age distribution in percentages to the nearest tenth of a percent for ages 0, 1 to 4 years, and 10-year age groups up to ages 75 and over was given in a paper by Ch'en Ta sent to the International Statistical Institute meeting in Stockholm in August 1957.[17] Some further fragments of information about the census age-sex distribution were subsequently revealed by two other writers but these added little to what was known already.[18] In 1959, an article in a health journal gave a percentage age distribution to the nearest hundredth of a percent for ages 0 to 6 years, 7 to 19 years, and ten-year age groups until ages 60 and over, and contained a figure representing the 1953 census age-sex pyramid plotted in percentages for five-year age groups.[19] Although the pyramid was crudely plotted and reproduced, it is possible to take readings from its bars and, in conjunction with T'ien's and Ch'en's percentage age distributions, to derive approximations of the original census data.

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[14] "Communiqué of the Results of the Census and Registration of China's Population," NCNA, Peking, Nov. 1, 1954; translated in *CB*, No. 301, Nov. 1, 1954, p. 1.

[15] Pai Chien-hua, "600 Million People—A Great Strength for Socialist Construction of China," *JMJP*, Nov. 1, 1954; translated in *SCMP*, No. 926, Nov. 10–11, 1954, p. 34.

[16] Tai Shih-kuang, "1953 Population Census of China," Indian Statistical Institute, Calcutta, Dec. 20, 1956, p. 21. The sex ratio is the number of males per 100 females.

[17] Ch'en Ta, "New China's Population Census of 1953 and Its Relations to National Reconstruction and Demographic Research," International Statistical Institute, Stockholm, Aug. 8–15, 1957, p. 23.

[18] Pi Shih-lin, "The 1953 Population Census of China Is Scientific," *T'ung-chi kung-tso* (*Statistical Work*), 1957, No. 24, p. 17; Li Ch'in-k'o, "The Achievements of China's Population Census Are Not To Be Obscured," *T'ung-chi yen-chiu* (*Statistical Research*), 1958, No. 3, pp. 3–10.

[19] T'ien Feng-t'iao, "The Problem of Planned Childbirth and Population Increase in China," *Jen-min pao-chien* (*People's Health*), vol. 1, No. 5, 1959, pp. 462–463.

The 1953 census age-sex distribution presents a number of anomalies that cannot be explained satisfactorily on the basis of the probable demographic history of China in the years during which the 1953 population was generated. The proportions of the total population at ages 5 through 24 are lower than would have been expected, while the proportion at ages 75 and over is much too high. In these peculiarities the census age distribution tends to resemble those of a number of other Chinese population counts taken in the several decades before 1949 when the historical circumstances were quite different from those immediately antecedent to 1953. Even greater peculiarities are observable in the distribution of sex ratios by age from the census, particularly the rather high sex ratio for the age cohorts which should have been most affected by war-caused male mortality. In the absence of more detailed primary age-sex data, it is difficult to account for these features either in terms of historical causes or by identifying specific sources of bias. It is preferable therefore to substitute a hypothetical age-sex structure for that given for the census, because the anomalies in the latter would still be apparent in the projected age-sex structures after several decades and because they would also have some effect on birth and death rates.

The age-sex structures used in the estimates and projections presented in tables 5 and 6 were derived from a series of models which represent alternate assumptions about the demographic history of China for the past several centuries. Modified stable model population models were constructed for 1750 and projected from 1750 to 1850 using different levels of fertility, mortality, and natural increase, but following the general trend of rising and falling increase rates which can be inferred from historical information about changing living conditions. From 1850 through 1953, the models also include special allowances for catastrophes considered severe enough to have left visible marks on the age-sex structure as of 1953. The details of these reconstructions will not be repeated here.[20] Age-sex structures from two of these models were carried forward in the estimates from 1953 onward: One model assumes fertility levels equivalent to a crude birth rate of 40 per thousand in 1953 and a net increase of 15 percent in the total population between 1850 and 1953; the other assumes fertility levels equivalent to a crude birth rate of 45 per thousand in 1953 and a net increase of 35 percent between 1850 and 1953.

ESTIMATES FOR THE PERIOD 1953–65

Estimating the population by age and sex for the years from 1953 to the present requires certain assumptions about general trends in fertility, mortality, and natural increase, assignment of levels at key points along the trend lines, and interpolation of values for intermediate years. Net migration is a negligible factor and may be ignored. During the First Five-Year Plan period, age specific fertility levels probably did not change much. There may have been some increase in marriage rates during the first years of the regime as a result of the increasing general security of life after many years of war and civil disturbance. Higher marriage rates would have meant

[20] These are given in sec. III of the unpublished paper cited in note 11.

an increase in the fertility rates for younger women. There may also have been some general increase in the fertility of women in the childbearing ages due to improvements in general health and nutrition brought about by the public health programs and the system of food distribution set up by the new regime. On the other hand, the increasing separation of husbands and wives due to the Korean war, the large-scale migration of males from rural areas into the cities, the compulsory labor transfers, frontier settlement movements, and projects involving large numbers of laborers away from their home communities may have caused some reductions in fertility for the groups most directly affected.

The birth control campaign of the 1954–58 period did not receive strong official endorsement until late in 1956 and seems to have encountered much popular resistence and only limited cooperation from local cadres and health workers by the time it lost its priority about June 1958. Though some effects may have been achieved among women cadres and among female workers in the few factories where demonstration campaigns were pursued with vigor, it is doubtful whether the drive to popularize birth control could have affected perceptibly the birth rate for all China.

During the years of acute food shortage and general economic crisis, 1959–62, some of the factors sustaining a high marriage rate and high marital fertility rates were reversed. Not only was there general concern about whether the regime would be able to maintain order, but there were also signs of demoralization among Party, Government, and military personnel. Malnutrition reached such extremes that in some areas the list of symptoms included loss of libido and amenorrhea. It is hard to know how widespread these phenomena actually were or what effect they may have had on the birth rate. The accounts of the most severe distress came, of course, from refugees fleeing the mainland, who for a short period in the spring of 1962 were allowed to enter Hong Kong without restraint by the Chinese Communist border guards. But the refugees undoubtedly came from areas in which conditions were most depressed or anxieties most heightened; their representations, even if accurate, would not have been typical of the entire country. Furthermore, it is doubtful whether fertility could be extremely susceptible to the effects of undernutrition in a species which must have evolved under circumstances in which hunger was a common experience. Though definitive research is lacking, there is reason to believe that the effects of food crises on fertility are slight and of short duration. By the end of 1962, a general economic recovery was evidently under way. More recently this has leveled off somewhat, but economic distress is probably not a factor in determining fertility levels for the time being.

Even though fertility may have shown little reflecton of the crisis years, the response of mortality must have been immediate and marked. The symptoms of undernutrition reported from some areas were such as to suggest not only deficiencies in particular food elements but also generally low caloric intake. Though the distress was by no means uniform, varying degrees of undernutrition must have been extremely widespread, and it is to be expected that resistence to disease and capacity to recover would both have been affected. Though there may

have been few deaths directly attributable to starvation, there must have been a general increase in mortality from other causes during the worst years of the crisis.

These assumptions lead to the conclusion that age-specific fertility rates were fairly stable from 1953 through 1965, but that age-specific mortality rates followed a decelerating downward trend between 1953 and 1958, took a sharp rise from 1958 through the winter of 1961–62, and dropped back again rather quickly during 1963 and 1964, remaining constant thereafter. The trend of natural increase during the entire period would have been affected primarily by the trends in mortality, though influenced slightly by a downward trend in the crude birth rate caused by changing age composition. However, since the appropriate levels of mortality for the several critical years cannot be determined directly from the information available, they have been derived as a residuals of the assumed levels of fertility and natural increase.

Two fertility assumptions were made for the 1953–65 period, consistent with the two assumptions employed in the reconstruction of the 1953 age-sex structure—one equivalent to a crude birth rate of 40 per thousand and the other equivalent to a crude birth rate of 45 per thousand in 1953. Four assumptions about natural increase in 1953 are associated, two each, with the two assumptions about fertility, making a total of four series of estimates for the period. Increase rates of 22.5 to 20.0 per thousand are combined with the higher birth rate and 20.0 and 17.5 per thousand with the lower. (See table 4.) The increase rates for all four models are permitted to rise about 2.5 points through falling mortality levels by the end of the First Five-Year Plan period. During the crisis years, natural increase declines in the various models until it is as low as 15.0 per thousand in the highest model and below 10.0 per thousand in the lowest. By 1965, natural increase is almost back to the 1953 levels, though mortality is as low as it was in 1958; the reason is that the crude birth rate had been depressed by a decline in the proportion of the population who are females in the childbearing ages. This decline results largely from the relative increase in the proportion of children under 15 years of age.

PROJECTIONS FOR THE PERIOD 1966–85

Positing assumptions about the determinants of future demographic trends in Mainland China is even more problematical than making assumptions about those of the recent past. In the latter case there is at least descriptive information to be interpreted and represented in quantitative terms which, however uncertain, presumably bear at least some resemblance to reality. Projections for the future require alternate assessments of prospective economic, social, and political conditions specific to China. The past experience of other countries may be totally irrelevant. Assumptions for China must make adequate allowance for what cannot presently be known, and are necessarily widely divergent.

The immediate prospects for the population of China are in large measure contingent on the outcome of the struggle to make the rate of increase in food production exceed the rate of increase in population.

During the First Five-Year Plan period, when official figures were being compiled on food and population, the per capita grain figures declined in 2 years out of the 5, and some doubts were expressed in the press as to whether the 5-year average gains indicated by the figures could be trusted or whether, in fact, the food situation was worse than before 1949. After 1957, there were no figures comparable with those for earlier years, but the food crisis of 1959–62 indicates more clearly than official data could that the subsistence margin in China remains very narrow. Extrapolations of economic takeoff based on the easing of food problems during the past 4 years may therefore be premature. The possibility that China might presently begin to escape from the pressures of population on food supply and proceed at an accelerating pace along a stable course of general economic development cannot be excluded categorically. But it is at least equally possible that China will continue for an indefinite period, as in the immediate past, to labor through cycles of alternating crisis and recovery without much forward motion. It is not impossible that a coincidence of unfavorable circumstances in agriculture, perhaps exacerbated by problems in the economic, political, social, or military spheres, may precipitate a major catastrophe resulting in a net decrement in the population.

Turning to the demographic implications of these alternative prospects, the outlook for fertility ranges from continued high age-specific fertility levels to the beginning within the next few years of a gradual downward trend. High levels will probably persist as long as neither deliberate policies nor domestic economic and social changes are able to alter the basic social institutions which have maintained high birth rates in centuries past. Falling birth rates could be achieved through changes in the customs affecting average age at marriage, the proportion of women marrying, the stability of marital relationships, and the acceptance of contraception, sterilization, and abortion. Official policies may influence the direction and speed of these changes if properly conceived, but policy cannot be expected to bring about a revolution in values and social institutions unless reinforced by other major social changes. In most parts of the world, changes in fertility patterns seem to have been associated with changes in the basis of economic security and in general living levels. Only when the enhancement of both is clearly dependent upon restricting the number of children born will there be sufficient motivation to overcome whatever traditional barriers stand in the way of widespread adoption of methods of family limitation. In Mainland China, the relative scarcity of consumer goods, the relative uniformity of wages, and the relative security of employment and of health and welfare services do not uniformly point to the advantages of having fewer children in the effort to improve the family's economic status.

For the present, it is doubtful whether the changes in political and economic institutions attempted by the Chinese Communists have sufficiently penetrated the institutional infrastructure which is most directly responsible for fertility behavior to reverse customs and motivations toward high fertility. The discussions in Chinese newspapers and journals of the "socialist transformation" of the countryside contrast sharply with some reports of visitors and refugees which describe the persistence of traditional practices and relationships in villages.

Despite some sanguine views expressed in the press in 1957 and 1958, it is doubtful whether the conspicuous mass propaganda that climaxed the first birth control campaign, which began in 1954 and ended in 1958, had achieved a significant degree of success in either urban or rural areas before its termination. In a population as large as China's, in which fertility control is virtually unknown, what may be significant for the pharmaceutical and rubber industries may not be significant for the crude birth rate.

Moreover, it is not completely clear what the official position now is on the question of fertility control. Since 1962, encouragement has again been given to contraception, sterilization, and the postponement of marriage. The three-child family has been declared ideal, and abortion is once more available under the liberal provisions which had been attacked by the China Medical Association in 1957. However, the implication in some official statements that the matter is not regarded as very urgent is at least consistent with the moderate tone and scale of the current propaganda campaign. Though there have been some reports that food and cloth rations and maternity leave are not granted after the fourth child, these potentially repressive measures are apparently not universally or strictly applied. Falling birth rates would no doubt be welcome, but China's leaders do not seem to have attached high priority to this objective during recent years.

The prospects for mortality range from a resumption of the downward trend of the early 1950's at a somewhat more gradual pace to a continuation of present average levels with periodic sharp increases during intervals of domestic crisis. If a moderate economic development gets underway in the near future, a part of the investment capital created by the growing economy will probably be set aside for general health improvement. Health services are popular with the people, whose cooperation must be cultivated even in an authoritarian system, and may also increase the productivity of labor by cutting worktime loses due to illness and by extending the average working life and thus recouping more on the investment in labor force training and experience. The Chinese Communist commitment to general health improvement has been one of the more stable elements of domestic policy, though, like most other elements, it has not been served with unvarying funds and efforts. However, beyond a certain point, which may already have been reached, the per capita costs of further health improvements rise very sharply and the effects of these improvements on the death rate becomes less and less apparent. Moreover, it is one thing to provide the latest medical and surgical advances for Party leaders and important technical personnel in the major cities and quite another thing to make the same services generally available throughout the countryside. The dissemination of high cost services is not likely to be rapid under the most favorable circumstances. Hence, in Mainland China there is little possibility of an immediate marked decline in mortality levels.

Radical fluctuations in mortality levels during periodic food crises would probably mean no appreciable reduction of general mortality during successive periods of recovery, since a long-term downward trend in mortality would probably be possible only under conditions which would preclude food crises. In fact, the overall mortality trend

implicit in a situation of recurrent crisis would probably be upward unless the severity of the crises was diminishing. If the crises were to become more severe, the general trend of mortality might be sharply upward. If one such crisis reached sufficient severity and extent, perhaps in conjunction with other kinds of civil disturbance, to disorganize the system of emergency food distribution over a large and populous part of the country, mortality could attain a level not seen in China since the major famines of the nineteenth century. The scale of the catastrophe could well be far greater and the recovery less rapid than in former famines since the Chinese population today is probably more dependent than ever before in its history on the centrally planned and controlled storage, movement, and distribution of food in times of local distress. The return to a condition of local self-sufficiency would probably mean a lowering of the maximum population which the affected areas would be able to sustain even in normal times, and the combination of factors could result in a considerable ecological readjustment. Once the adjustment was completed, the relationship of human numbers to food resources and the general economic situation could be quite different from those which have prevailed during the past century.

The possibilities for future trends in fertility and mortality in China are derivative of alternate assumptions about future economic, political, and social developments, hence not all combinations and permutations can be incorporated into rational models. Generally speaking, models which anticipate successful national development imply falling birth and death rates, and ultimately, if the results of that development are not risked in a world conflagration, declining population increase rates associated with rising living levels. Anticipations of faltering or unsuccessful national development have more ambiguous implications for demographic model construction. If the degree of failure is enough to produce recurrent or chronic undernutrition, fertility may be somewhat depressed; if it is simply enough to cause a return to higher infant mortality rates and thus to remove some of the incentive for family planning, birth rates may remain relatively high or even increase. If China's economy continues as in the recent past to flounder periodically without making any significant per capita gains, the rate of increase in the population will probably be higher over a more prolonged period than if the economy gains or fails more rapidly hereafter.

Demographic models which embody assumptions of periodic crisis or a major catastrophe cannot be constructed by means of the simple extrapolation of trends in vital rates which serve reasonably well for countries in which more stable demographic development is expected. Some stylization of the demographic particularities of a given configuration of socioeconomic events is possible, but even so the models tend to have a specificity beyond what is customary in population projections. A recurrent crisis model must show fluctuating birth and death rates, but before their cycles can be laid out it is necessary to decide on the time of occurrence, degree of severity, and duration of each crisis, and also to make certain assumptions about the extent to which fertility and mortality are to be affected in each instance. Since there is no basic research along these lines to serve as a guide

in making assumptions, all such decisions are extremely arbitrary. Hence, it is obvious that no meaning can be attached to the demographic values projected for any particular year; it is only the overall pattern that is significant, and even that is only one representation of the general conception of recurrent crisis which might have been represented in a variety of other ways.

Four projection models for the 1966–85 period are presented here, each a continuation of one of the four models for the preceding period. Model III embodies the most optimistic prospects for economic development, with falling fertility and mortality levels. In model IV, development proceeds slowly for the next 10 years, followed by a period of deterioration during which fertility ceases to fall and mortality reverses its previous trend and begins to rise once more. Model I assumes that two crises similar in nature to that of the 1959–62 period occur within the next 20 years, each more severe and prolonged than its predecessor; fertility and mortality show corresponding variation, but the long-term trend in mortality is upward and that for fertility is unchanged. Model II traces the demographic effects of a catastrophic famine resulting in a net decrement of 100 million in the population of China over a 4-year period, 1970–73, followed by a recovery which restores fertility and mortality by 1985 to the levels assumed for 1965.[21]

The estimated and projected populations for selected years from 1953 through 1985 generated by the four models just described are given in table 3. Crude birth, death, and natural increase rates for the same years are given in table 4. Age-sex structures for each model as of midyear 1953, yearend 1965, and yearend 1985 are given in tables 5 and 6.

TABLE 3.—*Estimates and projections of the population of Mainland China, various models and series, for selected years, 1953–85*

[Jan. 1 figures in millions]

Model and series	1953	1955	1960	1965	1970	1975	1980	1985
Model I:								
Census-based series	576	603	682	743	817	868	926	960
5-percent undercount series	606	635	718	783	860	914	975	1,011
10-percent undercount series	640	671	758	826	908	964	1,029	1,067
15-percent undercount series	678	710	802	875	962	1,021	1,090	1,130
Model II:								
Census-based series	577	601	671	718	788	696	765	859
5-percent undercount series	607	633	707	755	830	733	805	904
10-percent undercount series	641	668	746	797	876	774	850	955
15-percent undercount series	679	707	790	844	927	819	900	1,011
Model III:								
Census-based series	577	601	672	734	814	904	1,003	1,104
5-percent undercount series	607	633	708	772	857	951	1,056	1,162
10-percent undercount series	641	668	747	815	904	1,004	1,114	1,226
15-percent undercount series	679	707	791	863	957	1,063	1,180	1,298
Model IV:								
Census-based series	578	599	662	715	779	853	938	1,026
5-percent undercount series	608	631	697	752	821	897	987	1,080
10-percent undercount series	642	666	736	794	866	947	1,042	1,140
15-percent undercount series	679	705	779	841	917	1,003	1,104	1,207

[21] Further details on the assumptions and methods employed in constructing these models and their underlying rationale are given in the previously cited forthcoming publication. See note 11.

TABLE 4.—*Estimated and projected crude birth, death, and natural increase rates for Mainland China, various models, for selected years, 1953–85*

[Per thousand population per year]

Year	Model I	Model II	Model III	Model IV
Crude birth rates:				
1953	45.0	45.0	40.0	40.0
1955	44.3	44.4	39.6	39.7
1960	42.3	42.6	38.1	38.4
1965	40.8	41.5	36.8	37.3
1970	38.2	36.0	35.5	36.7
1975	41.1	45.9	34.2	37.0
1980	39.1	48.8	31.8	37.6
1985	41.5	47.7	26.5	37.9
Crude death rates:				
1953	22.5	25.0	20.0	22.5
1955	19.5	22.2	17.3	19.6
1960	22.5	26.1	19.3	21.8
1965	18.4	20.9	16.1	18.6
1970	39.7	55.2	14.6	19.4
1975	21.1	31.7	13.2	17.8
1980	48.1	26.2	11.6	19.6
1985	27.5	24.6	9.8	21.5
Natural increase rates:				
1953	22.5	20.0	20.0	17.5
1955	24.8	22.2	22.3	20.1
1960	19.7	16.4	18.8	16.7
1965	22.4	20.6	20.8	18.7
1970	−1.4	−19.2	20.9	17.2
1975	20.1	14.3	21.0	19.2
1980	−9.0	22.6	20.2	18.0
1985	14.0	23.1	16.7	16.5

TABLE 5.—*Reported and estimated distributions of the population of Mainland China by age and sex, 1953*

[Midyear figures in percent of the total population]

Age	Official data [1]			Models I and II			Models III and IV		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	100.0	51.8	48.2	100.0	50.6	49.4	100.0	50.2	49.8
0 to 4 years	15.6	8.0	7.6	16.3	8.3	8.0	15.1	7.7	7.4
5 to 14 years	20.3	10.9	9.4	22.4	11.5	10.9	21.4	10.9	10.5
15 to 24 years	17.3	9.1	8.2	19.2	9.8	9.4	19.1	9.8	9.3
25 to 34 years	14.6	7.8	6.8	14.7	7.3	7.4	14.2	7.0	7.2
35 to 44 years	12.0	6.2	5.8	11.1	5.6	5.5	11.1	5.4	5.7
45 to 54 years	9.3	4.7	4.6	8.2	4.2	4.0	9.0	4.5	4.5
55 to 64 years	6.5	3.3	3.2	5.1	2.5	2.6	6.1	3.0	3.1
65 to 74 years	3.4	1.5	1.9	2.4	1.1	1.3	3.1	1.5	1.6
75 years and over	1.0	.3	.7	.6	.3	.3	.9	.4	.5
0 to 14 years	35.9	18.9	17.0	38.7	19.7	19.0	36.5	18.6	17.9
15 to 59 years	56.8	29.6	27.2	56.1	28.4	27.7	56.8	28.4	28.4
60 years and over	7.3	3.3	4.0	5.2	2.5	2.7	6.7	3.2	3.5

[1] According to data provided by Ch'en Ta and T'ien Feng-t'iao. (See text, pp. 355 ff.)

It can be seen from table 3 that under all but the most pessimistic expectations the population of China surpasses 1 billion by 1985, but the demographic circumstances accompanying this growth are quite different from one model to another, as table 4 shows. For model III, both birth and death rates fall at about the same rate through most of the period of the projections, with the result that natural increase is relatively constant at around 2 percent per year until almost the end of the period. For model IV, birth and death rates are higher and

TABLE 6.—*Estimated and projected distributions of the population of Mainland China by age, both sexes, 1965 and 1985*

[Yearend figures in percent]

1965

Age	Model I	Model II	Model III	Model IV
All ages	100.0	100.0	100.0	100.0
0 to 4 years	15.6	15.3	14.7	14.5
5 to 14 years	26.2	25.8	24.9	24.7
15 to 24 years	17.5	18.0	17.2	17.5
25 to 34 years	13.7	14.0	14.1	14.3
35 to 44 years	10.7	10.8	10.9	11.0
45 to 54 years	7.6	7.7	7.9	7.9
55 to 64 years	5.2	5.1	5.9	5.8
65 to 74 years	2.7	2.6	3.3	3.2
75 years and over	.8	.7	1.1	1.1
0 to 14 years	41.8	41.1	39.7	39.2
15 to 59 years	52.5	53.4	53.3	53.9
60 years and over	5.7	5.5	7.0	6.9

1985

All ages	100.0	100.0	100.0	100.0
0 to 4 years	14.7	17.9	12.5	14.7
5 to 14 years	23.0	21.6	23.6	23.7
15 to 24 years	19.9	16.6	19.2	18.6
25 to 34 years	16.7	17.2	15.5	15.2
35 to 44 years	10.4	11.1	10.4	10.3
45 to 54 years	7.4	7.8	8.2	8.0
55 to 64 years	4.8	4.9	5.8	5.5
65 to 74 years	2.4	2.3	3.3	2.9
75 years and over	.7	.6	1.5	1.1
0 to 14 years	37.7	39.5	36.1	38.3
15 to 59 years	57.1	55.5	56.6	55.3
60 years and over	5.2	5.0	7.3	6.4

almost constant for most of the period, with the result that natural increase is also relatively constant though not as high as for model III.

Model I has even higher fertility levels and high and irregular mortality levels. During the pit of each crisis there is some net decrease in population. The effects of the catastrophe in the early 1970's assumed in model II is apparent in the high death rates during the worst years and in the very high birth rates in subsequent years as a result of the concentration of surviving population in the childbearing ages. Other comments on age composition will be reserved until the discussion of characteristics of the population in section III.

What is most important for users of these population estimates and projections is to take due notice of the range of population figures that is possible within particular models and between one model and another. For 1953, the range within any given model produced by the varying base totals is 100 million; by 1985 this has widened to almost 200 million in some cases. The varying assumptions for different models, though they result in no appreciable difference in the totals in 1953, yield a range of almost 300 million by 1985. The total range of the figures by 1985 is from 859 to 1,298 million, or just under half a billion persons. Moreover, the varying magnitudes apply proportionately to the numbers of persons in various age groups by sex and the numbers of births and deaths implied by the different models. If

these ranges convey nothing else, they should serve to underline one important fact about the present and prospective population of Mainland China: the wide margin of uncertainty about its size and rate of growth.

III. Characteristics and Distribution of the Population

Whatever the exact total, the magnitude of China's population is its most conspicuous characteristic, and certainly an impressive one. But once the observation has been made that the Chinese mainland has the largest concentration of human beings under a single political authority anywhere in the world, very few of the essential questions that this observation prompts can be answered without going further into the characteristics of that population. From the standpoint of economic, political, and military power it is by no means a certainty that a large population is an unqualified advantage in proportion to its size, or that China's position and influence in world affairs should be accorded gratuitously on the basis of proportional representation. What matters most about a large population with a high rate of increase is whether its productive members have achieved a high and rising level of skill and productivity or whether numbers and increase rate alike constitute an impediment to development. Answers to these questions must be found by analysis of the characteristics of the population and of the economy as a whole and their changes over time.

However, there is very little that can be said with assurance about the characteristics of the population on the basis of available data. The 1953 census did not collect information on literacy, educational attainment, occupation, employment, or income, and though there were subsequent censuses and surveys of specific segments of the nonagricultural labor force which did collect some of these kinds of information, the coverage of the urban population in general is incomplete and there is virtually no coverage of the rural population. Although the census was supposed to provide data needed for national economic planning, economic characteristics of the population were not included on the grounds that this would have made the task of census taking impossible. General inferences may be drawn as to how the population is distributed with respect to these characteristics, but definitive official data are lacking. Only the strictly demographic characteristics of age and sex may be estimated for the whole population with any degree of assurance.

Distribution by Age and Sex

Regardless of the model used, the population of China has a relatively heavy concentration of persons in the younger ages in 1953. Between 35 and 40 percent of the population is under 15 years of age, whereas persons aged 60 and over account for only 5 to 7 percent of the total population. The 1953 age-sex structure is much influenced by the fact that mortality rates, including infant mortality, had fallen sharply from traditionally high levels after the pacification of the Chinese mainland in 1949; lower infant mortality rates combined with continuing high birth rates resulted in much larger cohorts of children in the ages 0 through 4 than had previously been found in those ages.

As the new larger cohorts grow older and are replaced by other enlarged cohorts, the proportion of the total population at ages under 15 actually increases for a time, until by 1965 it is either just below or a little above 40 percent in all models. The population aged 60 and over increases only slightly during the period 1953–65, but as a result of the increasing percentages of old and young, the proportion of the population in the adult years declines about 3 percentage points. By 1985, the proportion of adults rises in all models, but the population remains comparatively youthful, with 35 to 40 percent younger than 15 years of age. There are fairly marked differences between models in the proportion at ages 0 to 4 in 1985 as a result of the differences in the birth rates in the preceding 5 years. For example, model III has only 12.5 percent of the popultaion in the ages under 5, whereas model II has nearly 18.0 percent in these ages.

The 1953 census gave an overall sex ratio for Mainland China of 107.6 males per 100 females, which would mean that males exceeded females by over 20 million. The model age-sex distributions used in constructing the estimates and projections presented here include varying allowances for high mortality among males in wars, civil disturbances, and political executions during the century prior to 1953. They show sex ratios well below that of the 1953 census: 102.3 under one set of assumptions and 100.6 under the other. Even taking into account the range of totals for the base population as of 1953, these sex ratios imply a surplus of males of only from 1 to 7 million. Between 1953 and 1965, the models show very little change in the overall sex ratios; in models I and II they fall somewhat, whereas in models III and IV they rise somewhat, the difference due mainly to the differences in age-sex structure between the four models at the outset. Between 1966 and 1985, a long-term trend toward higher sex ratios is evident as the male-deficient cohorts from earlier years become a less and less significant part of the total population. By 1985, sex ratios for all four models exceed 101, and that for model II has almost reached 104 as a result of the especially high mortaltiy levels for females in the childbearing ages and among older age groups in the course of the catastrophe assumed in that model in the early 1970's.

The variability of estimates of China's age-sex structure can best be illustrated by citing the ranges in absolute figures for certain key age groups. Applying the maximum range in base totals to the various models, the total number of births in China is between 23 and 31 million in 1953, between 27 and 36 million in 1965, and between 30 and 50 million in 1985. The annual population increment is between 10 and 15 million in 1953, between 14 and 20 million in 1965, and between 14 and 24 million in 1985. The population in the primary school ages, 7 through 12 years, is roughly 75 to 90 million in 1953, 110 to 140 million in 1965, and 125 to 190 million in 1985. If both primary and secondarly school-age children are considered, the total number is roughly 145 to 175 million in 1953, 200 to 250 million in 1965, and 180 to 350 million in 1985. In the labor force ages, 18 through 60 years for men and 18 through 55 years for women, the range is roughly 290 to 340 million in 1953, 330 to 400 million in 1965, and 450 to 650 million in 1985.

These figures also indicate how the magnitude of China's population affects the scale of whatever economic, social, and political arrange-

ments must be made to provide the food, clothing, housing, health care, employment, education, welfare services, and other essential goods and services needed by particular age and sex groupings of a growing population. For example, around 1953 there is an annual increment of 1.0 to 2.0 million in the population of primary school ages; by 1965 this age group is increasing at the rate of 1.6 to 3.0 million a year; by 1985 the increase reaches 3.5 million a year under the most optimistic projections for economic development and fertility control. To have universal education through the secondary level by 1985, the schools in China would have to accommodate over 6 million new students annually under the same optimistic assumptions.

The number of new people entering the labor force ages each year is between 11 and 13 million in 1953 but rises to between 15 and 26 million by 1985; the annual net increase in the labor force ages rises from around 4 to 6 million in 1953 to a maximum of 15 million in 1985. The population 75 years and older, which amounts to only 3 to 6 million persons in 1953, reaches a maximum of nearly 19 million by 1985, according to the model with the lowest mortality levels (model III).[22] If current policies tending to separate aged persons from their families and accommodate them in old people's homes, euphemistically called "happiness houses" in China, are still in force by 1985, the national budget for this kind of "happiness" will have to be greatly expanded. Needless to say, meeting the minimal needs of a growing population in all sectors at once is a formidable task requiring planned national investment on a scale well beyond the capacity of the economy or of the administrative system at the present time. Given the scale of this problem, foreign aid is not likely to be a significant factor even if China's relations with other countries were such that it could be invited and received.

DISTRIBUTION BY PROVINCE AND REGION

The distribution of the population of China within its borders reflects, to a considerable degree, the varying habitability of the land, and since China is still essentially an agrarian country with limited technological resources, habitability is essentially a matter of topography, climate, and soils. Of China's 3.7 million square miles, nearly one-third consists of mountains and canyons, the steep slopes of which are for the most part useless for agricultural purposes. Another one-fifth is hill country with gentler slopes, some of which can be cultivated. Still another one-fifth is divided between three plateaus, only one of which contains much cultivable land. Of the remaining 30 percent of China's land area, 16 percent is made up of basins, most of which are in the north and far west and too dry for agricultural purposes. The other 14 percent is in alluvial plains along the major rivers, the most fertile and populous areas in China.[23] It is said that

[22] The model which allows for a major catastrophe in the early 1970's (model II) yields quite different results in all age groups as of 1985. For example, because of the famine deaths of children, this model shows a net decrement of more than half a million in the primary school ages each year by 1985. Its labor force increment is only 4 million in 1985—no larger than the increment for 1953, and its aged population, which would have suffered major losses during the famine, numbers only 5 million in 1985.

More detailed data on age, sex, and components of change for the models described in this chapter are obtainable on request from the Foreign Demographic Analysis Division, U.S. Bureau of the Census.

[23] George B. Cressey, *Land of 500 Million: A Geography of China*, McGraw-Hill Book Co., New York, 1955, pp. 45–47.

barely 15 percent of China is potentially suitable for agricultural use.[24] The unequal carrying capacity of the land accounts for the uneven distribution of China's population; some 90 percent of the people live in one-sixth of the country, and the remaining five-sixths has an average population density of less than one person per square mile.[25]

China's most habitable areas are generally located in the eastern and southern part of the country within a large triangle, delimited by the seacoast to the east and southeast, the international boundary in the south as far west as Yünnan Province, a line from western Yünnan up to central Manchuria in the northeast. Even within this area there are two distinct regions: the tropical and semitropical rice-growing area to the south, and the comparatively arid wheat-growing area to the north. The southern region is watered by the monsoons out of the South China Sea and remains green the year around. It is a land of hills and mountains with fertile river valleys. Wet rice culture is found throughout the valleys and climbs the lower slopes of the hills in elaborately terraced paddy fields. The northern region is swept by the dry winds that blow from the Mongolian desert. It has short, hot summers and long, cold winters. The rainfall in the north is moderate to light and unstable from year to year. When it fails, the region is subject to drought, dust storms, and major crop failures; when it is excessive, violent floods may occur as the silt-laden rivers break through the dikes.

The rest of China is a vast expanse of mountains, plateaus, and basins lying to the west of the more populated part. Throughout much of this region the annual rainfall is less than 12 inches. Three large deserts, the Gobi, Alashan, and Ordos, constitute the western part of the Inner Mongolia Autonomous Region and the northern part of Kansu, and another desert, the Takla Makan, accounts for about 250,000 square miles, or nearly one-third, of the Sinkiang Uighur Autonomous Region. The northeastern edge of this region includes a large area of wind-driven silt, known as loess, which is capable of growing crops during years when rainfall is adequate, but is under only limited cultivation because rainfall is highly variable and drought is frequent and severe. Much of the central part of Tibet is too high and lacking in soil and vegetation to permit more than marginal pastoral activities. In short, more than half of China is a harsh and forbidding land which repels settlement.

The 12 provinces that make up the southern region contain nearly 28 percent of the land area of China and 59 percent of the population. (See table 7.) The eight provinces in the northern region account for about 18 percent of the land area and 36 percent of the population. The western region, on the other hand, includes almost 55 percent of China's territory but is occupied by only about 5 percent of the population. The average population density in the northern and southern regions is about the same, but that for the western region is far below the others. The regional differences in population density show how little significance overall population densities may have for large countries in which population is very unevenly distributed.

[24] *Ibid.*, p. 30.
[25] *Ibid.*, pp. 2–3.

TABLE 7.—*Official population, area, and population density, by province and region, 1953 and 1957*

Province and region	Population (thousands)		Area (square miles)	Persons per square mile	
	1953	1957		1953	1957
Mainland China	582,603	646,530	3,711,889	157	174
Southern region	344,125	376,740	1,029,033	334	366
Kiangsu	47,137	52,130	41,699	1,130	1,250
Anhwei	30,663	33,560	54,015	568	621
Chekiang	22,866	25,280	39,305	582	643
Fukien	13,143	14,650	47,529	277	308
Hupeh	27,790	30,790	72,394	384	425
Hunan	33,227	36,220	81,274	409	446
Kiangsi	16,773	18,610	73,629	264	292
Kwangtung	36,740	37,960	82,857	443	458
Kwangsi	17,591	19,390	91,583	192	212
Szechwan	65,685	72,160	219,150	300	329
Kweichow	15,037	16,890	67,181	224	251
Yunnan	17,473	19,100	168,417	104	113
Northern region	210,388	237,020	653,118	322	363
Hopeh	43,348	48,730	84,316	514	578
Shansi	14,314	15,960	60,656	236	263
Liaoning	20,566	24,090	57,683	357	418
Kirin	11,290	12,550	72,201	156	174
Heilungkiang	11,897	14,860	178,996	66	83
Shensi	15,881	18,130	75,598	210	240
Shantung	48,877	54,030	59,189	826	913
Honan	44,215	48,670	64,479	686	755
Western region	28,090	32,770	2,029,736	14	16
Inner Mongolia autonomous region	7,338	9,200	501,930	15	18
Kansu and Ninghsia	12,928	14,610	135,298	96	108
Tsinghai	1,676	2,050	278,378	6	7
Sinkiang	4,874	5,640	641,930	8	9
Tibet	1,274	1,270	472,200	3	3

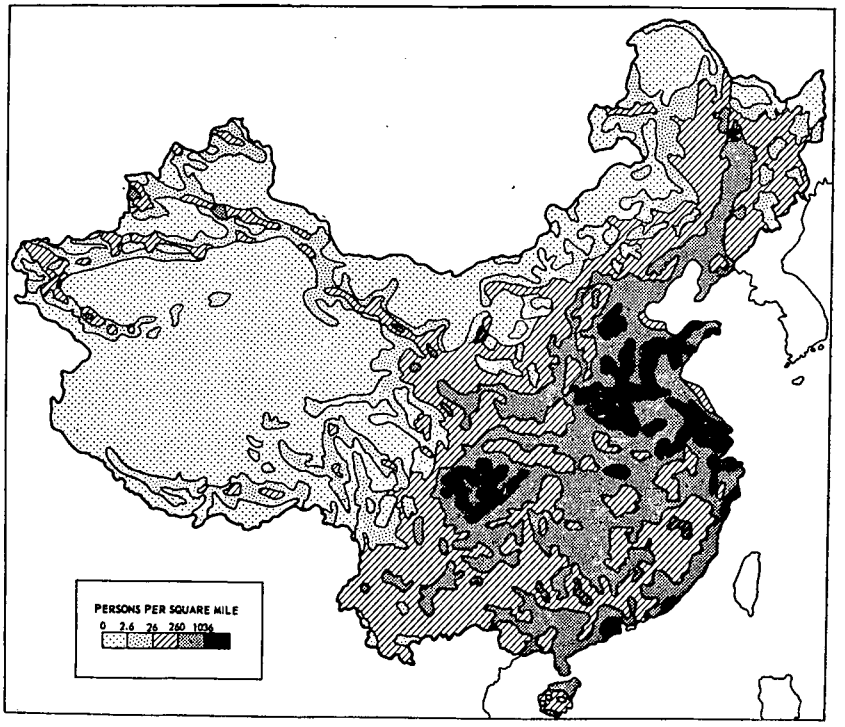
Source:
Population: 1953—Census figures as of June 30, 1953, in 1957 boundaries, from *Chung-hua jen-min kung-ho ti-i'u-chi* (*Atlas of the People's Republic of China*), Map Publishing Society, Peking, 1957. 1957—Registration figures as of yearend 1957, from State Statistical Bureau, *Ten Great Years: Statistics of the Economic and Cultural Achievements of the People's Republic of China*, Foreign Language Press, Peking, 1960, p. 11.
Area: Based on figures in square kilometers given in Hu Huan-yung, "Table of the Area and Population of China by Province and Region," *Ti-li chih-shih* (*Geographical Knowledge*), 1959, No. 9, pp. 390-391.

The variability becomes more apparent when we look at the densities of the provinces within the regional groupings. Before doing so, it is well to bear in mind that the margin of error in official provincial population totals, both the census figures for midyear 1953 and the registration figures for yearend 1957, is probably considerably greater than that in the regional figures; hence, only large differences in the figures for particular provinces should be considered significant. Sizable portions of the populations in some of the frontier provinces were not enumerated directly during the 1953 census but were estimated by means never explained. The 1957 figures for these provinces must also be regarded as suspect. The deterioration of the registration system during the latter part of the First Five-Year Plan period probably affected the 1957 provincial totals in different ways; some of the figures may represent acute underregistration whereas others may be the result of estimating or adjustment procedures which tended to exaggerate the population. No significance should therefore

be attached to differences in the apparent population growth rates of individual provinces between 1953 and 1957. The population densities of the provinces must also be regarded only as very rough approximations since there may be variable biases in both the population and the area figures.

The provinces of the southern region, though generally characterized by moderate to high densities, show a very considerable range from slightly over 100 persons per square mile in Yünnan to well over 1,000 in Kiangsu. A similar variability exists within the northern region between the far northern Province of Heilungkiang and the Northern Yellow River Plains Province of Shantung. Without the Province of Kansu, the southeastern end of which is fairly populous, the average density for the western region would be only about 8 to 10 persons per square mile. If regional groupings are disregarded, the most densely populated Provinces of Kiangsu, Shantung, Honan, Chekiang, Anhwei, and Hopeh together form a great wedge in the Lower Yellow River Plain which is conspicuous as the largest single area of high population density shown in the population density map (fig. 1). Aside from several high-density areas in Kwangtung Province in the southern coastal area, the only other major area of high population density is in central Szechwan Province in the Upper Yangtze Basin, where an elaborately terraced rice culture has permitted dense settlement for at least the past several centuries.

Figure 1.--POPULATION DENSITIES IN MAINLAND CHINA: 1953



The population density map, which is derived from a Chinese density map based on 1953 census data for local areas, reveals further details of the relationship between population distribution and geography. The population of the western region is shown to be distributed in several narrow bands. The northernmost belt of settlement consists of a series of oases in the Dzungarian Basin running from the Soviet border in the northwest across Sinkiang to the Kansu corridor and the Lanchow Basin in the geographical center of China. A second band of oases stretches along the intermittent rivers of the Tarim Basin, joining the first just below the western edge of Outer Mongolia. A third band extends to the southeast from the Soviet border between the Takla Makan Desert and the northern edge of the Tibetan highlands, but this band fades out in central Sinkiang. Far to the south, another band of settlement occupies the valleys of the Indus, Sutlej, and Brahmaputra Rivers.

Much of the settlement pattern of the rest of China is related to the major river systems. The Yangtse River, one of China's two largest, rises in eastern Tibet and travels eastward nearly 3,500 miles to reach the sea in southern Kiangsu Province. Both agriculture and commerce follow the course of this river and its tributaries. It is a major highway linking some of the key agricultural and industrial centers in China, including such cities as Shanghai, Nanking, Wuhan, and Chungking. In summer, oceangoing vessels can ascend the river for 630 miles to the heavy industry center of Wuhan; river steamers can reach Chungking, another 800 miles upstream.[26] The Yellow River rises in Tsinghai Province and pursues a wandering course of some 2,900 miles with great diversions to the north or south on its way eastward to the sea in the Gulf of Chihli.[27] It is less suitable for large vessels than the Yangtse, hence few of the major cities of the north are located along its banks. In the northeast (Manchuria) settlement is heaviest in the north-south corridor of the Manchurian plain formed by the valleys of the Liao and Sungari Rivers. In the far south, where rainfall is abundant and the land is hilly, the settlement pattern is influenced more by the location of level ground in the flood plains, deltas, and coastal areas than by the need to be near rivers for water.

Overall population densities are totally misleading as a measure of the pressure of population on resources, particularly in comparing essentially agricultural countries with industrially developed countries. They may also be misleading in comparing agrarian countries which have unequal proportions of uncultivable land. For example, as of the beginning of 1967, estimated overall population densities reach 55 persons per square mile in the United States, 27 in the Soviet Union, around 430 to 440 in India, and a little under 700 in Japan.[28] The estimate for China is around 200 persons per square mile using the census figure as a base total, or up to 250 persons per square mile

[26] *Ibid.*, p. 173.

[27] The Yellow River gets it name from the burden of silt it carries and its nickname, "China's Sorrow," from its habit of overflowing thousands of square miles of densely populated farmlands during flood stage. In some places the level of the land is well below that of the riverbed.

[28] Area figures are from the United Nations *Demographic Yearbook, 1964*, New York, 1965, table 1. Population estimates for the United States and the Soviet Union are from U.S. Census Bureau projections. Rough population estimates for India and Japan are based on the latest figures in the *Demographic Yearbook* and a linear extrapolation of recent increase rates.

with allowance for undercount in the census. But comparing the Chinese figures with those for the United States and the Soviet Union greatly understates the difference in population pressures. The comparison with India suggests a marked difference where similarity is to be expected. The comparison with Japan is obviously meaningless for the purpose in hand.

If only agrarian countries are compared and if only land under cultivation is considered in calculating densities, some of the anomalies can be eliminated. There remain problems as to the comparability of estimates for countries for which reliable data are lacking, particularly since there is no way of making adequate allowance for the effects of multiple cropping, the productivity of various types of land, crops, and methods of cultivation, and other factors which determine yields, on the numbers of people who can be sustained per square mile of agricultural land. However, even rough figures may have some utility. According to available estimates and data on population and land under cultivation, the number of persons per square mile of cultivated land in 1967 will approach 1,100 in India, 1,400 in Pakistan, and somewhere between 1,800 and 2,200 in China, depending upon the assumptions made as to the size of China's population.[29]

The explanation of the differences between the three countries probably must be sought in differences in the average productivity of the cultivated land and the efficiency of crops and farming methods. If the differences can be explained in this way, the inference is that in China the land carries more people in a more delicate balance of population and resources. The system of organization of agricultural production and the distribution of agricultural products may also be more highly developed in China; if this is so, though the immediate pressure of population on food resources may be no greater in China than in India or Pakistan, the Chinese population may be dependent to a far greater degree on the continuity of the system which makes such intensive settlement possible.

Over the centuries, the pressure of population on land resources in China has contributed to a gradual redistribution of the population in several directions and frequently to short-term relocations involving smaller movements of population. Redistribution has occurred without migration as a result of changing regional differentials in vital rates, as once prosperous areas became overpopulated and subject to more frequent food crises and higher mortality levels. Redistribution by migration has taken various forms, including forced resettlement, flight from political crises, the voluntary settlement of previously uncultivated areas made possible by the development of new crops, depopulation of old cultivated areas because of the exhaustion or erosion of once fertile soils, the attraction of surplus rural population by employment alternatives in industrial centers, and the accumu-

[29] Population estimates for Pakistan are from U.S. Bureau of the Census, *Projections of the Population of Pakistan, by Age and Sex: 1965–1986,* by James W. Brackett and Donald S. Akers, June 1965, table 1, p. 9. The figure for the cultivated area of Pakistan is from Government of Pakistan, Agricultural Census Organization, *1960 Pakistan Census of Agriculture,* vol. 1, East Pakistan Report 2, table 13, p. 103, and West Pakistan Report 2, table 13, p. 112. The figure for the cultivated area of India is from U.S. Agency for International Development, Mission to India, *Statistical Information on Agriculture in India,* New Delhi, April 1963, p. 467. The corresponding figure for China is an estimate by the U.S. Department of Agriculture.

lating pressures due to population increases in areas with finite agriculture resources.

Among the historical relocations, a number of comparatively sudden movements of population have occurred following the depopulation through famine and civil disturbance of areas already intensively cultivated, as the populations of crowded regions round about moved in to take up the unoccupied lands. In the second quarter of the 17th century, an economic vacuum created by a peasant rebellion in Szechwan started an influx of migrants from Hupeh and Shensi Provinces which continued into the 19th century.[30] During the Taiping rebellion of 1851–64, there was considerable loss of life in the lower Yangtse region, partly as a result of deliberate massacres of the population for political reasons by the opposing armies and partly as a result of the starvation of peasants whose food supplies had been confiscated in military foraging expeditions. When the Taipings were finally subdued, agricultural land and the demand for labor brought settlers into the most severely affected parts of Kiangsu, Anhwei, and Chekiang Provinces from Hupeh, Hunan, and Honan, and there was some redistribution within Chekiang and Anhwei as well.[31] Similar vacuums were created by the Nien rebellions in Shensi and Kansu during the 1860's and 1870's and by the great Shensi famine of 1877–78, both of which were followed by an influx of settlers from other areas. As Prof. Ho Ping-ti observed in connection with the Taiping depopulation, major catastrophes in China have sometimes proved to be a blessing in disguise at least for the surviving population and their neighbors in adjacent provinces, inasmuch as they have provided a temporary respite from the imbalance of population and land resources.[32]

Historically, a major long-term drift of population has occurred toward the south, in more recent centuries toward the north, and still more recently in a very limited volume to the northwest and west. The most important of the movements in recent history is unquestionably the settlement of Han Chinese in the northeastern region, commonly called Manchuria. The colonization of Manchuria began before the founding of the Manchu dynasty in 1644, as the Manchus sought to develop their lands by means of Chinese labor captured on raids into north China. In 1668, the policy was reversed on imperial orders which closed Manchuria to Chinese settlement, but the movement of Chinese north of the Great Wall, no longer involuntary, apparently continued surreptitiously, and the prohibitions, though renewed from time to time, were never effectively enforced.[33] By 1850, Chinese colonization of Manchuria had already virtually obliterated the indigenous Manchu culture, and soon after the Taiping rebellion, which gave the northward movement an added thrust, all restrictions on migration were formally terminated. By 1900, the population of Manchuria was said to be about 80 percent Chinese.

With the Japanese investment in industrial development in Manchuria and the consequent rise of urban centers, the nature of the

[30] Ho Ping-ti, *Studies on the Population of China, 1368–1953*, Harvard University Press, Cambridge, Mass., 1959, p. 139.
[31] *Ibid.*, pp. 154–156.
[32] *Ibid.*, p. 157.
[33] *Ibid.*, pp. 158–163.

migration changed. No longer primarily a matter of agricultural resettlement based substantially on the push from the overcrowded areas of Shantung and Hopeh Provinces, it became essentially a rural-to-urban movement of interregional scope. Manchuria was rapidly becoming the principal industrial region of China. In the 20 years from 1923 to 1943, official records indicate an average net increase by migration in the population of Manchuria of about 1 percent per year. After the collapse of the Japanese administration in 1945 and the outbreak of civil war, which began in the northern regions and moved southward, there was probably a considerable net outflow of population. The movement back to ancestral home villages in north China was probably reinforced by the unemployment that resulted from the stripping of machinery from Manchurian factories by the Russian armies which occupied the region upon the defeat of Japan. However, the Chinese Communists were able to secure the return of at least a part of the equipment during the early 1950's and their own investment programs brought about a resumption of industrial development in Manchuria. There can be little doubt that the flow of migrants into Manchuria resumed soon after 1949 and has continued in the years since, with the possible exception of 1955 and the early 1960's.[34]

Migration into Manchuria is seldom treated in the press in Communist China as a form of rural-to-urban movement. Although the growth of cities throughout China was a matter for some exultation in the early years of the regime in the local metropolitan papers, excessive urban growth was a constant preoccupation from 1952 onward and restrictive policies have been in force almost continuously since 1952. There have, however, been sustained efforts on the part of the regime to encourage rural settlement of frontier regions in the north and west. Mao himself had called for organized resettlement in these areas as a continuing project to run throughout the first three 5-year plans, and in the years of candor, 1956–57, the Chinese Communist authorities were able to state frankly in the press that the aim of this movement was to bring arable wastelands under cultivation in order to expand food production and relieve the pressure of population on land resources in the already densely settled areas where labor power was admittedly in surplus.[35]

Prior to 1956, the resettlement policy seems to have received little official support. According to official figures, the total number of persons migrating into virgin lands from 1949 through 1955 was only 600,000. A major drive to accelerate this movement was planned for 1956. According to a report by the Ministry of Interior, some 725,000 people were actually moved during the year, of which 432,000 were resettled in the Inner Mongolia Autonomous Region, and in the provinces of Heilungkiang, Kansu, Tsinghai, Sinkiang, and Kiangsi, mainly former residents of Honan and Hopeh Provinces and the cities of Peking, Tientsin, and Shanghai. The remaining 293,000 moved within their own native provinces—Kwangtung, Fukien, Chekiang, Kiangsu, Kirin, and Liaoning. Subsequent reviews of this movement

[34] U.S. Bureau of the Census, *The Population of Manchuria*, by Waller Wynne, Jr., International Population Statistics Reports, Series P–90, No. 7, Washington, D.C., 1958, pp. 17–23.

[35] "Make a Good Job of Resettlement for Reclamation," *KMJP*, Mar. 3, 1956 (editorial); translated in *SCMP*, No. 1249, Mar. 16, 1956, pp. 4–6.

admitted that the sudden increase had been too hasty, that preparations to receive settlers had been inadequate, that the arrangements for their movement were ill organized and confused and caused disruption of normal activities at both ends of the line.[36] These problems should have come as no surprise; they were essentially the same as had characterized the smaller scale relocations of earlier years. A New China News Agency dispatch from Harbin early in 1956 noted that there had been some backflow of settlers from Shantung in 1955 because the government had failed to recognize the complexity of the task and had assumed that its responsibilities to the settlers were over as soon as they were deposited at their destinations.[37]

Despite difficulties, plans for 1958 called for a further resettlement of 530,000 persons, of which over 230,000 were to be involved in interprovincial movement to the northeast and west, mostly from Shantung and Honan to Heilungkiang and Kansu. The other 300,000 were to be relocated within their own provinces, which included Hopeh, Fukien, Kwangtung, and Kiangsi. Settlers who had moved into Heilungkiang, Kansu, Tsinghai, and the Inner Mongolia Autonomous Region within the previous 2 years were to be joined by some 140,000 dependents who had been left behind.[38] The latter movement may have been an effort to reduce the amount of backflow, on which figures were never given. However, in subsequent years, the choice of migrants for frontier regions seems to have shifted away from complete households toward unmarried youth, urban workers and cadres without families, and discharged servicemen. Some of these policies seem to have been dictated by considerations other than the development of the areas to which the migrants were dispatched, a matter for further discussion in the next section in connection with urban-to-rural movements.

In proportion to the size of the population in the areas from which the migrants came, resettlement generally was of negligible significance. Despite Mao's early policies, there was never any realistic possibility that migration could represent a significant relief of population pressure in overpopulated areas. The sparsely settled lands were uninhabited for very substantial economic reasons, and the regime was not financially able to set aside funds for investment in the development of these regions on a scale which would have permitted them to accommodate large numbers of new inhabitants on short notice. The reclamation of marginal lands required elaborate systems of irrigation and water control, and the nature of the soils posed problems of salinization and erosion with which settlers from the Yellow River and Yangtse Plains were not familiar. Despite financial and labor investments made by Government and settlers alike, reclamation efforts seem in many cases to have ended in failure within a year or two, and, so far as overall agricultural production is concerned, the net effects of all of these projects, reckoned by accurate accounting, would probably have been slight. Even in the receiving provinces the significance of resettlement either for population growth or for economic development may not have been as great as the news dis-

[36] *China News Analysis*, No. 212, Jan. 17, 1958, pp. 2–3.
[37] "Spokesman of Heilungkiang Resettlement Bureau on Problems of Resettlement," NCNA, Harbin, Mar. 14, 1956; translated in *SCMP*, No. 1255, Mar. 26, 1956, pp. 15–16.
[38] "China To Resettle Over 500,000 People This Year," *JMJP*, Apr. 21, 1958; translated in *SCMP*, No. 1763, May 2, 1958, p. 5

patches imply. It was reported that 70,000 settlers came to Tsinghai Province in 1956, which would have meant a net increment by migration of about 3.5 percent for that year, but in 1958, with the scale of settlement much reduced, it was reported that the number of "young people" settling in the province was only 7,000.[39] If there were as many as twice that number of adult settlers, the increase by migration would have been about 1 percent. Allowing for smaller numbers of inmigrants and a substantial rate of backflow in other years, the average increment over the long term must have been rather modest.

Comparing the official population totals from the 1953 census with those from the registration system as of yearend 1957 (see table 7) suggests a significantly above average increase in population for some of the areas toward which migration was encouraged during these years. For all China the implied increase rate was 11 percent for the period, whereas Heilungkiang and the Inner Mongolia Autonomous Region showed an increase of 25 percent, Tsinghai 22 percent, Sinkiang 16 percent, and Kansu 13 percent. However, it is well to bear in mind that these rates include the population growth in frontier cities, many of which were experiencing booms induced by crash programs to develop hitherto neglected mineral resources. There may also be an incalculable upward bias in the trend of the figures themselves between 1953 and 1957. Many of these areas contained seminomadic populations which could not be enumerated and may have been underestimated in 1953 but were being brought under control and perhaps were more accurately counted or estimated by 1957. In any case, it would be unwise to draw any firm inferences from the changes in provincial population totals for 1953 and 1957, given the serious doubts about their statistical comparability.

The spatial distribution of the population of China as a whole has evolved out of economic necessity and is not likely to be altered surdenly on a large scale. Long-term changes will probably continue to occur, in association with changes in the interregional structure of the Chinese economy. However, given the country's present limited capacity for capital accumulation and investment, rapid change in the near future is not to be expected. The vast unoccupied lands in the western reaches of China offer no significant relief for the pressure of population growth in the densely settled regions. Population redistribution promises no ultimate solution to China's population problems.

DISTRIBUTION BY RURAL AND URBAN RESIDENCE

The proportion of the population of any country which is urban gives a rough indication of the status of its overall economic development. A country which is highly urban is normally one in which domestic agriculture is highly mechanized and efficient or in which the rewards of commerce and industry are sufficient to permit the country to rely on other, more predominantly agricultural countries for its food supply. In either case, the economy is well developed and

[39] "Tsinghai To Privilege Resettlers This Year With Tax Exemption," *Ch'ing-hai jih-pao*, Sining, Nov. 20, 1956; translated in *SCMP*, No. 1434, Dec. 19, 1956, p. 29, and "We Welcome Honan Young People Who Have Come to Tsinghai To Take Part in Construction," *Ch'ing-hai jih-pao*, Sining, Mar. 15, 1959 (editorial): translated in *SCMP*, No. 2019, May 25, 1959, p. 13.

modern. On the other hand, a country in which a major proportion of the population resides in rural areas and depends upon agriculture for a living is usually one in which the economy as a whole is backward and living standards are generally low in both rural and urban areas.

The latter situation holds in Mainland China. Although a long-term trend toward urban population growth was well underway before 1949, urbanization in the Western sense was largely confined to the Manchurian cities and the treaty ports, where it was mainly a consequence of foreign investment and trade. After 1949 these same cities resumed their growth, joined by the administrative cities of the interior and some new industrial and mining centers developed under the impetus of Soviet aid and the First Five-Year Plan investments.

However, not all of the recent increase in urban population represents an increase in industrialization. Some of it is merely an increase in scale of the traditional functions of marketing and the supplying of specialized services to an agricultural hinterland. Some of it has been due to the drift of population from overcrowded rural areas into the cities in a desperate quest for amelioration of living conditions.

The industrial development which has in fact taken place has often been achieved without much modernization in techniques or equipment and has not represented an overall proportionate development of the national economy. At the moment, China appears to be the one major underdeveloped country of the world in which urbanization is not gaining ground relatively; in fact, the proportion of the total population in urban areas in Mainland China may be smaller today than in 1958.

The actual proportion urban of the mainland population, now or at any time in the past, is indeterminable for lack of reliable data. The figures obtained through the police registrations from 1949 onward and the census of 1953 are not reliable enough for the purpose. The police registrations only covered the principal municipalities, in which population control problems were the most serious, and they did not distinguish between the residents of a municipality on the basis of rural or urban status. The 1953 census figures on the total urban population and the populations of major municipalities were included in the communique of November 1, 1954, but the meaning of "urban" in this case is questionable, since the census plans and instructions do not mention and apparently did not anticipate the complexities involved in distinguishing between rural and urban population within municipalities or between smaller urban places and rural villages. Census registrars were told to write the household address in the upper left corner of the form for city households and the upper right for rural village households, but they were given no official definitions or criteria.[40] If supplementary instructions were dispatched from Peking to the local census offices, these have not become available through publication in the press. Probably none were issued, since a resolution of the State Council passed on November 7, 1955, on the criteria for delineation of urban and rural areas mentions no prior determinations and discusses the problem as if for the first time. After laying down certain general criteria on partly functional, partly size-

[40] "Directions on Filling Census and Registration Forms," NCNA, Peking, Apr. 6, 1953; translated in *CB*, No. 241, May 5, 1953, p. 36

NA WITH 20,000 INHABITANTS OR MORE: 1953

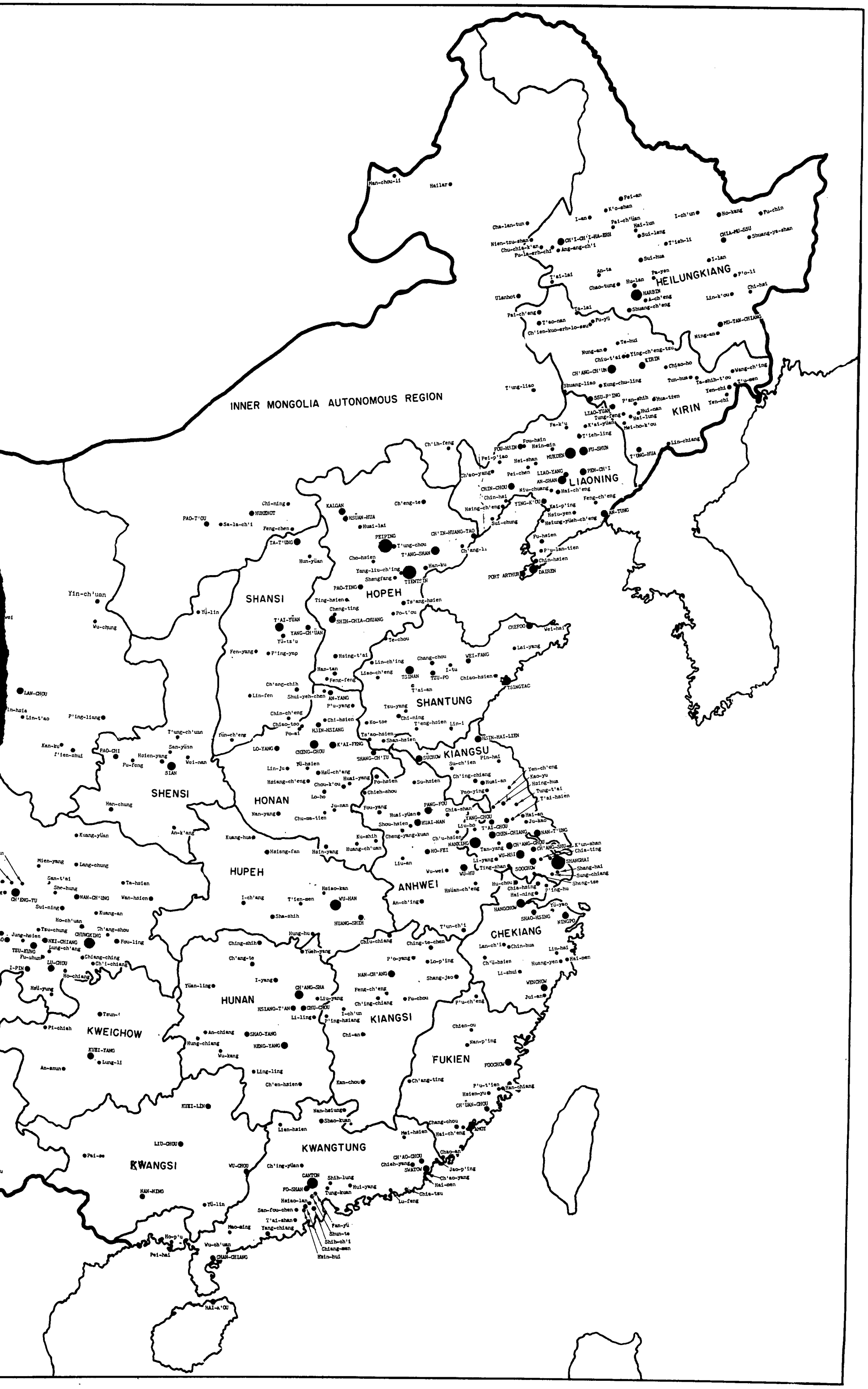


Figure 2.-- URBAN PLACES OF MAINLAI

LEGEND

Urban Places with populations of:

- 2,000,000 or more
- 1,000,000 TO 2,000,000
- 500,000 TO 1,000,000
- 200,000 TO 500,000
- 100,000 TO 200,000
- 50,000 TO 100,000
- 20,000 TO 50,000

NOTE: Urban places of 100,000 population or more in capital letters.

SOURCE: U.S. Bureau of the Census, Cities of Mainland China: 1953 and 1958, by Morris B. Ullman, International Population Reports, Series P-95, No. 59, 1961.

class grounds, the resolution concludes that the Ministry of Interior should determine "as soon as possible during 1956 the status of the present urban and urban-type residential areas and publish a guide on urban and urban-type areas in China" with State Council approval.[41] However, there is no indication that this decision was ever implemented. The discontinuities in the official figures on the population in urban areas are explainable on other grounds. Hence, the categories "rural" and "urban" in official population data from 1953 through 1957 were in essence defined by the uninstructed and probably unstandardized judgments of local registrars during the 1953 census.

According to the census, there were altogether 5,568 urban places in China in 1953, of which 5,148 had less than 20,000 inhabitants each. The geographical location and size class in 1953 of the remaining 420 urban places are shown in figure 2.[42] As has already been noted, not all of the population of the larger urban places was classed as urban, and it is not known whether a similar distinction was maintained in the case of the inhabitants of smaller urban places, hence the total urban population shown for cities in various size classes in table 8 is probably somewhat less than the total number of inhabitants of urban places.[43] However, all of these figures are subject to an incalculable degree of distortion because of unresolved questions of definition, and the questions became more serious in later years.

TABLE 8.—*Number of urban places and urban population by size of place, June 30, 1953*

[Population figures in thousands]

Size of place	Number of urban places			Urban population		
	All urban places	Municipalities	Other urban places	All urban places	Municipalities	Other urban places
Total	5,568	164	5,404	77,257	43,523	33,734
1,000,000 or more	9	9	----			
500,000 to 999,999	16	16	----			
200,000 to 499,999	28	28	----			
100,000 to 199,999	49	49	----	51,313	43,523	----
50,000 to 99,999	71	50	21			
20,000 to 49,999	247	12	235			7,790
2,000 to 19,999	4,228	----	4,228	24,699	----	24,699
1,000 to 1,999	727	----	727	1,108	----	1,108
Less than 1,000	193	----	193	137	----	137

Source: U.S. Bureau of the Census, *Cities of Mainland China: 1953 and 1958*, by Morris B. Ullman, International Population Reports, series P-95, No. 59, August 1961, p. 8.

[41] "State Council Resolution on the Criteria for Demarcation of Urban and Rural Areas," passed at the 20th meeting of the State Council, Nov. 20, 1955, *Hsin-hua pan-yüeh k'an (New China Semi-Monthly)*, No. 3, Feb. 6, 1956, p. 7.

[42] Of these places, those with 100,000 or more inhabitants and some important industrial and mining centers with less than 100,000 population were classed as "municipalities." There were 164 such centers at the time of the 1953 census. The municipalities at the national level, such as Peking and Shanghai, were the administrative equivalent of provinces: those at the provincial level were equivalent to counties (*hsien*). U.S. Bureau of the Census, *Distribution of the Urban and Rural Population of Mainland China: 1953 and 1958*, by Ernest Ni, International Population Reports, Series P-95, No. 56, October 1960, p. 5.

[43] For further discussion of the problems mentioned here, see U.S. Bureau of the Census, *Cities of Mainland China: 1953 and 1958*, by Morris B. Ullman, International Population Reports, Series P-95, No. 59, August 1961. This report also traces the growth of particular cities between 1953 and 1958 on the basis of information available as of 1961.

The larger metropolitan centers of China consist generally of a central city, a suburban area surrounding it, and in some instances a certain amount of contiguous rural territory which was placed under the jurisdiction of the metropolitan authorities for administrative purposes. It is not clear in particular instances just how the populations of these various components were reckoned in the compilation of official figures on city and urban populations, or whether the same method was used consistently in preparing summary figures. Moreover, during 1958 and 1959, the territory assigned to the major municipalities was greatly expanded, partly as a means of giving the municipalities a greater control over the sources of their food supply and partly to facilitate the management of manpower. Shanghai, which had an official population of 6.9 million at the end of 1957, was suddenly given control of an area containing another 3.1 million people; Tientsin's authority was expanded during 1958 from an area with 3.2 million people at the end of 1957 to a 20,000-square-kilometer area with 11.4 million people.[44] Such arrangements were apparently short lived, but they endured long enough to introduce a great deal of discontinuity into the figures for the population of specific urban places given in isolated citations in the Mainland China press.[45]

The problem of defining the urban population was further complicated by the fact that the official population records distinguished between permanent and temporary residents, who were registered in separate books. According to registration regulations, temporary residents were persons who maintained a permanent domicile in another place from which they were absent for not more than 6 months out of the year. In fact, however, the attempt to use the population registers, with the associated system of residence permits and certificates of removal for migrants, to control the movement of the population into the cities resulted in extensive violation of the 6-month rule. In the major cities, a large segment of the population was carried on the books as temporary residents and therefore not included in the official city population totals. When the security police attempted to enforce the residence requirements, many migrants simply avoided registering, thus becoming part of an incalculable third category of urban residents who were not on the public records and could not be counted.[46]

There are also statistical problems with the official urban totals which were published by the State Statistical Bureau in 1957 (table 1). The total population figures for 1949, 1950, and 1951 were said to have been based on "the trend of natural increase in the past" and the corresponding urban figures were said to be "estimates based on the rate of population increase in cities and towns in the northeast and northwest."[47] But, in fact, as the figures themselves suggest, the trend of increase in the total population consisted merely of assigning a rate of 2 percent, probably based on the official vital rates survey rate of 20 per thousand population, to the year 1951 and assuming a value

[44] *Ibid.*, pp. 13–14.
[45] No effort has been made to update the Bureau of the Census monograph on the population of Chinese cities cited in the previous two notes because of the confusion in city population totals from 1958 onward.
[46] *Ibid.*, pp. 2–6 and 12.
[47] "Data on China's Population From 1949 to 1956." *T'ung-chi kung-tso* (*Statistical Work*), No. 11, June 14, 1957; translated in *ECMM*, No. 91, July 22, 1957, p. 22.

0.1 percent lower for 1950 and 0.1 percent higher for 1952. A similar procedure was evidently followed for the rate of increase in the urban population, as appears from the suspiciously regular progression of 7.0, 7.5, and 8.0 percent per year for 1950, 1951, and 1952, respectively. The absolute values for the total and urban populations were evidently derived by backward projection using these percentages, and the absolute values for the rural population were then obtained as residuals. However, the trend in the increase rates assumed for the total population is too gradual to represent the effects of falling mortality which would be expected in the aftermath of a period of disorder such as that which preceded 1949. The restoration of peace and the revival of industry during these years should have resulted in higher and probably more variable rates of increase in urban populations as well. Hence, the figures for the urban and rural population during the years 1949–52 are actually too crude and unrealistic to be useful estimates.

The 1956 figure for the total population, though reportedly based on registration data for some areas and estimates for others from which final reports had not been received, appears instead to have been derived simply by repeating the increase rate obtained from the reported figures for 1955. The State Statistical Bureau promised that the figure would be revised later as final data came to hand, but no subsequent figure was ever released. The 1957 total population figure published by the Bureau in the fall of 1959 is nearly 3 percent higher than this tentative 1956 total and obviously inconsistent with the trend of increase in the total population indicated by the official vital rates.[48] The urban estimate for 1956 was said to have been based on reports from 14 provinces and from Peking, Shanghai, and Tientsin, evidently an incomplete collection of data. But the figure derived from these sources, an increase rate of 7.6 percent,[49] does not seem high enough for a year in which it was afterward disclosed that urban industries indulged in extreme overhiring of workers, many of whom undoubtedly came from rural areas, perhaps more than enough to nullify the expulsion of urban population attempted in 1955 A recent source revealed that the urban population had increased by 38.9 percent between the beginning of 1953 and the end of 1957,[50] which would imply an urban population total of 99.5 million as of yearend 1957, nearly 12 percent above the official yearend 1956 figure.

Since 1957, no precise urban totals have been given, and the statements of Chinese officials have been somewhat ambiguous. During 1958, a large influx of population into the cities was apparently permitted as part of the Leap Forward drive to increase production by massive applications of manpower in all kinds of enterprise. Accord-

[48] State Statistical Bureau, *"Ten Great Years: Statistics of the Economic and Cultural Achievements of the People's Republic of China,"* Foreign Languages Press, Peking, 1960, p. 11. The Mainland China total of 646,530,000 given in this source is not included in table 1 because it is discontinuous with the rest of the official series in the table. The 1957 total would imply an upward revision not only of the figure for 1956 but also of that for 1955. It is quite possible that the State Statistical Bureau had revised these figures upward after their publication in June 1957, but no revised figures for these years have ever been released. Probably both the 1955 total and the estimated figure for 1956 are too low because of the effects of evasion of population control during 1955 on the population registers. The urban figures for 1955 and 1956 were doubtless even more directly and severely affected.

[49] "Data on China's Population From 1949 to 1956," p. 23.

[50] Hsüeh Cheng-hsiu, "Tentative Treatise on the Relationship Between Increase of Urban Population in Socialist Cities and Development of Industrial and Agricultural Production," *KMJP*, Oct. 7, 1963; translated in *SCMP*, No. 3093, Nov. 4, 1963, p. 2.

ing to the State Statistical Bureau there was an increase of 8 million in the category of "workers and employees" during 1958, which does not include all categories of urban labor, nearly half of which are said by the same source to have come "from the countryside." [51] Some of these probably brought their dependents with them. Another source reports that the population in 22 large- and medium-sized cities increased by 24.56 percent between March 1958 and March 1959. It adds that the total population of urban areas throughout the country shows an increase of 7.7 percent when the figure for the first half of 1959 is compared with that for the first half of 1958. The size of the urban population is referred to somewhat indefinitely as "over 100 million." [52] A more specific figure was used by Po I-po in an interview with Anna Louise Strong in January 1964, in which he indicated that, as of some unspecified prior point in time, the urban population of Mainland China was 130 million.[53] However, these figures do not provide an adequate basis for reconstructing the official urban population totals, if in fact any such series is maintained in Peking, and they are totally inadequate for estimating the actual size and growth of the urban population from year to year.

Nevertheless, even in the absence of usable data, some conclusions can be drawn about the trend in urban growth in China from the descriptive materials available on urban conditions and population movements. The prevailing pattern has been one of a sustained pressure of rural population trying to enter the cities, restrained by various means and with varying degrees of success by official policies. The movement toward the cities probably began immediately after the pacification of the mainland and the restoration of urban industries, but by 1952, when the flow of rural labor began to add to the unemployment in the cities, the central authorities recognized it as a problem and began to refer to it as a "blind drift." Among the causes of the migration listed in the press were the higher wage levels in urban areas, the direct recruiting of rural workers by urban enterprises, the inadequacy of famine and disaster relief in rural areas, inappropriate job placements for rural workers, depressed rural living conditions, an excess of labor in the agricultural producer cooperatives, and a general pessimism about the prospects for improvement of rural life—this last admittedly a major factor. It was also noted that the cadres in charge of the cooperatives themselves encouraged the peasants to migrate. They wrote letters of introduction for migrant workers, or, when the authorities attempted to crack down on this practice, urged their surplus laborers to migrate without letters. No direct allusion was made to the fact that much of the peasant dissatisfaction and disillusionment was related to the ruthless violence of the land reform movement and the subsequent forced collectivization which deprived even those peasants who had benefited during the land reform of their newly acquired land.

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[51] "How Chinese Working Class Has Grown to 32 Million," NCNA (English), Peking, Apr. 26, 1959; in *SCMP*, No. 2007, May 6, 1959, p. 14. Others included demobilized servicemen, many of whom may have been recruited originally from rural areas. They would not have been classified as urban population while in the military service.

[52] Chou Po-p'ing, "Supply of Food Grains in China This Year," China News Service, Canton, Oct. 3, 1959; translated in *SCMP*, No. 2126, Oct. 29, 1959, p. 16. The 22 cities do not include such major administrative, trade, and industrial centers as Peking, Shanghai, Tientsin, Canton, Harbin, and Chungking.

[53] Anna Louise Strong, "Interview With Po I-po on Economic Readjustment," *Ta-kung pao*, Hongkong, Jan. 15, 1964; translated in *SCMP*, No. 3152, Feb. 3, 1964, p. 7.

Not all of the rural migrants to urban areas were able to find work. Some, it was said, became in effect displaced persons, selling their clothes or whatever else they had brought with them to buy food, and camping in railway yards, cold and hungry. Others turned to gambling and stealing or otherwise disturbing the peace and creating problems for the urban police. Those who were merely indigent constituted an additional burden on the relief rolls. The rest, even though successful in finding employment, added to the pressures on the available housing space and increased the amount of food which had to be transported into the cities. From the many press articles discussing these problems, it is evident that the problem was regarded as serious by the authorities.

The response of the regime to this problem was to issue orders prohibiting the movement. In 1952, the Government Administrative Council called upon the local governments at all levels to solve the problem of surplus labor in the villages and to prevent the peasants from blindly moving into the cities. It suggested that local authorities undertake projects to reclaim wasteland, expand arable acreage, build irrigation and water conservancy works, develop subsidiary agricultural products and handicrafts, and carry out various rural construction projects in order to expand rural employment opportunities.[54] There was no indication where the funds for these operations were to come from.

In the spring of 1953, another Government Administrative Council directive was issued requiring all authorities to cooperate in dissuading peasants from migrating, in refusing them documents for moving and obtaining urban employment, in relying on the regular labor departments instead of recruiting rural labor directly, and in persuading cadres and militiamen who had fled to the cities to return to their posts and lead the peasants in spring plowing.[55] Subsequently, it was claimed that the directive had succeeded in checking the flow for a short time in the spring of 1953, but that in many places all the old problems were continuing as before, and in some the situation had become worse than ever.[56] The year 1954 was one of acute agricultural distress, with floods and famines complicating the difficulties of control. Rural food shortages drove many peasants to migrate to urban areas in search of food, and some apparently came to the cities to purchase grain and return to their homes, causing a major depletion of urban grain reserves.[57]

In 1955, a year of comparatively favorable conditions in agriculture, there was a major drive to expel recent rural migrants from the cities. Shanghai alone reportedly returned 558,000,[58] and other cities

[54] The provisions of the Government Administrative Council directive are described in "Notice of Central-South Military Administrative Council on Prevention of Flow of Rural Labor Power to Cities," *Ch'ang-chiang jih-pao,* Hankow, Oct. 21, 1952; translated in *SCMP.* No. 444, Nov. 1–2, 1952, pp. 30–31; and "We Should Dissuade Peasants from Blindly Moving Toward Cities, Declares Social Affairs Department, Ministry of Interior," *JMJP,* Nov. 26, 1952; translated in *SCMP,* No. 468, Dec. 9, 1952, pp. 11–12.

[55] "GAC Directive on Dissuasion of Peasants From Blind Influx Into Cities," NCNA, Peking, Apr. 17, 1953; translated in *SCMP,* No. 554, Apr. 18–20, 1953, pp. 24–25.

[56] "CPG Ministry of Interior and Ministry of Labor Issue Joint Directive Concerning Continued Implementation of Directive Advising Against Blind Influx of Peasants Into Cities," *JMJP,* Mar. 15, 1954; translated in *SCMP,* No. 774, Mar. 25, 1954, pp. 8–9.

[57] Pan Chin-yuan, "Two Years of Planned Purchase and Planned Supply of Grain," *Hsin chien-she* (*New Construction*), No. 9, September 1955; translated in *ECMM,* No. 9, Oct. 10, 1955, pp. 14–33.

[58] "Mobilize the Nonproductive Population in Cities To Return to Rural Areas for Production." *KMJP,* Dec. 29, 1955; translated in *SCMP,* No. 1203, Jan. 7, 1956, pp. 8–9.

apparently returned smaller but still substantial numbers. Not only were rural laborers expelled, but there was an effort in some cities to return dependents of permanent urban migrants to their native villages, a step which seems to have been carried too far in some places, since in later years it was necessary to warn against the indiscriminate eviction of persons who were wholly dependent upon urban laborers for their support. The impact of the expulsion program may be seen in the drop in the rate of increase in the urban population during 1955 as shown by the official figures (table 1). The actual decline may have been less than the figures showed, since there was undoubtedly a good deal of unregistered backflow.

By 1955, the official rationale for the urban exclusion policy began to emphasize the burden on the urban grain supply and civil control systems and the need for peasant labor in rural areas. Talk of rural unemployment disappeared. The reason was probably not merely related to crop conditions but to the fact that 1955 was the year of acceleration in the agricultural collectivization program, a policy which could not be squared with the idea of surplus rural labor. But in 1956, another bad year in agriculture, the flight from the rural areas, spurred again by widespread natural calamities, resumed with considerable force. Between May and November 1956, Shanghai had an increase of 500,000 in its registered population, most of it due to a "great infiltration" of people into the city,[59] and by the end of the year the increment had reached 700,000, of which "more than 500,000" were said to be peasants from rural areas,[60] a figure roughly equal to the number of persons expelled during the previous year. Other cities had similar problems, and renewed efforts were made to solve them by tightening control of food supplies, residence permits, and access to employment.

However, in 1957, the rural-to-urban drift was still continuing. Many of the causes were the same as before. In addition, mismanagement of the agricultural cooperatives had made bad living conditions worse; education, medical care, and housing were all unsatisfactory in rural areas. The police could not control the movement nor could the registers keep track of urban residents. The situation was regarded as particularly threatening since the rural migrants, who were more docile and worked for lower wages, took jobs from urban workers and the displacement of the latter stirred up antagonism between workers and peasants, undermining the "worker peasant alliance" so vital to the Chinese Communist conception of a unified socialist society. A study of overcrowding in 15 cities found that the "nonproductive" population accounted for 60 percent of the total, and that, since 1953, the "productive" population had increased by only 28 percent while the "nonproductive" population had increased by 70 percent.[61]

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[59] "Shanghai Population Again Swells: People's Council Takes Steps To Check Further Rise." *Chieh-fang jih-pao,* Shanghai, Dec. 26, 1956; translated in *SCMP,* No. 1513, Apr. 18, 1957, pp. 25–26.

[60] "Shanghai Takes Concrete Steps To Repatriate Peasants to Home Districts." *Lao-tung pao,* Shanghai, Mar. 14, 1957; translated in *SCMP,* No. 1513, Apr. 18, 1957, p. 26.

[61] "Nonproductive Population in Cities Too Large and Growing Too Fast." NCNA, Peking, July 25, 1957; translated in *SCMP,* No. 1582, Aug. 1, 1957, pp. 1–2. The study was conducted by the State Planning Commission, the spokesman for which told the NCNA correspondent that the statistical method employed in compiling these figures actually understated the rate of increase in the "nonproductive" population.

The movement did not merely carry off excess rural labor but left the cooperatives in some areas with insufficient labor for the peak periods of agricultural activity. In one county of Fukien Province, it was said that 13 percent of the labor force had left for the cities.[62] According to one speaker before a national political forum in Peking, the inequality of living standards between rural and urban areas was the basic reason why the influx was continuing and why there was only a negligible exodus of peasants from the cities in spite of official efforts. The problem would gradually disappear when rural development had relieved the austerity of rural life sometime before the end of the Second Five-Year Plan period, he said, but his assurances were predicated on the assumption that the plan would be fulfilled.[63]

On December 18, 1957, the Party Central Committee and the State Council jointly issued another directive on the prevention of the "blind" movement of peasants to the cities. The directive once again ordered the cadres in the cooperatives to stop issuing letters of introduction to migrants and told urban enterprises to stop hiring temporary hands without prior official approval. It also repeated the call for tighter control of food rationing. Evidently previous instructions of the same kind had been generally disregarded. The new directive was somewhat more punitive in tone than its predecessors and contained a number of specific suggestions which had not been offered before. Railroad and boat personnel were ordered to inspect tickets to prevent free travel and riding beyond the points for which tickets had been purchased. The backflow of expellees was to be checked by the "return straight home" method, which included the sending of escorts with the returning migrants to make sure that they did not return to the cities without going home. Falsifying of household books was specifically prohibited and a crackdown was ordered on the free market, which provided an alternative source of food supply for those who could not get residence permits and ration allotments. Special organizations were to be set up under the local civil administration departments to coordinate the efforts of the various government agencies dealing with migrants.[64]

Soon after this directive appeared a new set of regulations for population registration were issued by the Ministry of Public Security, some of which were evidently intended to provide a stricter control over population movements.[65]

By the end of the First Five-Year Plan period the regime had been struggling to control the drift into the cities for at least 6 years without much success. Official records showed a total of 8 million rural migrants into urban areas during the period, in addition to an annual increment of 2 million accruing to the urban labor force through natural increase, for all of which employment had to be found. The

[62] "Fukien Province Calls on Peasants Not To Infiltrate into Cities," *Fu-chien jih-pao*, Foochow, Mar. 10, 1957; translated in *SCMP*, No. 1513, Apr. 18, 1957, p. 28.

[63] Tseng Cheng-wu, "One Way of Easing Overcrowding in Urban Centers," *JMJP*, Mar. 18, 1957; translated in *CB*, No. 445, Apr. 5, 1957, pp. 22–23. When the Second Five-Year Plan period ended in 1962, the country was just emerging from the depths of the great subsistence crisis of 1959–62.

[64] "Joint Directive of CCP Central Committee and State Council on Prevention of Blind Exodus of Rural Population," NCNA, Peking, Dec. 18, 1957; translated in *SCMP*, No. 1682, Jan. 2, 1958, pp. 2–4.

[65] "Regulations of the People's Republic of China Governing Household Registration," NCNA, Peking, Jan. 9, 1958; translated in *SCMP*, No. 1695, Jan. 21, 1958, pp. 1–5.

task was impossible. The economic base in the cities was too weak, it was admitted, hence there could be no sizable increase in the numbers of industrial and mining workers for some time to come. Although it was recognized that the rural migrants would have difficulty in finding employment in the rural areas, the authorities insisted that the surplus labor in the cities had to be returned to the rural areas, since "only the vast rural regions can absorb the ever-increasing labor force." If each of the 750,000 agricultural cooperatives would accommodate five persons from urban areas, it was suggested, a total of 3,750,000 urban residents could be sent back.[66]

Meanwhile, two other drives had gotten underway which also had the effect of reducing somewhat the urban population. One was a "reogranization of personnel" in Government and Party administration ostensibly intended to eliminate topheavy staffing in urban headquarters by reassigning large numbers of administrative cadres to lower levels and to rural areas. The other was the transfer to rural and frontier areas of those graduates of primary and middle schools for whom there was no room at the next higher level educational institutions. Both drives amounted to an expulsion from the cities of specific segments of the population, and, in spite of some equivocation in the press, the authorities obviously intended that for many of the transferees the move would be permanent.

The reorganization plan, according to the Deputy Secretary General of the State Council, who explained it in a youth magazine in April 1957, was a necessary step to improve the work of state agencies, to overcome bureaucracy, to increase administrative efficiency, and to reduce administrative expense. It was also expected to strengthen the work of organs at the primary levels, which had been neglected in staffing and weakened by the transfer of too many of the better cadres to higher levels. Working at lower levels was to help the cadres to improve themselves through practical work experience, and, in addition, would provide an opportunity to rid administration of these cadres who were not equal to their tasks and belonged in manual labor.[67]

Since the change was obviously to the advantage of both the individual and the state, the Deputy Secretary explained, the administrative cadres were generally enthusiastic for it. However, there were some who felt that transfer meant that the person "sent down" was incompetent and that it was therefore a mark of personal dishonor. Others, reflecting a widespread prejudice about the inferiority of rural work and a natural reluctance to share in the depressed living conditions in rural areas, saw reassignment as a sacrifice of personal interests. "Only a fool wants to go to the primary strata," they said.[68] The young graduates from primary and secondary schools who had failed the entrance examinations for the next level saw their new duties in much the same light. They felt that they were being shamed and humiliated,[69] that to till the land instead of being promoted meant

[66] Chang Ching-wu, "Why Must We Reduce Urban Population?" *Kung-jen jih-pao*, Peking, Jan. 4, 1958; translated in *SCMP*, No. 1693, Jan. 17, 1958, pp. 7–9.

[67] Chang Tseh, "Correctly Recognize the Significance of Reorganization," *Chung-kuo ch'ing-nien (China's Youth)*, No. 7, Apr. 1, 1957; translated in *ECMM*, No. 85, June 3, 1957, pp. 1–2.

[68] *Ibid.*, p. 2.

[69] "What Students Who Fail To Gain Admittance Into Institutions of Higher Education Should Do," *JMJP* (editorial), Aug. 22, 1957; translated in *SCMP*, No. 1603, Sept. 4, 1957, pp. 17–19.

"suffering a loss," and that if they went to the countryside instead of to the universities they would never become "specialists." [70]

This was, of course, an "incorrect attitude." The young people were advised that they ought not to look down on rural work, that they could continue their studies while they worked, that higher studies and plowing contributed equally to the cause of socialism, and that young people should be willing to go wherever their motherland needed them. But the "correct" attitude proved difficult to inculcate. Uppermost in the minds of the cadres, and probably also of the students, was the question of when, if ever, they could come back. The response to this question about which many cadres were "concerned, and in some cases, perturbed," was given unofficially and equivocally in an article which reproved them for the question and indirectly suggested that their chances of getting back depended upon how well they seemed to be learning the lessons of manual labor—not a very reassuring reply.[71] Other press articles warned the involuntary school dropouts that there would be no great increase in educational opportunities or in urban employment for some time to come.

The significance of these movements may be measured by the reported volume of participation, even though such figures as these may have only the very roughest correspondence to actual achievements. By November 1957, 810,000 cadres had already been transferred to lower levels, of which 303,000 had gone into manual labor, mostly in agriculture.[72] By February 1958, the tally stood at 1,300,000 according to "preliminary figures." [73] A somewhat contradictory figure of "close to 1,000,000" was cited in September 1958, but this figure seems to refer specifically to those who were not merely reassigned to rural areas but also reduced to manual labor.[74] No other summary figures are available, but the cadre movements seem to have continued to involve fairly large numbers at least into the latter part of 1960. There was some mention of transfer back to the cities, but the numbers of those fortunate enough to be moving in that direction were not as large.

The numbers of primary and middle school students transferred to rural and frontier areas seem to have been considerably larger than the numbers of cadres. In September 1957, it was announced that "more than 2,000,000" had recently gone to rural areas to participate in production.[75] Unambiguous summary figures are not available for later years, partly because the movement was joined by other categories of "volunteers," including demobilized servicemen, groups of laborers, graduates of colleges and universities, and miscellaneous youths. The transfers are still continuing as of the time of writing, but the totals seem more modest. There are indications that large numbers of youth have recently been inducted into the Red Guards, which have been

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[70] "The Problem of Primary and Middle School Graduates Taking Part in Agricultural Production," *JMJP* (editorial), Apr. 8, 1957; translated in *SCMP*, No. 1513, Apr. 18, 1957, pp. 1–11.

[71] Li Ts'eng, "A Discussion on the Future of the Down-to-the-Farm Cadres." *Hsueh-hsi* (*Study*), No. 5, Mar. 3, 1958; translated in *ECMM*, No. 127, May 5, 1958, pp. 24–27.

[72] "Over 810,000 Cadres in Whole Nation Transferred to Lower Levels," NCNA, Peking, Nov. 26, 1957; translated in *SCMP*, No. 1668, Dec. 10, 1957, pp. 8–10.

[73] "New Progress Reported in China's Cadre Work: Number of Transferred Cadres Reaches 1,300,000," NCNA, Peking, Feb. 23, 1958; translated in *SCMP*, No. 1724, Mar. 5, 1958, pp. 5–6.

[74] "Decision on Cadres' Joining Labor Ranks," NCNA, Peking, Sept. 20, 1958.

[75] "Over Two Million Middle and Primary School Graduates Go to Rural Areas," *KMJP*, Sept. 22, 1957; translated in *SCMP*, No. 1631, Oct. 15, 1957, pp. 3–5.

assigned to the cities to work at political indoctrination and the intimidation of opponents of the current ruling group. Many Red Guardsmen probably prefer this kind of duty to agricultural work, but it remains to be seen where they will be sent when they are no longer needed or wanted in the cities.

Meanwhile despite the energetic explusions and resettlements of 1957 and 1960, the urban population continued to increase. One writer in February 1961 noted that in the course of the Leap Forward in the preceding 3 years, the population of cities and mining areas had risen by 20 million.[76] By 1962, there were increasingly frequent reports, mainly from refugees and foreign newsmen, of extremely large prospective transfers of urban population to rural areas—figures of 5, 20, and 30 million were mentioned in various sources. One report claimed that about 20 million had been sent to the countryside within a few months in 1961 and that another 30 million were to follow in 1962.[77] Some observers described in detail the crowding of trains and station platforms by families on their way to rural areas. After the crisis of 1959–62 had passed its nadir, Chou En-lai, at a meeting of the Second National People's Congress in April 1962, listed the reduction of population in cities and towns as one point in a 10-point program of "readjustment" of the national economy.[78] The policy was apparently still in force in 1964, according to statements attributed to Po I-po by Anna Louise Strong:

> . . . We have drawn too much manpower from the rural areas to the cities. . . . Natural calamities show that our urban population is greater than what our countryside can supply. While our industry has been modernized, agriculture has not yet been mechanized. And until the mechanization of agriculture, our urban population must be reduced from 130 million persons to 110 million.[79]

Since the end of the Leap Forward, the policy of restricting urban growth has acquired a new significance, related to some new attitudes toward the position of agriculture in the national economy and the role of labor power in the development of agriculture and industry. During the First Five-Year Plan period, urban growth was resisted on the grounds that China's urban economy could not develop fast enough to absorb the increase in the urban labor force. Though it was explicitly recognized that the rural areas also had a surplus of labor and that living conditions there were generally worse than in the cities, policies on economic development gave primary consideration to the nonagricultural sector; hence, the rural areas were simply told that they must find enough productive work to absorb both rural and urban surplus labor.

The Leap Forward was in some respects a rebellion of nontechnical but highly political elements in the Party against the inherent pessimism of the gradualists, who saw only distant success in economic

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[76] Lin Jih-hsin, "On the Relationship Between Agriculture and Heavy Industry," *Ta-kung pao*, Peking, Feb. 2, 1961; translated in *SCMP*, No. 2466, Mar. 29, 1961, p. 4.

[77] "China Plans To Send 5 Million From Cities to Work Farms," *Washington Post*, May 3, 1962; "The Chinese Puzzle," *East Europe*, vol. II, No. 10, October 1962, pp. 25–26 (selections from several dispatches from Peking by Vasil Magdeski).

[78] "Communiqué Issued on NPC Congress," Peking Radio, Apr. 16, 1962.

[79] Anna Louise Strong, *loc. cit.*

development and little progress being made toward it. The Leap overthrew restrictions on urban growth briefly in 1958 while pursuing a policy guided by the notion that unlimited applications of labor power and political enthusiasm could revolutionize all types of production, including both agriculture and industry, and that China could be freed overnight from the pinch of economic stringencies in every field. The reports of revolutionary success in agriculture returned by the newly arrived cadres sent down from urban areas, who were doubtless eager to show their diligence in rural work and to claim elimination of the difficulties in agriculture in the hope of getting back to the cities as soon as possible, convinced the Party momentarily that the Marxist theory of the unlimited productivity of labor had, in fact, proved to be China's salvation.

However, the conviction was not long sustained. By the spring of 1959, even though the Leap Forward claims of doubling of food crops were still being repeated, some press articles showed renewed concern over the low level of agricultural productivity, the falling ratios of land per capita, and the need to increase agricultural output through mechanization, all of which belied the implications of the figures cited in the same sources.[80] Though the Leap Forward position that a "shortage of labor power" was felt in both urban and rural areas was still being reiterated, restrictions on urban growth were promptly reimposed.[81] Even though the Leap had ended in near disaster, it was still necessary to protest that it had proven Mao's judgment to be "correct in every respect," but it was possible to acknowledge, almost in the same breath, that China's industry and agriculture remained in a backward state.[82]

It could also be admitted that the struggle for agricultural development was a long-term struggle which would absorb the energies of almost all of China's young people for many years to come.[83] As the crisis of 1959–62 deepened, there was a return to the more modest expectations of the First Five-Year Plan period, a rediscovery of the traditional wisdom of the peasants, and a new conception of the fundamental role of agriculture in economic development. A new priority was assigned to agriculture in the development of the economy, and a larger share of capital investment was allocated to those industries which produced chemical fertilizers and agricultural implements. At the 10th Plenary Session of the 8th Central Committee of the Chinese Communist Party, in September 1962, a new policy for national development was announced. It was said that Mao himself

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[80] For example, see Hsieh Yin-ch'i, "Ways To Increase Productivity of Labor in Agriculture in Our Country," *JMJP*, Mar. 12, 1959; translated in *SCMP*, No. 1986, Apr. 6, 1959, pp. 2–8.

[81] Liu Ti-ch'en, "Questions Concerning National Distribution and Use of Labor Power," *JMJP*, Apr. 15, 1959; translated in *SCMP*, No. 2017, May 21, 1959, pp. 3–7. The fact that a shortage of labor power could be felt in a country with 600 million people was a "good thing," this writer said, but he was concerned about the burden of supplying necessities to an excessively increasing urban population.

[82] Teng T'o, "Implement and Realize the Thought of Mao Tse-tung on the First Line of Agricultural Production," *JMJP*, Oct. 24, 1960; translated in *SCMP*, No. 2375, Nov. 9, 1960, pp. 13–14 and 17; Hu Yao-pang, "Bring Up a New Generation in the Great Struggle on the Agricultural Front," *JMJP*, Nov. 22, 1960; translated in *SCMP*, No. 2393, Dec. 8, 1960, pp. 1–10.

[83] Hu, *op. cit.*, pp. 3–4. This would mean that urban youth must continue to go to the countryside. "In our cities, several million teenage youth grow up and join the ranks of the young workers every year. Part of them will, of course, be absorbed by the industrial front. But for a long time to come, more of them will be required to go into agriculture than industry."

proposed "to place the development of agriculture in the leading position, to handle correctly the relationship between industry and agriculture, and to shift the operations of the industrial departments firmly to the orbit based on agriculture." [84] The connection between these events and the policies and the plans for urban development was explored somewhat cautiously by the writer of a newspaper article in the fall of 1963. Noting without intentional irony that blind increase in urban populations is characteristic of capitalist countries whereas urban growth under the socialist system is according to plan, he advanced the thesis that the size of the urban population must be determined in the last analysis by the level of development in agricultural production. From this principle he derived the necessity of maintaining an appropriate balance between urban and rural population by limiting urban growth and by transferring labor and dependents to the countryside when necessary.[85] Thus, a rationalization has evidently been developed to cover a policy of nongrowth and perhaps of contraction of the urban population for an indefinite period.

What policy means for the past trend and future prospects of population distribution by rural and urban residence is, as we have seen, no simple matter. Despite an apparently unchanging policy during the years from 1952 through 1957, a high influx of rural migrants continued until the urban expulsions of 1955, resumed strongly in 1956, and was checked again in 1957. In 1958, a policy favorable to movement coincided with inherent tendencies, and the movement was overwhelming. But when the exclusion policy was restored in 1959 and implemented by various planned resettlements, urban growth continued until the most acute phase of the food crisis in the winter of 1960–61. Regardless of whatever impressions foreign correspondents in Peking may have, it would seem unwise to accept the talk of planned reductions in the urban population during 1963 and 1964 as equivalent to achievement, even if the railroad stations that foreigners see are glutted with back-to-the-farm migrants. However, it is quite possible that a determined effort by the regime to expel population from the cities during these years, especially if reinforced by a slowdown in the rate of expansion of urban industries, could have slowed the growth of the urban population or perhaps brought about a net decline, at least temporarily. Even without deliberate intervention, so long as the growth of the nonagricultural economy was held back by the need to divert investments into agriculture, a large-scale influx of rural migrants into the cities probably could not have continued indefinitely without creating such acute distress in urban centers that the advantages of moving out began to surpass the advantages of moving in. At some point, the growth of cities would have been forced to wait for the resumption of general economic development. There is no indication that economic development has resumed on a broad front since 1964. The urban population of Mainland China is probably declining now

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[84] 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.

[85] Hsueh Cheng-hsiu, "Tentatite Treatise on the Relationship Between Increase of Urban Population in Socialist Cities and Development of Industrial and Agricultural Production," *KMJP*, Oct. 7, 1963; translated in *SCMP*, No. 3093, Nov. 4, 1963, pp. 1–9.

in relative if not in absolute terms, and there is no immediate prospect for a return to rapid urban growth.

DISTRIBUTION OF ETHNIC MINORITIES

The ethnic minorities in China constituted barely 6 percent of the total population according to the census of 1953. Although numerically insignificant, there are two reasons why they claim attention out of proportion to their numbers: their geographical location and their propaganda value. From Korea counterclockwise around the perimeter of China to Vietnam, the ethnic minorities occupy the territory adjacent to China's land borders; the treatment of the ethnic minorities is both a primary point in China's propaganda toward other peoples and a critical test of the Chinese Communist claim to tolerance and multinationalism.

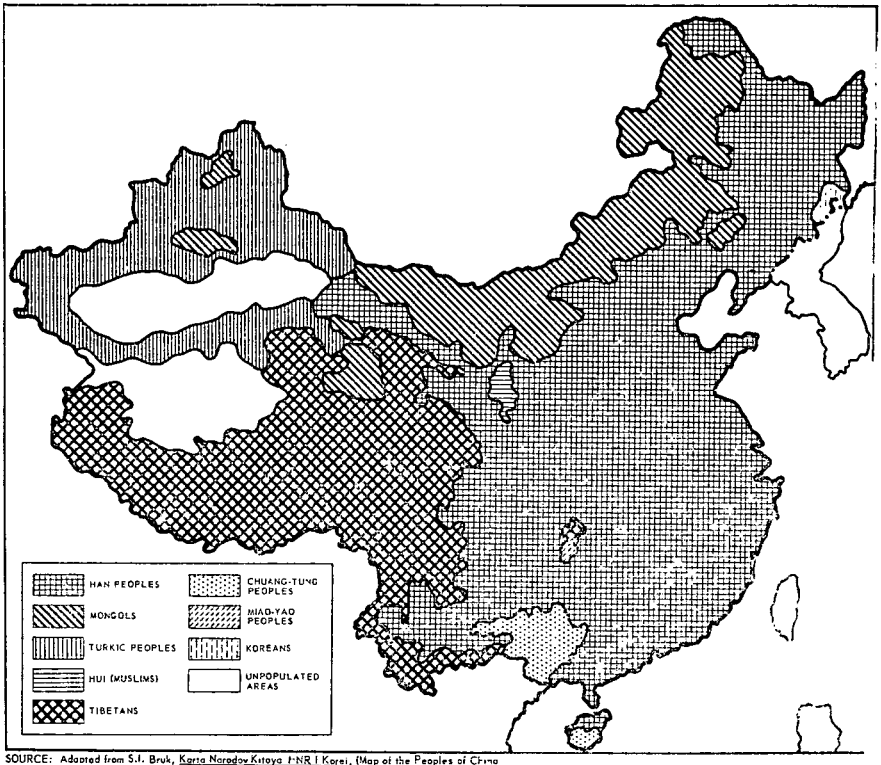
Altogether there are more than 50 minority groups in China, distinguished from the dominant Han population by language, culture, religion, race, or some combination of these factors. The largest, the Ch'uangs, were estimated at nearly 7 million during the 1953 census; the smallest amounted to only a few hundreds. Most of the minorities are more or less concentrated in a particular part of China, but the degree of dispersion is highly variable. Some of the smaller minorities occupy no more than a single oasis in the western region, where they have developed their own culture in relative isolation over a long period of time. Others, like the Hui peoples, who are similar to Han Chinese except for their adherence to Islam and its related culture patterns and social institutions, are distributed through almost every province in China. Even in the areas of their greatest concentration, few of the minority peoples actually constitute a majority of the local residents. According to the 1953 census, the Han Chinese outnumbered the minority populations in every provincial level unit except Tibet and Sinkiang. In Kwangsi, where the Ch'uangs live, they constitute only 37 percent of the total population. The Mongolians make up only about 12 percent of the population of the Inner Mongolia Autonomous Region and the proportion is shrinking as Han settlement in the region continues. In a number of provinces there are small minority districts in which particular ethnic groups are predominant, but these are little more than tiny islands in the great Han sea.

In some areas, particularly in the southeast, a great many different ethnic groups interpenetrate geographically while maintaining jealously their separate cultural and social identities. Not only the barriers of language but also economic functions serve to differentiate and separate the various ethnic groups. In some places the Hans occupy the towns and the river valleys where intensive rice cultivation is carried out, while the minority peoples live by more marginal forms of agriculture or by tending herds on the slopes of the hills and mountains. The result is a kind of vertical segregation with limited contact apart from market transactions and ritual political activities.

Representing the location of the principal minority groups on a map requires some arbitrariness and can at best convey only a general

idea of their distribution. One of the most ambitious efforts to date at producing an ethnic map is that of the Soviet geographer, Solomon I. Bruk, who attempted to combine ethnicity and density in a single system of representation. However, even on Bruk's map the numerous symbols differing only slightly in shading cannot always be superimposed on each other in areas where interpenetration of ethnic groups is considerable. The ethnic map in figure 3 is based on Bruk's work, which in turn is based on a Chinese Communist secondary school population density map, several Chinese maps on the distribution of ethnic groups, and a variety of other publications, as well as on consultations with Chinese ethnographers.[86] In figure 3, only major ethnic groups with distinct areas of concentration are shown. Some large ethnic groups which are not sufficiently concentrated to be represented by an area and some others which are so concentrated that their territory is scarcely identifiable on a map of this scale, have not been included.

Figure 3.--GEOGRAPHICAL DISTRIBUTION OF MAINLAND CHINA'S PRINCIPAL ETHNIC GROUPS



SOURCE: Adapted from S.I. Bruk, Karta Narodov Kitaya i MNR i Korei, (Map of the Peoples of China The Mongolian People's Republic, and Korea), Akademiya Nauk SSSR, Moscow, 1959.

[86] The text explaining the map is available in translation as Solomon I, Bruk, *Naseleniya Kitaya, MNR i Korei (The Peoples of China, the Mongolian People's Republic, and Korea)*, Publishing House of the U.S.S.R. Academy of Sciences, Moscow, 1959; translated in *U.S. Joint Publications Research Service*, No. 3710, Aug. 16, 1960. Sources are given in a note on pp. 48–51, and in some comments on p. 2. Bruk's work is the source for most of the details on particular minorities given later in this section.

The official communique of the results of the 1953 census listed a total of nine minorities as large as 1 million people or more. In order of size these were:

Ch'uangs	6,611,455	Miaos	2,511,339
Uighurs	3,640,125	Manchus	2,418,931
Hui	3,559,350	Puyis	1,247,883
Yi	3,254,269	Koreans	1,120,405
Tibetans	2,775,622		

All other minorities together accounted for only 6,728,025 of the overall total of 35,320,360 non-Han people.[87] Reservations as to the accuracy of census figures are more serious with respect to the minorities than for any other group in Mainland China's population. Most of the areas in which estimates had to be substituted for actual field enumeration were minority areas. In some of them the Han rulers in 1953 had not yet been able to establish a system of native cadres and could not risk sending in Han enumerators to count the people. For these areas, estimates were made by the Commission on Minority Affairs on a basis not specified. The figures for residents of Tibet and Sinkiang are particularly suspect on these grounds. Even in the case of such minorities as the Manchus, Hui, and Koreans, who were probably covered entirely by enumeration, the identification of minority group members depended upon the claims of heads of household.[88] Whether this would have resulted in concealment of national identity or a multiplication of ethnic subcategories based on unsubstantial differences would probably have depended upon local conditions antecedent to the enumeration in each area, but, taken together, all of the circumstances relating to the compiling of figures for the minority populations suggest that they may contain gross errors and are not comparable from one ethnic group to another. Moreover, the census figures are now more than 13 years out of date, and, during the years since, the minority peoples have not been increasing at equal rates. It cannot be assumed that they participated to the same extent as the Han majority in the general reduction of mortality and rise in natural increase rates though 1958. Also, political factors, including civil unrest and repression, flights across the border, and repatriations have undoubtedly affected the numbers of some of the minorities.

Beginning in the north and proceeding round the semicircle of minority peoples who live along China's land frontiers, the first major minority is the Koreans. These are concentrated mainly in the area immediately north of the T'umen River, which marks the eastern end of the Korean-Chinese border. Korean migration into China began during the last century and was accelerated after the Japanese occupation of Korea in 1910. The Korean settlers are mainly engaged in irrigated rice cultivation in an area in which few Chinese residents practice this kind of farming. In recent years a considerable repatriation of Koreans into North Korea has taken place, but the effects of this movement on the numbers remaining cannot de determined. It is perhaps significant that the Japanese census of Manchuria in 1940

[87] "Communique of Results of Census and Registration of China's Population," NCNA, Peking, Nov. 1, 1954; translated in *CB*, No. 301, Nov. 1, 1954, p. 2.

[88] Or so, at least, Krotevich says (Krotevich, *op. cit.*, p. 113). The original census directives failed to specify whose word was to be taken. Probably convenience would in any case have led the cadres to accept whatever the head of household told them.

found a total of 1,450,000 Koreans living in the area, whereas the 1953 census reported only 1,120,000. A part of the difference may be due to more effective counting by the Japanese census takers, but there may also have been some decline in numbers of Koreans in China as a result of their exodus after the Japanese defeat in 1945.[89]

The 1953 census also found fewer Manchus than were found by the 1960 census of Manchuria—2,419,000 as compared with 2,674,000, respectively. Here the problem is somewhat different, for the Manchus were to a considerable degree assimilated into the larger Chinese culture well before the end of the Manchu rule in 1911, and they have little cultural basis for a separate ethic existence. Major streams of Han migration were flowing into Manchuria from the overcrowded areas of North China before the 17th century, and the efforts of the Manchu rulers to restrict the movement of Han peoples northward across the Great Wall were apparently unsuccessful. By 1940, more than 90 percent of the population of Manchuria was Han Chinese, and the movement has undoubtedly continued under the Chinese Communists, both into the urban industrial centers developed by the Japanese and into the rural and frontier areas. The decline in the numbers of Manchus between the 1940 and 1953 censuses probably reflects mainly defections from the ranks as more and more people of Manchu decent find it advantageous to be counted simply as Chinese.

To the west of Manchuria along the northern perimeter of China just below Outer Mongolia are the vast arid lands inhabited by the various subdivisions of Mongols. Most of the Mongols are still nomadic peoples, despite efforts by the Chinese Communists to induce them to become sedentary and take up agriculture. Living in traditional tribal groups, they graze their sheep, goats, horses, cattle, and camels through a cycle of pasturelands, returning each year to the same starting point. Many of the tribes are wholly dependent upon animal husbandry, but some supplement their income by hunting and trapping fur-bearing animals and selling the hides. They speak a variety of Mongolian languages, and many are adherents of Lamaist Buddhism. Though outnumbered by the Han Chinese in most of their territory, their nomadic habits have helped to preserve their identity, and their political significance has probably been enhanced by the fact that adjacent Outer Mongolia exists as a purely Mongol state under Soviet rather than Chinese influence.

The Hui peoples are widely dispersed, as has already been noted, but their major concentration is in an area which had been a separate province from nationalist times until the middle of 1954, when it was incorporated in Kansu Province, to emerge again as the Ninghsia Hui Autonomous Region in 1958.[90] The Hui peoples constituted a reported 33 percent of the total population of the new region. In recent years there has been some tendency for the Hui from scattered settlements to migrate into the areas of major Hui concentration, motivated at least in part by their strong adherence to Islam with its prescriptions of marriage within the faith. Even in their smaller settlements,

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[89] *The Population of Manchuria*, pp. 38–41.

[90] "CPG Council Decision on Abolition of Regional First Grade Administrative Machinery and Changes in Provincial and Municipal Structures." NCNA, Peking, June 19, 1954; translated in *SCMP*, No. 832, June 19–21, 1954, p. 9; "Introducing Ninghsia Hui Autonomous Region," *JMJP*, June 21, 1958; translated in *SCMP*, No. 1826, Aug. 6, 1958, pp. 32–33.

and in both urban and rural areas, the Hui have tended to live apart from their Han neighbors. Hence their wide dispersion has not led to much assimilation. They have not been very cooperative in Chinese Communist political programs.

The northwest corner of China is occupied mainly by Turkic peoples, principally the Uighurs, Kazakhs, and Kirghiz, who are found in Kansu and Tsinghai Provinces and the Sinkiang Uighur Autonomous Region. All three peoples are adherents of Islam, and their long history of isolation from events and influences in the rest of China has given them a rather strong sense of separate identity. The Uighurs, who are China's second largest minority, are mainly engaged in agriculture. They cultivate irrigated crops in the several chains of oases in western and central Sinkiang and in the Dzungarian lowlands in northern Sinkiang. The Kazakhs and Kirghiz are pastoral nomadic peoples with the remnants of a system of tribal organization. The Kazakhs are located mainly in the northwestern part of Sinkiang, where they pasture their flocks on the hills and mountain slopes, retiring to encampments in the valleys in the winter. The Kirghiz live mainly in southwestern Sinkiang. The Turkic peoples are predominant in Sinkiang, but their relative numbers have been declining with the increasing settlement of Han Chinese in the area.[91] The Chinese settlement is partly a consequence of efforts to develop the mineral resources of the region, but political reasons have recently assumed a new importance as Sino-Soviet antagonisms have led to border disturbances and a rivalry between the two powers for influence among those minorities divided by the international boundary.

The Tibetans are distributed throughout Szechwan, Kweichow, Yünnan, Tsinghai, and Kansu Provinces as well as Tibet. In Tsinghai, they are the predominant population of a major portion of the province. The Tibetans also retain the vestiges of a tribal system, but few of them are nomadic. They are essentially farmers but usually keep some livestock as well, and, as with other peoples in China's far west, hunting is sometimes an important supplement to the food supply. The principal religion of Tibet has been Lamaist Buddhism since about the seventh century, and it served as the basis for both the social and the political institutions of Tibet until 1959. The Chinese Communists found Tibet difficult to assimilate. They had the ostensible cooperation of the Dalai Lama after their military invasion of Tibet in 1950, but Tibetan resistance continued until the revolt of 1959 was crushed by Chinese armies, and the Dalai Lama sought political asylum in India. The Panchen Lama was then selected by the Chinese Communists as their symbol of cooperation and steps were taken to establish "autonomy" in Tibet. By 1964, the Panchen Lama also proved either unsuitable or superfluous as an agent for Chinese Communist purposes in Tibet and was subjected to a regimen of self-criticism and reform. For the first time in their history the Tibetans are a conquered people.

Closely related to the Tibetans and included in the same family of ethnic groups in Bruk's map are the Yi peoples, who actually out-

[91] According to one recent Chinese source, the proportion of Sinkiang's population which is Uighur is now down to 67 percent; it was 75 percent in 1953 according to census figures. There is some reason to believe that the Chinese Communists prefer to understate the amount of Han settlement in Sinkiang. (See Michael Freeberne, "Demographic and Economic Changes in the Sinkiang Uighur Autonomous Region," *Population Studies*, vol. 20, No. 1, July 1966, pp. 107–108.)

numbered the Tibetans according to the 1953 estimates. They are distributed through three provinces: Yünnan, Szechwan, and Kweichow.

Their principal occupation is agriculture but with some keeping of flocks and herds. Some of the Yi peoples in the more inaccessible mountain areas have been able to avoid Han domination until very recent times and assimilation has been slow.

The Ch'uangs, China's largest minority, are one group within a particularly large family of linquistically related peoples, which also includes the fairly numerous Puyis of Kweichow Province. These ethnic groups occupy a very extensive area going far beyond the borders of China to the south and southwest. The Ch'uangs themselves are highly concentrated in an "autonomous" district in western Kwangsi Province, where they account for about 70 percent of the population, and in the southeastern part of Yünnan Province. The Ch'uangs are mainly dependent upon irrigated rice for their livelihood. Their religion is animist, with an emphasis on devotion to the spirits of ancestors. Even during the land reform period, the Ch'uangs and related peoples offered little resistance to Chinese domination, and they are often cited in Chinese Communist publications for foreign consumption as a prime example of Chinese beneficence toward minorities.[92]

Though they are not located near the land boundaries of China, the Miao-Yao peoples are among the numerically more significant of China's minorities. They are distributed over much of the central-south and southwestern provinces and into some of the provinces of east China, but their major concentration is in Kweichow. On linguistic grounds they are thought to be related to the Tibeto-Burman peoples, but they are subdivided into many fairly distinct components. In many areas Han influence has obliterated traditional elements of tribal culture, and language remains the principal basis of distinction.

Chinese Communist policy toward the minority peoples has been characterized by a fundamental ambivalence which leans heavily to one side. The Party professes a tender solicitude for the ultimate welfare of the minority peoples, but in practice it permits the minorities to preserve only those aspects of their culture, such as language, native costumes, music, dances, arts, and crafts, which are both picturesque and irrelevant to more serious Party objectives. Religion is tolerated with condescension so long as it is uninvolved with any indigenous power structure and does not prevent its adherents from complying with central policies, or so long as it is obviously moribund. If a minority religion is vital and resistive, it is either systematically subverted or crushed. So far as the traditional structure of minority society is concerned, either it must submit to penetration and reorganization to make it a suitable instrument for implementation of the Party's programs or else it must be destroyed.

For the minorities, Han oppression is nothing new in the perspective of history, throughout which "Great Han Chauvinism" has been a sustained motif. Before coming to power, the Chinese Communists explicitly dissociated themselves from this tradition. At the First

[92] However, there have been instances of resistance to Chinese influence on the part of Ch'uang cadres, who apparently have tried to interpose themselves between the Han cadres and their own people in order to protect the interests of the latter.

All-China Congress of Soviets in 1931, the Party officially endorsed the position adopted by the Communist Party of the Soviet Union in 1917 assuring the national minorities of the right of "self-determination, including the right to secede and form independent states." [93] However, after 1949, when the Chinese Communists were in a position to fulfill their promise, there was no further talk of independent states. Article 2 of Chapter I of the program for the implementation of national regional autonomy, passed by the Government Administrative Council on February 22, 1952, declared unequivocally that—

> All national autonomous districts shall be an inseparable part of the territory of the People's Republic of China. All autonomous organs of the national autonomous districts shall be local state power organs under the unified leadership of the Central People's Government and subject to guidance by people's governments of superior levels.[94]

From the second sentence quoted it is clear that the new concept of "autonomy," which was to be the guiding principle of official policies toward minorities thenceforth, was essentially a contradiction in terms. The articles specifying the powers of the "autonomous" organs were equally unambiguous as to the ultimate seat of authority, but lest any misunderstanding arise over this matter, the final article stated that "the right to interpret and revise this program shall belong to the Central People's Government.[95] The section on the "organs of self-government" in the national autonomous areas contained in the Constitution of the People's Republic of China adopted on September 20, 1954, also made it clear that any exercise of their powers of self-government required the prior approval of the Standing Committee of the National People's Congress.[96] In the practical administration of minorities policies there was never any doubt as to where the power lay. The Chinese Communists were determined that the minorities should undergo the same forms of economic, political, and social development as the Han majority, and it was obvious that the initiative, in both cases must come from the Party and the Government.

In the years prior to 1958 it was generally recognized that special handling was required in dealing with the minorities. Land reform and the subsequent socialization programs usually arrived in the minority areas some time after they had reached the adjacent Han population, and the methods of implementation were, at least in theory, adjusted to local conditions. An edict of the Commission on National Minorities' Affairs issued in 1953 warned Han cadres engaged in minorities work of the necessity of having a "full understanding of the characteristics of the nationalities and their actual conditions." "Under no circumstances," the edict cautioned, "should working methods . . . applicable to the Han regions be mechanically applied

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[93] "The National Minority Problem," *China News Analysis*, No. 232, June 13, 1958, p. 4. This "right" was written into the constitution of the Kwangsi Soviet in 1931. (Harold C. Hinton, "The National Minorities in China," *Far Eastern Economic Review*, vol. 19, No. 11, Sept. 15, 1955, p. 323.)

[94] "Central People's Government Promulgates Program for Enforcement of Nationality Regional Autonomy," NCNA, Peking, Aug. 12, 1952; translated in *SCMP*, No. 394, Aug. 14, 1952, p. 12.

[95] *Ibid.*, p. 16.

[96] "Constitution of the People's Republic of China," NCNA, Peking, Oct. 5, 1954; translated in *CB*, No. 297, Oct. 5, 1954, p. 16 (article 87).

to the minority regions." The warning was based on experience. Failure to take account of local conditions had stirred up resentment and caused confusion during the land reform and aroused traditional distrust of the Chinese. Some minority peoples attempted to flee when autonomous regions were set up in their areas, so great was their apprehension. In other areas, the Han cadres acted without regard to the interests of the minority peoples, disregarded the rights of minority cadres, ordered them about, forced them to speak Chinese and dress in the Chinese style, bypassed the autonomous organs in issuing directives to lower levels, and were indifferent to the hardships endured by minority peoples. The edict noted that the failure to take account of local conditions and the arbitrary application of procedures applicable only in Han regions were not confined to isolated occurrences but were the general practice.[97]

By 1958, solicitude for the customs and circumstances of the minority peoples had diminished considerably. The minorities had resisted Socialist "transformation" and other central policies as far as they could and in some instances, notably in Sinkiang in 1957–58, there had been open rebellion. Elsewhere, the minority cadres had either sided with their own people against the Han authorities or been rejected by their people as traitors, and some of the local leaders entrusted with nominal positions of authority had demanded the right to actual self-government. During the Hundred Flowers period, the minority intellectuals had joined with too much zeal in the criticism of Party cadres and policies. It had become apparent that the minorities would not easily be persuaded to "take the socialist road." In the winter of 1957 a "rectification and socialist education" campaign was being "pushed intensively" in the national minority areas. Its aim was the elimination of "local nationalism," an expression used to refer to any effort to put minority interests ahead of Party objectives. The "anti-Party and anti-socialist factions," who were said to be trying to undermine the unity of the motherland and the solidarity of the different nationalities by their "unprincipled slanders and criminal activities," were to be "exposed and criticized." [98] The proper attitude for the minority peoples, as expressed by an officially approved minority spokesman at a session of the National People's Congress, was to "love Chairman Mao, support the Chinese Communist Party, firmly follow the socialist road, love our homes but love the motherland more." [99]

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[97] "Basic Summarization of Experiences in the Promotion of Autonomy in National Minority Areas," NCNA, Peking, Sept. 9, 1953; translated in *CB*, No. 264, Oct. 5, 1953, pp. 12–22.

[98] "Rectification and Socialist Education Campaign Pushed Intensively in National Minority Areas," NCNA, Peking, Apr. 30, 1958; translated in *SCMP*, No. 1770, May 5, 1958, pp. 2–3. "Local nationalism" was defined for the benefit of minorities workers in Kansu Province as "a kind of anti-Marxist thinking. It is extremely harmful to the great common enterprise of the nationalities of building a socialist motherland and, therefore, must be thoroughly exposed and criticized." Some of its common manifestations were cited in the same source: "One expression of local nationalism at present is to try to repudiate the unified leadership of the Party on the ground of autonomous rights and 'nationalization,' to discriminate against and reject cadres from other parts of the country (including Han cadres and cadres of other nationalities not indigenous to the province), and take a distrustful and discriminatory attitude toward members of the Communist Party and the League and other activists of the local nationalties." Ma Ch'ien-nien, "Criticize Local Nationalism, Further Strengthen Socialist Solidarity of People of All Nationalities." *Kan-su jih-pao*, Lanchow, Jan. 23, 1958; translated in *SCMP*, No. 1730, Mar. 13, 1958, pp. 6–19.

[99] Lu Han, "Minority Nationalities Must Love Their Homes But Must Love the Motherland More," *JMJP*, Feb. 7, 1958; translated in *CB*, No. 500, Mar. 31, 1958, pp. 22–25.

The spirit of love was probably not enhanced by the next step in minority policies, which was a drive throughout 1958 to reform the customs and practices of the minority peoples. In the spring, the policy was to distinguish between customs according to their merit. Those that were good were to be encouraged; those that were bad were to be changed by educating the people to reform them voluntarily and gradually.[100] However, in the course of the drive, the official line hardened, and the change was reflected in the treatment of specific cases of dissidence in various minority areas. From its experiences in one instance, the Party was said to have learned that:

> There must not be any one-sided emphasis on the need of concessions to national habits and customs. No good can be done by such emphasis, regardless of whether these habits and customs are favorable or not to the socialist cause, to the solidarity of the nationalities, and to the development of the nationality concerned.[101]

It was also evident in the imposition of the commune movement on minority areas simultaneously with its application to the rest of China, showing that the minority peoples no longer enjoyed any special exemptions. The Vice-Chairman of the Nationalities Affairs Commission outlined the hard policy in a 10th anniversary speech in September 1959, in which he declared that all nationalities must achieve social reforms and follow the socialist road. Some latitude for timing and methods was to be left to the various minorities, but it was made clear that they would not be allowed to "abandon these undertakings half way." The reforms would be "peaceful" if they proceeded according to "the wishes of the people" and "the guiding principle and policy of the Party," but if there were any resistance by local minority leaders, "it would then be necessary resolutely to pulverize their resistance in order to assure implementation of the reforms." [102]

During the early 1960's, the policy toward minorities took a somewhat more moderate turn. The harshness of the immediately preceding years was blamed on misunderstanding of official intentions by local Party cadres, the usual retrospective explanation for an unwise policy which has had to be abandoned. The autonomous units, which had apparently been all but disregarded during the hard line period, were to be revived, minority cadres once again fostered, and the persecution of minority religious leaders was to give way to milder forms of reeducation. It was affirmed once more that religious belief was a matter of choice for the individual, though, of course, religious observance and religious organization remained matters for Party concern. The cadres were again reminded about the dangers of Great Han nationalism which had been evident in efforts to obliterate nationality differences and to change custom by force.

By the middle of 1964, there were signs of another hardening of the policy toward minorities with the appearance in the Party journal

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[100] Wang K'e and Ts'ui Chien, "Correct Treatment of National Customs and Practices," *KMJP*, Apr. 3, 1958; translated in *SCMP*, No. 1762, May 1, 1958, pp. 3–5.

[101] "Decision of the 5th Plenary Session of the Chinese Communist Party's Kweichow Provincial Committee to Expel Rightist Liang Wang-Kuei from the Party," *Kuei-chou jih-pao*, Kweiyang, Apr. 30, 1958; translated in *SCMP*, No. 1813, July 17, 1958, p. 12.

[102] Wang Feng, "The Great Victory of Our Nationalities Policy," *JMJP*, Sept. 27, 1959, p. 6.

Red Flag of an article by the Second Vice-Chairman of the Nationalities Affairs Commission, which began with the declaration that "The question of nationalities is related to the question of classes; in fact, the question of nationalities is the question of classes." The opposition from among minority nationality peoples to the Party's policies was therefore a part of the class struggle, led by class enemies, who sought to incite people to revolt in order to disrupt the unity of the nation. These counterrevolutionary forces would have to be thoroughly crushed. The solution of the problem would take a long time, but its final denoument could be foreseen:

> It is only with the coming of communism and the gradual extinction of classes that nationalities will merge and national peculiarities and differences will disappear.[103]

From this, minority leaders would have had little difficulty in recognizing, if they were not already aware of it, that the Party's ultimate goal for their people is total assimilation into the Han majority.

There is little likelihood that the minorities will soon disappear. Though their relative numerical importance in China was never very great and has probably decreased since 1949, the repressive policies of the Chinese Communists may only have reinforced their traditional distrust of the Han peoples and prevented intermarriage and other forms of social contact by which assimilation might otherwise have been advanced. In strictly demographic terms, the policies of the central authorities have not uniformly worked toward the elimination of the minority peoples. During the first birth control campaign the minority areas were explicitly exempted on the grounds that their numbers had been decreasing in the past and the regime did not wish to pursue policies among minority peoples which might be construed as hastening their extinction. Some of the minority customs under attack in 1958 were prejudicial to health and economic security of the people, and their elimination would probably have contributed to higher survival rates. However, many of the major political and economic programs, such as land reform and the socialization of handicrafts and private trade, probably created disruptions in the local economies which more than compensated for the limited gains in health and living standards obtained through the less urgent general welfare programs. For some of the minorities whose efforts to resist Han domination ended, like those of the Ili Kazakhs in 1950–51 and the Tibetans in 1959, in slaughter, there must have been net population losses, though they will probably never be measured in official figures. For all of the minorities whose once inviolate precincts are now being overrun by Han settlers planted there for political or economic reasons, there is the threat of an ultimate cultural annihilation. Elsewhere in the world such experiences have sometimes been followed by a physical decline, as the inheritors of the shattered culture succumb to total apathy and give up the struggle for survival.

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[103] Liu Ch'un, "The Question of Nationalities and the Class Struggle in Our Country at the Present Time," *Hung-ch'i (Red Flag)*, No. 12, June 30, 1964, pp. 16–25.

Though they may sustain a kind of rearguard action for many years to come, as long as the minorities remain under the dominion of a strong Han Chinese regime, there is little chance that they can evolve in directions predicated largely on the basis of their own cultural heritage or that they can indefinitely preserve their ethnic identities against the sustained pressures of Chinese penetration. In the long run, it seems, their years are numbered.

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EMPLOYMENT IN MAINLAND CHINA: PROBLEMS AND PROSPECTS

BY

JOHN PHILIP EMERSON

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Text Tables

Appendix Tables

General Note

In the footnotes to this chapter, Chinese personal names are given surname first, in accordance with Chinese usage. The following abbreviations are used:

Abbreviations	*Full form*
CB	American Consulate General, Hong Kong, *Current Background.*
CCYC	*Ching-chi yen-chiu* (*Economic Research*).
CHCC	*Chi-hua ching-chi* (*Planned Economy*).
CHYTC	*Chi-hua yü t'ung-chi* (*Plans and Statistics*).
ECMM	American Consulate General, Hong Kong, *Extracts From China Mainland Magazines.*
First Five-Year Plan	*First Five-Year Plan for Development of the National Economy of the People's Republic of China in 1953–57*, Peking, 1956.
The Great Ten Years	SSB, *Wei-ta ti shih-nien* (*The Great Ten Years*), Peking, 1959.
JMJP	*Jen-min jih-pao* (*People's Daily*).

KMJP	*Kuang-ming jih-pao* (*Kuang-ming Daily*).
LT	*Lao-tung* (*Labor*).
NCNA	New China News Agency, Peking.
Nonagricultural Employment	U.S. Bureau of the Census, *Nonagricultural Employment in Mainland China: 1949–58*, by John Philip Emerson, International Population Statistics Reports, Series P–90, No. 21, Washington, D.C.: U.S. Government Printing Office, 1965.
SCMM	American Consulate General, Hong Kong. *Selections From China Mainland Magazines.*
SCMP	American Consulate General, Hong Kong, *Survey of China Mainland Press.*
SPC	State Planning Commission.
SSB	State Statistical Bureau.
TCKT	*T'ung-chi kung-tso* (*t'ung-hsin*) (*Statistical Work* [*Bulletin*]).
TCYC	*T'ung-chi yen-chiu* (*Statistical Research*).
TKP	*Ta-kung pao* (*Impartial Daily*).

EMPLOYMENT IN MAINLAND CHINA: PROBLEMS AND PROSPECTS

I. Introduction

A. THE SETTING

Mainland China ranks first among the countries of the world in population and third in land area. However, less than 15 percent of the land is arable. The remainder consists of deserts, mountains, swamps, or regions with too few frost-free days to sustain an agricultural population. According to official estimates, nearly 90 percent of the population of more than 500 million persons lived in peasant villages at the time of the Communist takeover in 1949. Although the total population has probably increased by more than 200 million in the intervening 17 years, the proportion which is rural is still high, somewhere near 85 percent. China is still essentially a nation of peasants, who depend for their existence on tiny allotments of land which they cultivate with traditional farm implements. As in the past, they are still at the mercy of recurring natural disasters such as droughts, floods, typhoons, and plagues of locusts.

In order to transform China from a country mainly dependent on subsistence agriculture into a modern industrial power the Communist regime has taken industrialization as its primary economic goal. It has mobilized whatever capital it could find, and redirected a small proportion of its total labor force into industry, transportation, and construction, and such essential supporting services as education, public health, and government administration. Its labor policies and training and education programs are designed to support the development of a modern industrialized economy.

The demands of industrial expansion on education and the attempts to satisfy them have led to a wholesale reorganization of the educational system by the Chinese Communists and enormously expanded school enrollments at all levels. One result of these changes has been the emergence of ever-increasing numbers of literate Chinese. The great majority of them have come from peasant families but have job expectations directed for the most part toward nonagricultural pursuits. In the last few years, during which the classes graduating from primary and junior middle school have been larger than ever before, there have been almost no job openings for them in the nonagricultural branches of the economy, which were still recovering very slowly from declines they suffered during the crisis years of 1959–61. As a consequence of the scarcity of nonagricultural jobs in urban areas, a high proportion of new entrants into the working ages, both urban and rural, and whether literate or not, have had to turn to agriculture as their only means of livelihood. Thus, the career aspirations fostered by the educational system are not being fulfilled.

The supply of labor has generally exceeded the demand for labor. The regime has not yet succeeded in eliminating urban unemployment and chronic underemployment in rural areas. In urban areas, the surplus of labor has been increased by an almost uninterrupted influx of peasants who fled to the cities to escape the hardships of rural life.

There is nothing new in these conditions, since widespread unemployment has always been part of life in both town and country in China. What are new are Chinese Communist Party economic and social policies which have influenced employment. The general failure of these policies to provide satisfactory solutions to manpower and employment problems will become clear from the discussion below. This failure underscores the gravity of present economic conditions in Mainland China.

B. DEVELOPMENT OF STATISTICAL DATA RELATED TO EMPLOYMENT

1. *Statistics Undeveloped Before 1953*

Statistics in general and employment statistics in particular were largely undeveloped in Mainland China when the Communists seized power in 1949. Earlier pioneering efforts in statistical data collection were associated either with institutions founded under foreign pressure, such as the Chinese Maritime Customs, or in the course of efforts to establish modern industry, transportation, and communications in a few large cities. For the Chinese, both circumstances emphasized the fact that modern statistics were a non-Chinese innovation. Prof. Li Choh-ming, a leading authority on China's statistical development, gives two reasons for the failure of statistics to develop under the Nationalist government: first, trained statisticians avoided government statistical work, since many Chinese regarded it as a political intelligence activity; and second, government leaders of that period did not use statistics as a basis for making decisions, and were not interested in improving data collection.[1]

The first 3 years of Communist rule were basically a period of consolidation of political power during which the regime gave little attenton to problems of economic development. Economic data collection was limited to state-sector industrial and transport enterprises. The central administration in Peking made no effort to develop systematic coverage of even the industrial portion of the vast private sector.[2] Not until October 1952 was the State Statistical Bureau established to collect statistical data on a nationwide basis.

In 1952, the Chinese Communist leaders announced that China's First Five-Year Plan would begin at the start of the following year. Industrialization was to be pursued according to principles of Soviet economic planning. Almost all of the available investment resources were to be committed to a single pattern of economic expansion which gave priority to the development of heavy industry. Implicit in the decision to undertake the First Five-Year Plan was the assumption that the Party would entrust economic and engineering operations to

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[1] Li Choh-ming, *The Statistical System of Communist China*, Berkeley and Los Angeles, 1962, pp. 4–5.

[2] Li Fu-ch'un, "Directive of Vice Chairman Li Fu-ch'un of the Finance and Economic Committee of the Central People's Government, Government Administrative Council to the All-China Conference on Financial and Economic Statistics (July 1951)"; in SSB. *T'ung-chi kung-tso chung-yao wen-chien hui-pien (A Compilation of Important Documents on Statistical Work)*, Peking, 1955, p. 3.

professional personnel rather than to Party cadres who had little formal education and few or no technical qualifications. The great volume of dispatches published in the Mainland China press through 1957 on targets, production reports, and plan fulfillment at all levels concealed almost entirely an underlying conflict between Party members whose power rested in large part on their grasp of ideology and the economic planners and engineers who held their positions primarily as professional specialists. This conflict was fully exposed only in 1958, when Party cadres superseded specialists in the control of all aspects of economic management during the Great Leap Forward.

The State Planning Commission was founded in mid-November 1952, 6 weeks after the establishment of the State Statistical Bureau. At this time, the scope of planning work included only the compilation of "control figures" (initial target figures estimated by the central planning authority) for state-sector production for the current year. Subsequently, full annual economic plans for the state sector were drawn up for 1953 and 1954 and provisional drafts of the First Five-Year Plan were prepared. State-sector industry was the main planning target; the private sector was completely omitted for lack of data. The ignorance and inexperience of planning personnel were partly responsible for the incompleteness of these early planning efforts, but the lack of reliable statistical data was a more important cause. Li Fu-ch'un, chairman of the SPC, likened planning work during these 2 years to the manufacturing of individual parts of a complex machine. At that time, the SPC was making some of the parts, but had not yet produced a complete machine.[3]

2. *Development of Employment Data Collection, 1953–57*

Immediately after it came into existence in 1952, the SSB undertook two surveys, one on the gross value of output of industry and agriculture and the other on employment.[4] Although details on methods used to collect data are lacking, it seems certain from the brief time allotted for the work and the absence of local data collection facilities that these surveys were limited to bringing together relevant statistical data then available in the various ministries and other administrative agencies in Peking. Although defective, the data provided by the labor survey were the best and most comprehensive available during the first 3 years of the First Five-Year Plan period.[5]

At the start of 1953, the Government Administrative Council designated the SSB as the leading statistical organization of the country with authority over basic financial, economic, cultural, educational, health, and social statistical work.[6] In practice, this meant that the SSB was to have the final say on all statistical work apart from the internal accounting and bookkeeping carried on by enterprises and organizations. Armed with this authority, the SSB began to expand its operations, establishing statistical offices at the provincial and

[3] Li Fu-ch'un, "Unceasingly Raise the Level of Planning Work," *CHCC*, No. 1, Jan. 27, 1955, pp. 1–2.

[4] Hsüeh Mu-ch'iao, "An Examination of 1953 Statistical Work and Important Points in 1954 Statistical Work," *TCKT*, No. 1, Apr. 12, 1954, p. 4.

[5] Probably most of the employment data for 1952 published in the *First Five-Year Plan*, pp. 189–190, came from the 1952 employment survey. A comparison of these figures with the final figures later released by the SSB shows the extent to which the SSB recognized and corrected defects in the 1952 survey data.

[6] "Decision of the Central People's Government Government Administrative Council on Expansion of Statistical Establishments and Strengthening of Statistical Work," Jan. 8, 1953; in SSB, *op. cit.*, Peking, 1955, pp. 41–43.

county levels of administration, bringing under its control the statistical work of the so-called business affairs ministries (those with economic administrative functions), and developing reporting systems for the most important economic activities carried out under the state plan.[7]

The two main sources of information on employment organized and developed by the SSB were the periodic data reporting systems and a series of economic censuses taken in 1954 and 1955. The reporting systems were designed to supply the SPC with information on the extent to which economic plans had been fulfilled. In mid-1955, the periodic reporting systems for labor and wages in state-managed industry and the railway system were rated as superior to those in other branches of the economy. For some of the latter branches—for example, government administration, water conservancy, and urban public utilities—the ministries responsible had great difficulty in preparing for submission even annual reports on labor and wages.[8]

With one exception, the economic censuses were taken primarily to supply the Party with information on the numbers of private establishments and persons employed in them, in preparation for the socialization of the private sector of the economy.[9] Although census taking was expensive and time consuming, it was considered the only way of filling in the informational gaps on the private sector. The first of the series of economic censuses was the 1954 census of private industry. Preparations for the census were made jointly by the SSB and the Central Administration of Industry and Commerce in the spring of 1954. The actual enumeration took place in the late spring and early summer.[10] The census gathered information on the numbers of establishments and employed persons in 44,000 enterprises with 10 or more workers and employees each.[11] Information was also collected on wages, power equipment, and the physical volume and value of output.[12]

In the summer and fall of 1954 the SSB and the Central Bureau for the Administration of Handicrafts took a census of 89,000 private industrial establishments with four to nine workers and employees each, and another of handicrafts. The handicraft census was the first nationwide enumeration of handicrafts in Chinese history.[13] It gathered data only on the numbers of establishments and handicraftsmen and the value of output.[14] Lack of information on handicrafts, widespread illiteracy among handicraftsmen, and the scattered distribution

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[7] A good account of the expansion and development of SSB operations is given in Li Choh-ming, *op. cit.*, pp. 19–55.

[8] SSB, Labor and Wage Statistics Office, "[We] Must Do a Good Job of Labor and Wage Statistical Work," *TCKT*, No. 6, June 27, 1955, p. 7.

[9] SSB, Industrial Statistics Division, *Wo-kuo kuo-tu shih-ch'i ssu-ying kung-yeh tiao-ch'a t'ung-chi (Statistical Surveys of Privately Managed Industry in Our Country During the Transition Period)*, Peking, 1958, p. 64.

[10] *Ibid.*

[11] The term workers and employees is an English translation of the Chinese compound *chih-kung*, which the Chinese Communists have defined to correspond to the Russian term *rabochiye i sluzhashchiye*. Regularly collected employment data of the SSB are limited almost entirely to this group. For a more detailed explanation of this and other employment terminology currently used in Mainland China, see *Nonagricultural Employment*, pp. 41–52.

[12] "On Several Problems in Surveys of Individual Small Trade Commodities Industry and Private Capitalist Industry and Trade," *TCKT*, No. 4, July 12, 1954, pp. 8–9.

[13] Operational aspects of this census are summarized in SSB, Industrial Statistics Division. *op. cit.*, pp. 90–99.

[14] Chao I-wen, "Organize a Nationwide Handicrafts Census and Gradually Effect Socialist Transformation," *TCKT*, No. 5, Aug. 12, 1954, p. 9.

of the 3,300,000 handicraft households enumerated combined to make this census a far more difficult undertaking than the enumeration of the more than 40,000 private industrial establishments with more than 10 workers and employees each in May and June of the same year. The lack of adequate preparations, and particularly the failure to set uniform standards for data collection and compilation, affected the quality of the data collected.

A census was taken of private trade and the food and drink industry in the fall of 1955. This was an even more difficult undertaking than the census of handicrafts, because a greater number of establishments had to be covered—3.9 million in all—and because there was almost no prior information on the private sector of these two branches of the economy. More careful preparations were made for this census than for the censuses of 1954,[15] and better results apparently were obtained. Data were collected on numbers of establishments and employees, amount of capital, value of sales and income, and the urban and rural distribution of these items.

The SSB also took a census of state-sector employment in 1955. This was the first SSB census devoted solely to employment. It was designed to provide information on wages and on the numbers and levels of educational attainment of professional and semiprofessional personnel. Before this census, information on wages and educational attainment of professional manpower was so incomplete that the SPC could not meet even routine requirements of planning.[16] Decisions made in 1955 to draw up a long-range scientific development plan [17] and to conduct a major wage reform in 1956 [18] underscored the need for these kinds of information and may have been the principal reasons for the census.

The census date was September 30, 1955. Data were collected on the following employment characteristics: (1) the sex of all working personnel; (2) the age and number of years employed of personnel in industry, capital construction, railways, and posts and telecommunications; (3) the professions and trades, wage grades, and wage systems in industrial, capital construction, geological survey, railway, and trucking enterprises; (4) the personnel classifications, specializations, occupations, levels of educational attainment, technical titles, and class origin of engineers and technicians; and (5) the occupations of government administrative personnel.[19] After the census was taken, those branches of the economy which previously had not established regular labor and wage reporting systems were instructed to set them up with SSB help.[20]

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[15] *Nonagricultural Employment*, p. 16. A detailed account of the preparatory work is given in Hsüeh Mu-ch'iao, "Summary Report on the Nationwide Private Trade and Food and Drink Industry Census Work Conference," *TCKT*, No. 8, Aug. 17, 1955, pp. 16–21.

[16] "Strengthen Organization and Leadership, Overcome Difficulties and Complete on Schedule the Nationwide Census of Workers and Employees," editorial, *TCKT*, No. 9, Sept. 17, 1955, pp. 3–4.

[17] [Chinese Academy of Sciences], "Directive on the Drawing Up of a 15-Year Long-Range Plan of the Chinese Academy of Sciences," *K'e-hsüeh t'ung-pao* (*Science Journal*), No. 11, November 1955; translated in *ECMM*, No. 20, Jan. 3, 1955, pp. 8–12.

[18] "Second National Conference of Directors of Labor Bureaus Held in Peking," NCNA, July 5, 1955; translated in *SCMP*, No. 1089, July 15, 1955, p. 8.

[19] Statistical Work Handbook Editorial Committee, *Lao-tung t'ung-chi kung-tso shou-ts'e* (*Labor Statistical Work Handbook*), Peking, 1958, p. 2.

[20] These branches included government administration down to the *ch'u* (district) level, urban public utilities, water conservancy, civil airlines, and scientific research organizations, according to SSB, Labor and Wage Statistics Office, *op. cit.*, pp. 7–8. For the first time, semiannual reporting on labor and wages was set up in 1955 as a minimum requirement for all branches of the economy, according to SSB, "The 1955 All-China Statistical Work Outline," in SSB, *T'ung-chi kung-tso chung-yao wen-chien . . .*, p. 232.

Information updating the 1955 data on characteristics of workers and employees (including engineers and technicians) was obtained in a February 1957 census-type investigation. For industry, capital construction, and transport and communications, data were collected on the age and sex, number of years employed, level of skill, cultural and educational level, and the political affiliation of workers and employees, and the "class origin" of those who began to work after 1949.[21]

The expansion of the periodic labor and wage reporting systems following the 1955 state-sector employment census supplied the SSB with uniform information on the numbers of workers and employees in all branches of the economy. The results of the private-sector censuses and miscellaneous sources of information [22] were used to show changes in employment in individual branches of the economy by sector. However, since the SSB generally did not go beyond branch of the economy limits in aggregating employment data by sector, it produced no estimates of total nonagricutural employment comparable to those presented in table 1. In 1956, for the first time, the SSB was able to aggregate the total number of workers and employees. Not until 1957, however, did the Bureau utilize the results of the private censuses to complete adjustments of worker and employee data for earlier years and publish final worker and employee figures for selected years.[23]

3. *Other Surveys Related to Employment*

In 1955, the SSB made its first survey of incomes of farm families in agricultural producer cooperatives. In addition to data on income, the survey collected information on the number of persons available for work in the 16,000 households surveyed.[24] Other agricultural labor force data as of 1955 were obtained in a survey of the distribution of income in 26,000 agricultural producer cooperatives with 856,000 member households made by the Bureau in 1956.[25] A similar survey of cooperatives as of 1957 which covered only about one-tenth as many households was made in 1958.[26] The data from these surveys constituted virtually the only sources of information on agricultural labor collected by the SSB, yet little use seems to have been made of them in Mainland China.[27]

Complementing the investigations of farm family incomes, the SSB began in 1956 to make sample surveys of the family incomes of

[21] Statistical Work Handbook Editorial Committee, *op. cit.*, pp. 2–3.

[22] For example, the All-China Federation of Handicraft Cooperatives provided data on the numbers of handicraftsmen by sector, and the Communications Work Department of the Party Central Committee and the Ministry of Transport provided information on employment in traditional forms of transport (junks and carts).

[23] Worker and employee totals and data on selected branches of the economy for 1949, 1952, and 1956 were first published in *TCKT* Data Section, "Statistical Data Relating to the Rising Standard of Living of Workers and Employees," *TCKT*, No. 14, July 29, 1957, p. 13.

[24] Statistical Work Handbook Editorial Committee, *Handbook of Agricultural Statistical Work*. Peiping, 1956; translated in *CB*, No. 434, Jan. 15, 1957, p. 34.

[25] SSB, Agricultural Statistics Division, *Nung-yeh ho-tso-hua ho 1955-nien nung-yeh sheng-ch'an ho-tso-she shou-i fen-p'ei ti t'ung-chi tzu-liao* (*Statistical Data on Agricultural Cooperativization and the Distribution of Income in Agricultural Producer Cooperatives in 1955*), Peiping, 1957, p. 14.

[26] *TCYC* Data Section, "Data on the Model Survey of Income Distribution in 228 Agricultural Producer Cooperatives in 1957," *TCYC*, No. 8, Aug. 23, 1958, p. 8; translated as "Income and Distribution of Agricultural Producer Cooperatives in 1957," in *ECMM*, No. 148, Nov. 17, 1958, p. 34.

[27] The only known instance is Li Yüan-ts'en, "Problems of Surplus Labor in Our Country's Agriculture at the Present Stage," *Chiao-hsüeh yü yen-chiu* (*Teaching and Research*), No. 2, Feb. 4, 1957, pp. 20–22.

workers and employees to provide information on living conditions in urban areas. These investigations were continued at least through 1959. The Ministry of Labor was the principal consumer of the data from these surveys. Most published uses of these materials were for propaganda and not analytical purposes.

4. *Research and Analysis*

During the first 3 years of its existence, the SSB did almost no analytical work on the materials it had collected. In 1956, however, analytical articles began to appear in the semimonthly SSB journal, *T'ung-chi kung-tso t'ung-hsin* (*Statistical Work Bulletin*). Although there was a marked increase in the number of such articles in 1957, at the end of the year the SSB Director was still not satisfied with the progress of analytical research work.[28] Further expansion of this work was reflected in the appearance at the beginning of 1958 of a second SSB periodical, *T'ung-chi yen-chiu* (*Statistical Research*), the contents of which were limited almost exclusively to articles on statistical theory and research.

The SSB had great difficulty in meeting increasing numbers of requests from the central Party and administrative organs for fully processed statistical data, because it had not developed data processing routines and did not even have systematic procedures for recording and storing the data it had collected.[29] To organize statistical data to meet outside needs, an office was set up within the Summary Statistics Division in 1956 to develop and operate a data cataloging system.[30] In addition, this unit compiled brief statistical summaries [31] and produced other fully processed data which formed the basis for several important economic studies completed during 1957.[32] The sudden flowering of statistical research was, however, very short lived because of political events in 1957 over which the SSB had no control.

C. STATISTICS AND POLITICS

1. *The "Hundred Flowers" and "Rectification" Campaigns*

From its founding in 1952, until the end of the First Five-Year Plan period, not only had the SSB been in charge of its own operations, but it had been authorized by the Government Administrative Council to enforce its statistical policies on other data collecting organizations throughout Mainland China. As a service organization, it was expected to respond to requests for data made by the Party, the State Council, the SPC, and other high-level administrative organs, but the

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[28] Hsüeh Mu-ch'iao, "Initial Experiences in Chinese Statistical Work During the First Five-Year Plan Period and Future Tasks," *TCKT*, No. 21, Nov. 14, 1957, p. 3.

[29] The inability to supply fully processed statistical data was mentioned as a major shortcoming of the SSB in Hsüeh Mu-ch'iao, "Abstract of the Summary Report of the Fifth All-China Statistical Work Conference," *TCKT*, No. 5, Mar. 14, 1956, p. 9.

[30] Tung Shao-hua, "Our Statistical Data Control Work," *TCKT*, No. 19, Oct. 14, 1956, p. 31.

[31] Between May 1956 and September 1958 more than 25 statistical summaries containing data on employment were published in the two periodicals of the Bureau, most of them during the 14-month period from August 1956 through September 1957. They are listed in *Nonagricultural Employment*, pp. 214–215.

[32] Two of the most outstanding research studies based on SSB data are SSB, Industrial Statistics Division. *Wo-ko kang-t'ieh tien-li mie-t'an chi-hsieh jang-chi tsao-chih kung-yeh ti chin-hsi* (*Chinese Iron and Steel, Electric Power, Coal, Machinery, Textile, and Paper Industries—Past and Present*), Peiping, 1958, 225 pp. and Ch'ien Hua, Liang Ssu-ta, Mao Hsin-ts'ui, Kao Shou-sung, Wang Shih-hsin, Chang Chen-hai, and Mei Ying, *Ch'i-nien-lai wo-kuo ssu-ying kung-shang-yeh ti pien-hua* (*1949–56*) (*Changes in Privately Managed Chinese Industry and Trade in the Last Seven Years* [*1949–56*]), Peking, 1957, 184 pp.

methods used to obtain the information it supplied were its own affair. Such differences as arose between the Bureau and other agencies of the Communist administration were largely in the nature of jurisdictional disputes.[33] In addition to operational independence, the Bureau was relatively free to train its personnel as it saw fit. This was done either in classes taught by Bureau employees, or in programs offered by People's University, the leading Party-run institution of higher education. From the small amount of space devoted to Party propaganda in SSB periodicals it appears that the Party paid little attention to Bureau personnel.

With the advent of the "Hundred Flowers" campaign in May 1957, the SSB was caught up in a storm of change which lasted 5 years. This campaign was a Party-led operation designed to bring into the open the unresolved differences between the Party and other important elements of Chinese society by calling upon the "intellectuals," who were the most articulate non-Party group, to criticize the Party and the administration.[34] The criticism was intended to induce minor Party and government officials to reform themselves, especially in respect to their official contacts with the people. The Party evidently expected that an airing of grievances would lessen the pent-up hostility of those Chinese who had been alienated by its actions in the past.[35]

The Hundred Flowers campaign reached the SSB by way of an 11-hour symposium held on May 27, at which 14 of Mainland China's leading economists, statisticians, and demographers, none of them a Bureau employee or Party member, criticized the work and policies of the Bureau.[36] Most of the remarks of the academicians were confined to personal complaints about their lack of access to SSB data because of tight security regulations and the nearly complete absence of cooperation between the SSB and the universities.[37] Meanwhile, Bureau employees were asked to give their own criticisms of the Bureau's work at forums held within the Bureau. The latter criticisms, which centered around problems of statistical methodology and operations, were far more telling than those of the academicians.

Outside the Bureau, the Hundred Flowers campaign increased in intensity until it became an extremely violent verbal atack on the Party by China's intellectuals. It was particularly strong in the universities and colleges, the traditional centers of political protest in Mainland China. The Party evidently was totally unprepared for the intensity of the hostility expressed, and after enduring the attacks in silence for 5 weeks, the Party began early in June 1957 to strike back at its critics through its newspaper, *Jen-min jih-pao* (*People's Daily*). These counterattacks quickly ended the brief period of "free" expression of views on Party and Government policy and work.

The Party's response developed into what was called the "Rectification" campaign. The principal targets were the white collar em-

[33] For example, the continued conflict between the SSB and the Ministry of Agriculture over control of agricultural statistics is outlined in Li Choh-ming, *op. cit.*, pp. 33, 34, 89 and 96–98.

[34] In Communist China the term "intellectuals" includes all adults with at least a secondary education.

[35] A good account of the campaign is given in Roderick MacFarquhar, *The Hundred Flowers Campaign and the Chinese Intellectuals*, New York, 1960.

[36] "Hsüeh Mu-ch'iao, Director of the State Statistical Bureau, Invites Professors of Economics and Statistics in Peking and Tientsin to a Symposium To Help in the Rectification of the Bureau," *TCKT*, No. 12, June 29, 1957, pp. 1–10.

[37] Among the academicians, only Ch'en Ta criticized the statistical methodology and operations of the Bureau.

ployees of the Party, the central and provincial administrations, institutions of higher education, other political parties, news agencies, publishing houses, and scientific, technical, and cultural institutions. Later in the year, industrial and other workers, peasants, and middle and primary school teachers also were subjected to "Rectification." [38] For the SSB, "Rectification" meant that all employees were obliged to take part in mass meetings in which they confessed their "criminal anti-Party" thoughts and acts and denounced each other's previous criticisms of statistical policy and work. The campaign began in the late summer and lasted until the end of the year.

As the Party-led campaign to increase production, known as the Great Leap Forward, was getting underway early in 1958 several experimental "reforms" of routine statistical work were carried out at the *hsien* (county) administrative level. The "reforms" emphasized Party leadership of statistical work and the use of statistics to arouse enthusiasm among workers for increased production. In July, the reforms initiated in Hopeh were selected as a model to be followed in all other provinces, and the delegates at a national statistical work conference made a solemn pledge to Mao Tse-tung that these "reforms" would be completed within 3 months.[39] In the course of the "reforms" the Party took control of statistical work at local levels.[40] Rank and file workers were to do statistical work, thus freeing professional statistical workers for manual labor in factories or fields.[41] The dominance of Party views on the training of statistical workers was reflected in the establishment at the end of 1958 of a "Red and expert" statistical college, in which the curriculum was designed to produce statistical workers thoroughly imbued with Party ideology.[42]

The statistical data published for 1958 showed unmistakably the deterioration in the quality of statistical work since the start of the Hundred Flowers campaign 2 years earlier. Enormous exaggerations in 1958 production figures led officials to set impossible production targets for 1959.[43] Progress in developing statistical methodology and analysis, as judged by the contents of SSB Journals came to a complete halt.[44]

2. *Labor and Wage Reporting After 1957*

The lowering of the professional level of statistical work and the formation of some 300,000 new industrial establishments at the *hsien* level and in the newly formed rural people's communes in 1958 re-

[38] Teng Hsiao-p'ing, "Report on the Rectification Campaign," NCNA, Oct. 19, 1957; translated in *CB*, No. 477, Oct. 25, 1957, p. 1.

[39] A more detailed account of the 1958 statistical work reform is given in *Nonagricultural Employment*, pp. 20–21.

[40] *Ibid.*, p. 23.

[41] Li Choh-ming, *op. cit.*, pp. 81–82.

[42] Teng Wen-min, "State Statistical Bureau Red and Expert College Already Established," *TCKT*, No. 24, Dec. 29, 1958, pp. 20–21.

[43] The process by which agricultural statistics were inflated in 1958 is outlined in Li Choh-ming, *op. cit.*, pp. 84–88. Professor Li subsequently obtained corroboration and amplification of his views from a former economic planning official who had fled to Hong Kong. See Li Choh-ming, "Statistics and Planning at the Hsien Level in Communist China," *Current Scene*, vol. I, No. 28, Mar. 27, 1962, pp. 1–11; reprinted in *This Is China*, Francis Harper ed., Hong Kong, 1965, pp. 127–142.

[44] One of the chief reasons given for suspending publication in September 1958 of the SSB Journal devoted to theory and research, *T'ung-chi yen-chiu* (*Statistical Research*), was that after the 1958 campaign against "dogmatism" the contents of this journal were not easily distinguishable from those of the SSB journal devoted to education and operations, *T'ung-chi kung-tso* (*Statistical Work*). (See *TCYC*, No. 9, Sept. 23, 1958, p. 3.) In effect, this was an admission by the editors of *T'ung-chi yen-chiu* that the anti-intellectualism of the Party made it impossible at that time to publish articles on statistical theory and research.

duced the quality of labor and wage reporting still further. Labor and wage statistics had always been one of the more defective types of data collected by the SSB work, but, in 1958, the quality of these data declined even in established industrial plants,[45] probably because of the substitution of part-time nonprofessional statistical workers for full-time professionals. Labor and wage reporting apparently showed little improvement in 1959, for near the end of the year, Chia Ch'i-yün, the newly appointed SSB Director, said that labor and wage data required repeated auditing.[46] There is nothing in the statistical journals available through June 1960 to suggest that the SSB made any progress in restoring labor and wage reporting to its 1957 level. In the great number of urban commune industrial enterprises established in large and medium size cities in 1959 and 1960, which were essentially make-work projects staffed almost entirely by women, most of whom were illiterate, uniform labor and wage recordkeeping was out of the question.[47]

With the collapse of the crash drive to expand industrial production during the Great Leap Forward, the economy of Mainland China experienced a profound crisis during 1960 and 1961. Agriculture, on which the 500–600 million peasants of Mainland China depended for their livelihood, suffered more than any other branch of the economy. Food was in very short supply everywhere, levels of nutrition fell sharply, and physical symptoms of acute malnutrition, such as edema, beriberi, chronic diarrhea, night blindness, and amenorrhea, were widely reported. Shortages of raw materials of all kinds, mineral as well as agricultural products, grew steadily worse, forcing industrial enterprises either to make drastic cutbacks in operations or to close down altogether.

While human misery and economic chaos were increasing, statistics disappeared almost entirely from the Mainland China scene. Not only did the SSB suspend publication of the regular economic communiques, but the number of periodicals published by the regime was greatly reduced, and those which continued to publish contained almost no quantitative data of any kind. The single remaining statistical periodical, *Chi-hua yü t'ung-chi* (*Plans and Statistics*), jointly published by the SPC and SSB starting in January 1959, disappeared, and newspapers ceased publication of items on SSB operations. However, discussion of statistics did not die out entirely. The journal of the Institute of Economics of the Academy of Sciences, *Ching-chi yen-chiu* (*Economic Research*), continued to appear, and there were occasional newspaper articles on statistics. During 1961 and 1962, the newspapers carried a debate on the characteristics of Marxian analytical statistics and the relationship between statistics and Mao Tse-tung's method of "investigation and study."[48] Some writers asserted

[45] Serious deterioration in labor and wage reporting was noted early in 1959 in Hsü Kang, "Make a Success of Wage Statistical Work in 1959," *CHYTC*, No. 4, Feb. 23, 1959; translated in *ECMM*, No. 172, June 15, 1959, pp. 33–37.

[46] Chia Ch'i-yün, "Oppose Rightists, Whip Up Enthusiasm and Struggle To Strengthen Partisanship in Statistical Work," *CHYTC*, No. 14, Nov. 12, 1959, pp. 4 and 8.

[47] Statistical reporting in urban communes is discussed at greater length in *Nonagricultural Employment*, pp. 24, 50, and 51.

[48] According to Mao the essential facts of any economic or social problem could be grasped by selecting a "typical" case and subjecting it to intensive investigation and study, using Marxist and, of course, his own theoretical precepts as guides. The method was essentially nonstatistical, and the determination of what constituted a "typical" case was never clearly explained.

that "investigation and study" should be given priority over routine statistical reporting, others simply discussed the differences between the two approaches without expressing a preference. The spokesmen for the SSB argued the need for major improvements in statistical reporting, particularly in rural areas, in order to meet planning requirements. One SSB official wrote that the chief weakness of the reporting system was lack of enforcement, which he attributed directly to the priority already given to "investigation and study." [49] Wang Ssu-hua, Director of the SSB, in an important article in the Party Central Committee journal *Hung-ch'i* (*Red Flag*) in September 1962, confirmed this analysis of the problems in the reporting system. He also revealed that, in an apparent reversal of Great Leap Forward policies, the Bureau was once again to be placed directly in charge of all statistical operations. Local governments were to provide only administrative assistance and Party involvement in statistics was to be limited to matters of ideology.[50]

Six months after Wang's article had appeared, the State Council approved new "provisional regulations" on statistical work,[51] but the regulations themselves have not become available, and the extent of actual changes in statistical operations cannot be assessed. Although by itself the press silence since 1963 about statistical work can hardly be construed as indicating an absence of statistical development, statistics probably have fared no better than the study of economics in the last 3 years. In general, the content and quality of articles on economics have become progressively poorer,[52] as literate persons in all walks of life have come under increasing Party pressure to study the works of Mao Tse-tung. This campaign apparently reached a peak in the summer and fall of 1966, when with the support of the newly formed bands of teenagers known as Red Guards, it developed into a purge of Party officials. Issues of *Ching-chi yen-chiu* (*Economic Research*), the economic journal of the Chinese Academy of Sciences, published during this period contain almost nothing on economics. From this circumstance it appears that by the end of 1966 both economic research and statistical work may have been suspended altogether.

II. Sources of Nonagricultural Labor

The designers of the First Five-Year Plan expected increases in nonagricultural employment in response to the investment in heavy industry which the Plan emphasized, but they had no conception of the problems of labor supply and allocation and the movement of population which would result from the sudden expansion of the urban

[49] Ssu-t'u Ch'u, "Tentative Discussion of the System of Statistical Tables and Reports—With Observations on the Question of Principles of Statistical Work," *TKP*, July 24, 1962; translated in *SCMP*, No. 2800, Aug. 16, 1962, pp. 1–6. Ssu-t'u was clearly a SSB employee, since he was the author of an article in *TCYC* (No. 8, Aug. 23, 1958, pp. 29–34) which carried only articles by Bureau employees (and, of course, major Party pronouncements).

[50] Wang Ssu-hua, "Fully Bring Out the Role of Statistical Work in Socialist Construction," *Hung-ch'i* (*Red Flag*), No. 18, Sept. 16, 1962; translated in *SCMM*, No. 335, Oct. 16, 1962, pp. 14–20. The importance of this article as a policy statement on statistics is indicated by the fact that it is the only article by a SSB official ever to appear in this Central Committee journal.

[51] "The 127th Plenary State Council Session Held," *JMJP*, Mar. 17, 1963, p. 1.

[52] Compare Yüeh Wei, "On Socio-Economic Survey and Research," *CCYC*, No. 6, June 20, 1965, translated in *SCMM*, No. 488, Sept. 7, 1965, pp. 39–49 with ———, ———, "Some Questions in Relation to Comprehensive Balance of the National Economy," *CCYC*, No. 7, July 15, 1964, translated in *SCMM*, No. 431, Aug. 24, 1964, pp. 12–20.

economy. Similarly, the socialization of the private sector of the economy and collectivization of agriculture, which was a major objective in the Party's program for the 1953–57 period, was pushed to completion without regard to its consequences for employment. The failure of the regime to anticipate the deleterious effects of its social and economic policies on employment and migration has led repeatedly to severe employment crises and a host of related socioeconomic ills.

In 1952, shortly before the start of the First Five-Year Plan period, officials of the regime acknowledged that unemployment was serious in urban areas.[53] According to the outline of the First Five-Year Plan published in 1955, employment in the nonagricultural branches of the economy was to increase by 4 million persons between 1953 and 1957.[54] By 1957, this figure had been revised upward to about 6 million persons.[55] However, the actual increase for the period is estimated to have been only about 3 million (table A–1). At the start of 1956, urban unemployment was still serious, and the regime admitted that it had no short-term solution to the problem.[56] The problem of excessive urban population growth had become a source of anxiety to Communist leaders and a topic of public discussion. Very rapid urban population growth, economic dislocation resulting from socialization of the private sector of the economy, and a narrow concentration of investment in a few branches of industry during the First Five-Year Plan period were major factors contributing to urban unemployment before 1958.

A. DEMOGRAPHIC ASPECTS OF LABOR SUPPLY

1. *Population Increase and Labor Supply in Urban Areas*

According to official figures, the urban population grew from 71.6 to 99.5 million, or by nearly 40 percent, between 1953 and 1957.[57] The average annual rate of growth was more than 7 percent. Natural increase rates exceeded 3 percent in most cities during the period,[58] and rural-to-urban migration accounted for the balance. Although the number of migrants evidently was much greater than official records

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[53] "Government Administrative Council 146th Meeting: Labor Employment Committee Appointed," and "GAC Decision on the Labor Employment Problem," both items NCNA, Aug. 3, 1952; translated in *SCMP*, No. 388, Aug. 3–5, 1952, pp. 50–57

[54] The planned increase in the numbers of persons employed in nonagricultural branches and of workers and employees in state farms and forestry, two agricultural branches, is given as 4.2 million in *First Five-Year Plan*, p. 191. This figure is reduced to about 4 million after deducting planned increases in the two latter branches (*ibid.*, p. 190).

[55] Sung P'ing, "Let's Discuss Problems of Labor and Employment," *Hsüeh-hsi* (*Study*), No. 12, June 18, 1957, p. 26.

[56] More than 1 million unemployed are referred to in Liao Lu-yen, "Explanations of the Draft 1956–67 National Program for Agricultural Development," NCNA, Jan. 25, 1956; translated in *SCMP*, No. 1219, Jan. 31, 1956, p. 24. This number included only those registered as unemployed with labor bureaus in urban areas. It excluded unemployed rural-to-urban migrants who would not have registered for fear of revealing their unauthorized urban residence, and school graduates and dropouts who had not entered on their first job. In addition, many other unemployed adults with working experience remained unregistered for a variety of reasons. The length of time envisaged in 1956 for solving the problem of urban unemployment was 5 to 7 years, according to article 39 of "Draft 12-Year National Program for Agriculture," NCNA-English, Jan. 26, 1956; in *SCMP*, No. 1219, Jan. 31, 1956, p. 14.

[57] The yearend 1952 estimate of 71.6 million is reported in [*TCKT* Data Section], "Data on China's Population from 1949 to 1956." *TCKT*, No. 11, June 14, 1957; translated in *ECMM*, No. 91, July 22, 1957, p. 23. By the end of 1957 the urban population had increased by 38.9 percent, according to Hsüeh Cheng-hsiu, "A Tentative Discussion of the Relationship Between Socialist Urban Population Increase and Industrial and Agricultural Production Development," *KMJP*, Oct. 7, 1963, p. 4.

[58] All but one of the reported rates of natural increase in nine cities exceeded 3 percent per year during the years 1953–56, and the exception may have resulted from underregistration of births. The data are reported in Roland Pressat, "La Population de la Chine et son Economie," *Population*, vol. 13, No. 4, October–December 1958, pp. 572–573.

indicate,[59] the volume of migration indicated by the official figures was large enough to cause great concern to the officials responsible for economic planning and grain administration.[60] In the 3-year period, 1958–60, the urban population jumped to 120 million.[61] Rural-to-urban migration in 1958 unquestionably accounted for most of the increase of 20 million. By the end of 1963 the urban population reportedly had reached 130 million.[62] Natural increase could have accounted for as much as 9 million of the net increment of 10 million during the 3-year period to which these figures seem to refer. The regime has not given any indication of the size of the urban population since 1963.

The causes of the rise in natural increase after 1949 were related to high marriage rates and a concentration of young married couples in the cities, whose high-fertility levels began at once to affect urban birth rates. During this period there was a general improvement in living conditions following the restoration of civil order and the recovery of the economy in urban areas. The early efforts of the regime to improve sanitation and health, particularly the health of mothers and children, seem to have brought about a sharp drop in urban death rates.

During the First Five-Year Plan period the indigenous urban population added about 1 million jobseekers per year,[63] exclusive of rural-to-urban migrants, and of the average of 1,600,000 migrants per year (based on Communist estimates of only 8 million rural-to-urban migrants) probably at least 800,000 were in the working ages,[64] making a total average annual increment to the urban working age population of 1,800,000. During this period, urban workers and employees were increasing by only 1.4 million persons per year.[65] Hence, urban unemployment was growing by at least 400,000 persons annually. The actual extent of the oversupply of labor in urban areas, however, was not known with any accuracy by the Chinese Communists.[66]

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[59] An estimate of 8 million rural-to-urban migrants during the First Five-Year Plan period is given in Sung P'ing, *loc. cit.*, and in Wang Kuang-wei, "How To Organize Agricultural Labor Power," *CHCC*, No. 8, Aug. 9, 1957; translated in *ECMM*, No. 100, Sept. 23, 1957, p. 11. Wang also estimated that the urban population would reach 91 million in 1957, 8.5 million less than the total of 99.5 million indicated later by Hsüeh Cheng-hsiu (see note 57). It seems probable that the volume of actual migration was nearly twice as large as the estimate of 8 million given by Sung and Wang and that this increase accounts for most of the difference between Wang's estimate of a total urban population of 91 million in 1957 and what apparently is the final SSB figure of 99.5 million.

[60] Housing and food shortages, dislocation of the supply of labor in rural areas adjacent to large cities, and increased government expenses are among the effects of rural-to-urban migration discussed in Sun Kuang, "Urban Population Must Be Controlled," *JMJP*, Nov. 27, 1957; translated in *SCMP*, No. 1668, Dec. 10, 1957, pp. 3–4.

[61] "Let the Whole Party Start To Work, the Whole People Start To Work, To Farm, To Raise Grain," editorial, *JMJP*, Aug. 25, 1960, p. 1.

[62] Anna Louise Strong, "Interview With Po I-po on Economic Readjustment," *TKP*, Hong Kong, Jan. 15, 1964; translated in *SCMP*, No. 3152, Feb. 3, 1964, p. 7.

[63] Sung P'ing, *loc. cit.*

[64] In 1953, rural-to-urban migrants accounted for more than 70 percent of the increase of 2,450,000 workers and employees (table A–2), or for about 1,720,000, according to Sung P'ing, *loc. cit.* Of the estimated urban population growth of 6 million in 1953, 2.5 million would have resulted from a rate of natural increase of 35 per 1,000, while migration and improved registration records would have accounted for the remaining 3.5 million. Yearend SSB urban population estimates for the years 1949–56 are given in table 1 of the chapter of this report by John S. Aird.

[65] Workers and employees increased by 8.7 million during the 1953–57 period (table A–2), or by average of 1.7 million per year. Only 83 percent of all workers and employees were urban, according to Hsü Min, "In Considering Problems of Livelihood the Whole Picture Must Be Taken Into Account," *Kung-jen jih-pao (Daily Worker)*, Dec. 20, 1957, p. 3.

[66] It should be noted that even in 1957, when employment data were better than at any other time before or since, the Communist regime did not have accurate measurements of annual changes in either the total or the urban labor supply, according to Sung P'ing, "The Problem of Employment," *LT*, No. 21, Oct. 4, 1957; translated in *ECMM*, No. 117, Feb. 3, 1957, pp. 20–21. Therefore, Communist estimates of increments of the working age population were, of necessity, crude.

2. *Rural-to-Urban Migration*

The causes of the great influx of peasants into urban areas included the push of depressed economic conditions and social upheaval in rural areas and the pull of comparatively attractive urban economic opportunities. During the first 10 years of Communist rule, the traditional peasant society and economy of rural China were undergoing a series of changes unlike any they had experienced in their several thousand years of recorded history. Immediately after the Chinese Communist armies had overrun Mainland China in 1949, the regime undertook on a national scale what it called "land reform," which meant seizure of farmland from landowners and transfer of this land to tenants and landless peasants. This program had already been started in scattered areas in North China which had remained under Communist control after the end of World War II. The terror which the Chinese Communists considered essential to success in "land reform" was achieved by forcing the peasants to participate in kangaroo trials at which landlords were sentenced to various punishments and in many instances to death. The "land reform" was completed, except in a few minority areas, by the end of 1952. During these years the regime also launched a terror campaign against "counterrevolutionaries" (persons suspected of active resistance), which also took a heavy toll of lives in the countryside. Thereafter, the regime adopted a "soft" line in rural areas to prepare the peasants for collectivization of their land, draft animals, and farm equipment. The collectivization drive reached a peak in 1955 and was completed in 1956. This was followed less than 2 years later by another major reorganization of rural society, when party activists organized the peasants in the 700,000 collectives into 26,000 rural communes as part of the Great Leap Forward of 1958.

In addition to social upheaval, there were compelling economic reasons why many young people left their villages to migrate to the cities. Some were related to unemployment and underemployment and others to very depressed living conditions. Rural unemployment was seldom discussed openly by officials of the Communist regime and there seem to have been few investigations of actual employment conditions in rural areas. However, early in 1957, just before the "Hundred Flowers" period began, one writer cited agricultural employment data for 1955 which showed that in selected cooperatives in four provinces the labor force was without gainful employment on 17 to 35 percent of all workdays.[67] An editorial in *Chi-hua ching-chi* (*Planned Economy*) in 1958 cited data for earlier years for various counties and districts indicating underutilization of from 10 to 20 percent of the labor force.[68] The great discrepancy between the incomes of peasants and those of urban workers and employees was widely discussed by Chinese Communist planners. Since there was no immediate possibility of a substantial rise in peasant incomes, the planners thought it advisable to reduce the wages of nonagricultural workers in rural areas in order to discourage peasants, attracted by the visible advantages of nonagricultural employment, from seeking jobs in the cities.[69]

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[67] Li Yüan-ts'en, *op. cit.*, p. 20.
[68] "To Compile and Implement the Second Five-Year Plan, It is Necessary to Oppose Conservatism and Waste," editorial, *CHCC*, No. 3, Mar. 9, 1958, p. 3.
[69] Sung P'ing, "Why it is Necessary to Introduce a Rational Low Wage System," pp. 28–29.

On the other hand, local officials frequently encouraged the migration of peasants to the cities by providing them with letters of introduction and other documents to facilitate travel and job hunting. According to regulations, these documents could be issued only upon approval from the urban labor bureaus. The bureaus were supposed to give their approval only when the demand for labor could not be met from the resident urban population. In fact, however, urban employers, especially construction enterprises, often bypassed the bureaus and sent their own agents into the rural areas to recruit labor. In 1953, the Government Administrative Council issued a directive to halt migration which, in effect, held local governments responsible for the movement.[70] But, in 1954, the GAC directive was ignored in many areas; unauthorized letters of introduction were still being given to migrants.[71] In 1955, even though the regime attempted to reverse the tide by forcibly sending millions of migrants back to their native villages,[72] unauthorized letters of introduction were still being issued.[73] The year 1956 saw an extremely large increase in the number of workers and employees, of which peasant migrants to the cities accounted for one-third.[74] These were reportedly supplied by agricultural producer cooperatives, which had replaced local governments as the agencies responsibile for labor allocation in rural areas after the collectivization of agriculture in Mainland China was virtually completed in 1956. Even in 1957, at the very end of the Plan period, many industrial and construction enterprises were still hiring labor directly from rural areas.

At the end of 1957, the State Council published new and more stringent prohibitions against unauthorized recruiting of rural labor for nonfarm work. These stipulated that all such recruiting was to be done by agreements between the labor bureaus and *hsien* (county) or *hsiang* (township) people's councils.[75] Although the regulations proved totally ineffective in preventing migration of rural labor to urban areas in 1958, they did succeed in establishing a system of contract arrangements for the hiring of temporary rural laborers, which came into widespread use in 1958[76] and was said to be effective in preventing short-term transfers of labor from becoming permanent migra-

[70] "Government Administrative Council Directive on Dissuasion of Peasants From Blind Influx Into Cities," NCNA, Apr. 17, 1953, translated in *SCMP*, No. 554, Apr. 18–20, 1953, pp. 24–25; and "Peasants Blindly Flowing Into Cities Should Return to the Countryside," editorial, *JMJP*, Apr. 20, 1953, translated in *SCMP*, No. 555, Apr. 21–22, 1953, pp. 23–24.

[71] "Central People's Government Ministry of Interior and Ministry of Labor Issue Joint Directive Concerning Continued Implementation of Directive Advising Against Blind Influx of Peasants Into Cities," Mar. 21, 1954, *JMJP*, Mar. 15, 1954; translated in *SCMP*, No. 774, Mar. 25, 1954.

[72] For example, see "Forcible Evacuation of One-Seventh of Shanghai's Population in Full Swing," *Union Research Service*, Hong Kong, No. 1, Sept. 16, 1955, pp. 1–12.

[73] Lin Chiang-yün, "Certain Problems in the Control of Labor Power," *LT*, No. 11, Nov. 15, 1955; translated in *ECMM*, No. 27, Mar. 12, 1956, pp. 22–23.

[74] Of the 2,240,000 newly hired workers and employees (excluding sectoral transfers) in 1956, 767,000 came from rural areas, according to "Ranks of Our Working Class Have Grown to Unprecedented Size," *NCNA*, Jan. 18, 1957; translated in *SCMP*, No. 1460, Jan. 29, 1957, p. 2.

[75] "State Council's Provisional Regulations Governing Recruitment of Temporary Workers in Rural Areas by Various Units," NCNA, Dec. 13, 1957, and Ma Wen-jui, "Explanations of State Council's Provisional Regulations Governing Recruitment of Temporary Workers in Rural Areas by Various Units," NCNA, Dec. 13, 1957; translated in *SCMP*, No. 1699, Jan. 27, 1957, pp. 22–24 and 24–26, respectively.

[76] "Labor Reserve Universally Built Up by Agricultural Cooperatives in Shansi"; Wang P'o, "Important Reform for Labor System"; and "Labor Contract System Pushed in Chungking," *JMJP*, June 7, 1958; all three items translated in *SCMP*, No. 1795, June 19, 1958, pp. 25–29.

tion.[77] Despite prohibitions, more than 10 million peasants migrated into urban areas in 1958 in response to employment opportunities in industry, transport, and construction enterprises.[78]

3. *Forced Outmigration From Urban Areas*

SPC officials considered forced migration from urban-to-rural areas the most effective way of ridding the cities of persons unemployed.[79] More than half a million peasant migrants to urban areas were sent back to the countryside in the fall of 1955.[80] In 1957, this method was again used to stem the growth of cities, except that this time not only were peasants dispatched but also large numbers of students and government workers.[81] In 1958, the expulsion policy was in temporary abeyance, but after the Leap Forward came to an end, the regime resumed its policy of forced outmigration from cities. Foreign correspondents in Peking talked of a total exodus of 20 million during 1961 and a further expulsion of 30 million during 1962.[82] A large reduction of the urban population was listed as the fourth of 10 "urgent tasks" in economic readjustment in a report to the National People's Congress in April 1962.[83] In 1964, Po I-po, a top-ranking economic planner, spoke of a planned reduction in the urban population from 130 to 110 million within an unspecified period.[84] In the 3-year period 1963–65, it was reported that 1 million young urban residents who had finished their schooling left the cities for rural areas.[85] Although Party propaganda claimed that more manpower was needed for agriculture, reports that men in rural communes were called for work only once every 2 days and women only once every 3 days [86] indicate clearly that there were no general shortages of labor in rural areas. The actual reason for continuing forced outmigration from the cities is simply to rid them of unemployed persons and to lessen the demands made on the grain supplies of the regime in urban areas. The regime has not released any aggregate figures on the volume of outmigration.

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[77] Li Yüeh, "Let's Talk About Several Problems in the Contract Labor System," *CHYTC*, No. 9, June 23, 1959, p. 20.

[78] More than 10 million peasants assisted urban industrial, mining, and transport enterprises in 1958, according to Li Chih-han, "Struggle To Raise the Rate of Labor Productivity," *CHYTC*, No. 7. Apr. 23, 1959, p. 18. Although the author does not say so, much of this group of rural laborers was probably employed in building rather than operating enterprises.

[79] Wang Kuang-wei, *op. cit.*, p. 12; Cheng K'ang-ning, "Summarize 1956 Experiences and Improve Labor and Wage Planning Work," *CHCC*, No. 8, Aug. 9, 1957, p. 10; and Sung P'ing, "The Problem of Employment," pp. 20–21.

[80] "Mobilize the Nonproductive Population in Cities To Return to Rural Areas for Production," editorial, *KMJP*, Dec. 29, 1955; translated in *SCMP*, No. 1203, Jan. 9, 1955, p. 8. This forced outmigration from city to farm is cited in a footnote to a table of yearend urban and rural population totals in [*TCKT* Data Section], "Data on China's Population from 1949 to 1956," p. 24, as the cause of the small increase of only 1.3 million in the urban population in 1955. The rural population data in this table show an increase of 11.6 million for the same year, much higher than for any other year in the 1953–56 period. These data are given in table 1 in the chapter of this report by John S. Aird.

[81] "Movement and Immobilization of Population," *China News Analysis*, No. 212, Jan. 17, 1958, pp. 1–7, reviews the 1957 drive to send people from the cities to the countryside.

[82] Vasil Magdeski, dispatch in *Vjesnik*, Zagreb, May 26, 1962; translated in "The Chinese Puzzle," *East Europe*, vol. II, No. 10, October 1962, p. 25, and ——— ———, "Great Migration From the Chinese Cities," *Politika*, Belgrade, July 25, 1962. "In the last 6 months and more, according to reliable statistics, more than 10 million labor force [units] have already been sent down" (i.e., returned to the countryside) "and they are all good labor force [units]," from "Present Rural Conditions Greatly Improved," *Kung-tso t'ung-hsin* (*Work Bulletin*), No. 16, Apr. 19, 1961, p. 24. This is a periodical irregularly published by the People's Liberation Army, General Political Department.

[83] "Press Communique of the Third Session of the Second National People's Congress of China," NCNA-English, Apr. 16, 1962; in *CB*, No. 681, Apr. 18, 1962, p. 2.

[84] Strong, *loc. cit.*

[85] "A Million Educated Young People From Cities Work in China's Countryside," NCNA-English, Sept. 25, 1965; in *SCMP*, No. 3548, Sept. 30, 1965, p. 24.

[86] Magdeski, "Great Migration From the Chinese Cities," *loc. cit.*

B. THE EDUCATIONAL SYSTEM

The educational system in Mainland China failed to meet the demands for professional and semiprofessional labor because of defective planning and other weaknesses in the system. Planning for education, like that for labor, depended upon statistics. However, because statistics on education were even less developed than statistics on labor, educational planning remained in a rudimentary state, even at the end of the First Five-Year Plan period.[87] Early in 1960, one authoritative Communist source characterized education statistics and planning as incomplete and unsatisfactory.[88] The educational plans for institutions of higher education and technical middle schools included estimates of (1) the number of students who would be admitted on the basis of qualifying examinations; (2) the number of students expected to graduate; and (3) the number of students who would be enrolled at the start of the school year. The numbers of research students and students sent abroad for study were estimated separately. Estimates for spare-time higher education and technical middle schools were incorporated into the plans for the first time in 1956. Plans for general middle schools and primary schools included estimates of the numbers of schools, classes, students to be admitted, students to graduate, students to be enrolled at the start of the school year, needs for additional teachers, and sources of supply of teachers.[89]

The performance of senior middle schools during the 1953–57 period clearly illustrates how ineffective education planning actually was. Expansion of these schools was given a priority second only to that of the college level,[90] in order to insure an adequate supply of qualified applicants for admission to institutions of higher education. Two Chinese Communist writers on education recommended a ratio of two to three senior middle school graduates to one student admitted to college as the minimum desirable.[91] However, the number of senior middle school graduates, including those from short courses for workers and peasants, was less than the number of students admitted to institutions of higher education in three of the years of the First Five-Year Plan period.[92] The failure of senior middle schools to supply institutions of higher education with enough qualified applicants to fill admission quotas made it necessary for the latter to lower admission standards, which had the effect of lowering the quality of education. The fact that education planning took no account of student dropout rates also contributed to the failure of senior middle schools and institutions of higher education to meet their quotas of graduates despite continuing overenrollments in the entering classes.[93]

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[87] Education planning was criticized as "full of defects and without accomplishments" in Ko Chü-po and Liu Ts'un, "Planning Problems in the Development of Middle and Primary School Undertakings in Our Country," *CHCC*, No. 10, Oct. 9, 1957, p. 20.

[88] "Make a Great Effort To Strengthen Cultural and Education Planning and Statistical Work To Take Account of the New Circumstances of the Cultural Revolution," editorial, *CHYTC*, No. 3, Mar. 23, 1960, p. 1.

[89] Huang Chih-yin, "Lecture 14: Cultural Affairs, Education, and Public Health Planning Forms," *CHCC*, No. 2, Feb. 9, 1958, pp. 39–40.

[90] *"First Five-Year Plan,"* pp. 201–202.

[91] Ko Ch'ü-po and Liu Ts'un, *op. cit.*, p. 22.

[92] Data given in *TCKT* Data Section, "The Development of Chinese Education in the Last Few Years," *TCKT*, No. 20, Oct. 29, 1956, p. 6.

[93] Failure to allow for dropouts and lengthening of what had been standard 4-year college courses by an additional year in the latter part of the 1953–57 period are given as the reasons why only 96 percent of the planned number of college graduates actually graduated during this period, in Chang Chien, "Higher Education in Our Country Is Getting Better All the Time," *Jen-min chiao-yü (People's Education)*, No. 10, Oct. 9, 1957, p. 6.

During 1958, enrollment in higher education was expanded by 50 percent, in technical middle schools by 89 percent, in general middle schools by 36 percent, and in primary schools by 34 percent (table 1).

TABLE 1.—*Number of students enrolled in Mainland China schools, by level of school, 1949–58*

[In thousands]

Year	Institutions of higher education	Technical middle schools	General middle schools	Primary schools
Peak year prior to 1949	155	383	1,496	23,683
1949	117	229	1,039	24,391
1950	137	257	1,305	28,924
1951	153	383	1,568	43,154
1952	191	636	2,490	51,100
1953	212	668	2,933	51,664
1954	253	608	3,587	51,218
1955	288	537	3,900	53,126
1956	403	812	5,165	63,464
1957	441	778	6,281	64,279
1958	660	1,470	8,520	86,400

Source: SSB, *Ten Great Years*, Peking, 1960, p. 192. A note to the original table reads: "A large number of agricultural middle schools and other vocational middle-schools were opened in 1958, with an enrollment of 2 million students. The figures for students in institutions of higher education given here and elsewhere do not include research students."

This expansion was made at a time when normal classroom teaching was suspended to permit students to set up so-called factories on school premises, to work as peasants in agriculture, to operate backyard iron smelters, or to engage in other forms of production—activities which did not enhance the standards of academic achievement. In 1959, the final examinations for the graduating class at Peking University, generally considered the best in Mainland China, reportedly were given only to a few of the best students in each field of specialization, and their average marks were then assigned to all students.

The number of graduates of institutions of higher education during the Second Five-Year Plan period, 1958–62, totaled 600,000,[94] or 2.2 times as many as had graduated during the First Five-Year Plan period (table 2).

Because of the greatly expanded numbers of admissions during 1958 and 1959, the number of graduates continued to rise through 1962, when it reached 178,000. However, after the Great Leap Forward collapsed in 1960, employment opportunities fell off sharply. Probably because of this, the enrollments in institutions of higher education were cut back somewhat by 1962. Since then there has been no indication of any substantial improvement in job opportunities for college graduates, the great majority of whom probably are assigned to work which bears little or no relation to their college training.

[94] Yang Ying-chieh, "Victory Through Self-Reliance," *China Reconstructs*, vol. XIII, No. 10, October 1964, p. 8.

TABLE 2.—*Number of graduates from Mainland China schools by level of school, 1949–58*

[In thousands]

Year	Institutions of higher education	Technical middle schools	General middle schools	Primary schools
Peak year prior to 1949	25	73	326	4,633
1949	21	72	280	2,387
1950	18	75	296	2,829
1951	19	57	284	4,232
1952	32	68	221	5,942
1953	48	118	454	9,945
1954	47	169	644	10,136
1955	55	235	969	10,254
1956	63	174	939	12,287
1957	56	146	1,299	12,307
1958	72	191	1,313	16,225

Source: SSB, *Ten Great Years*, p. 194.

C. SECTORAL TRANSFERS

Transfers of persons from one sector of the economy to another, usually from the private to the state or collective sectors, have been a major source of labor for particular sectors of the nonagricultural economy in Mainland China. They do not represent net increments to the labor force as a whole, although transfers from agricultural to nonagricultural work have substantially increased the size of nonagricultural employment, particularly in 1958.

1. *Socialization of the Economy, 1954–56*

The transfer of private establishments and enterprises to the state sector was originally scheduled to take place gradually, but during the latter part of the Plan period, the rate of transfer was suddenly accelerated as a result of two decisions. One was Mao's decision in August 1955 to speed the collectivization of agriculture. The other was a decision to complete the socialization of private industry, trade, transport, and handicrafts before the end of the Plan period, probably because it was thought they would not be economically viable in an economy which was otherwise completely socialized.

Private industry consisted for the most part of old plants when the Chinese Communists came to power in 1949. Faced with the almost certain prospect of socialization, private owners had little or no incentive to use their capital to expand or modernize their plants. In 1954, two-thirds of the 134,000 private factories were very small "handicraft workshops" with fewer than 10 workers and employees each. Most of these workshops were entirely without modern power equipment.[95] Since their assets were very small, they were extremely vulnerable to sudden changes in demand for their products, and as a consequence

[95] Handicraft workshops were classified by the SSB as capitalist industry and their personnel as workers and employees if they employed four or more persons. Establishments with three or fewer employees were classified as handicrafts and persons working in them as handicraftsmen. See Wang-Ssu-hua, "On the Definition of Handicrafts and Problems of Their Classification," *CHCC*, No. 2, Feb. 27, 1955, p. 21, and *Nonagricultural Employment*, pp. 46–47. The numbers of private industrial plants are given in Kuan Ta-t'ung, "Another Great Victory in Socialist Transformation of Capitalist Industry and Trade," *Cheng-chih hsüeh-hsi (Political Study)*, No. 2, Feb. 13, 1956, p. 43.

had a high bankruptcy rate.[96] With the cancellation of munitions orders after the end of the fighting in Korea in 1953, private industrial production fell off sharply.[97] In 1955, another drop in production by private plants was caused by shortages of raw cotton, cotton yarn, tobacco, and oil-bearing crops.

Handicraftsmen and small traders were also vulnerable to changes in demand for products and shortages of raw materials. Some trades, such as those producing the paper money and candles used in religious ceremonies, were affected by sharp reduction in demand as a consequence of a Party ban on "superstitious observances." Producers of noodles, soap, and tobacco and leather products encountered competition from factory production, and shortages of raw materials caused problems for coppersmiths, tinsmiths, brewers, and others who depended on the government for these supplies. Many private retail traders found that they could not make a living within the profit margins allowed them by government regulations. The widespread reluctance of supply and marketing cooperatives to supply private retailers with goods sharply curtailed employment in private trade, particularly in rural areas. Thus, although some of the drop in private sector employment represented transfers of private plants and trading enterprises to the state sector, much of it was caused by bankruptcies which shut down operations and turned former employees out on the street. The bankruptcies slowed the growth of nonagricultural employment as a whole, particularly in those branches of industry, such as textiles and food processing, in which private sector employment predominated prior to the 1955–56 socialization drive.

(*a*) *Socialization of private industry.*—Private industry as a source of labor and plants for state industry is evident from the changes in the numbers of workers and employees and plants in state-private and private industry given in tables 3 and 4. In 1953, only 39 plants were transferred to state-private management, but most of them were large, employing upwards of 500 workers and employees each. In 1954, an additional 708 plants were brought under state-private management, but they had only about 40 workers and employees each. The 1,449 plants added to state-private management in 1955 were little more than handicraft workshops with an average of 17 workers and employees each. The policy of transferring the largest and best plants first and leaving the smallest and least mechanized until later had the effect of weakening private industry year by year, and thus contributed to its decline.

(b) *Cooperativization of individual handicraftsmen.*—Conversion from individual to cooperative management of handicraft establishments, which produced about 20 percent of Mainland China's manufactures during the First Five-Year Plan period, remained at an experimental level between 1949 and 1953. Only a few thousand cooperatives with a peak membership of 300,000, fewer than 4 percent

[96] In the eight largest cities (Peking, Tientsin, Shanghai, Wuhan, Canton, Shenyang, Sian, and Chungking) 11,300 private industrial establishments with 165,000 workers and employees were partly or wholly shut down in 1954, according to Ch'ien Hua *et al., op. cit.*, pp. 92–93.

[97] In 1954, the gross value of industrial output fell by 21.4 percent below the 1953 figure, according to SSB, "Statistical Abstract of the National Economy," appended to the pamphlet, *Kuan-yü 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, p. 29.

TABLE 3.—*Employment in industry and handicrafts, by sector, 1949–57*

[Figures are yearend and are in thousands; excludes employment in fishing and salt extraction; (*) indicates data not available and no estimate made]

Sector	1949	1950	1951	1952	1953	1954	1955	1956	1957
Total	8,914	10,615	11,637	12,627	13,910	15,280	14,323	13,260	14,467
Industry	3,059	3,386	4,379	5,263	6,121	6,370	6,121	7,480	7,907
State industry	1,415	1,570	2,356	3,206	3,890	4,574	4,811	7,466	(*)
State and cooperative industry	1,310	1,439	2,190	2,958	3,620	4,041	4,026	5,080	(*)
Cooperative industry	(*)	(*)	(*)	(130)	(256)	(359)	(366)	(*)	(*)
Joint state-private industry	105	131	166	248	270	533	785	2,386	(*)
Private industry	1,644	1,816	2,023	2,057	2,231	1,796	1,310	14	(*)
Handicrafts	5,855	7,229	7,258	7,364	7,789	8,910	8,202	5,780	6,560
Handicraft cooperatives	89	260	140	228	301	1,213	2,206	5,183	5,890
Cooperative members	(*)	(*)	(*)	(*)	(*)	1,139	1,875	4,679	5,540
Cadres	(*)	(*)	(*)	(*)	(*)	74	331	504	350
Individual (self-employed) handicraftsmen	5,766	6,969	7,118	7,136	7,488	7,697	5,996	597	670

Source: *Nonagricultural Employment*, p. 134.

TABLE 4.—*Number of industrial establishments, by type of management, 1949–56*

[Figures are yearend; (*) indicates data not available and no estimate made]

Type of management	1949	1950	1951	1952			1953			1954			1955	1956
	Total	Total	Total	Total	Large scale	Small scale	Total	Large scale	Small scale	Total	Large scale	Small scale	Total	Total
Total	126,392	138,703	156,525	167,403	27,527	139,876	176,405	31,379	145,026	167,626	31,187	136,439	125,474	60,000
State	2,677	4,591	6,726	10,671	8,609	2,062	12,295	9,351	2,944	13,666	10,273	3,393	15,190	17,104
Central	(*)	(*)	(*)	2,409	2,035	374	2,722	2,338	384	33,92	2,658	734	4,077	(*)
Local	(*)	(*)	(*)	8,262	6,574	1,688	9,573	7,013	2,560	10,274	7,615	2,659	11,113	(*)
Cooperative	357	800	1,443	6,164	1,025	5,139	12,799	1,988	10,811	17,938	2,173	15,765	18,282	9,693
Joint state-private	193	294	706	997	820	177	1,036	878	158	1,744	1,603	141	3,193	32,166
Central	(*)	(*)	(*)	88	88	0	101	101	0	130	129	1	147	(*)
Local	(*)	(*)	(*)	909	732	177	935	777	158	1,614	1,474	140	3,046	(*)
Private	123,165	133,018	147,650	149,571	17,073	132,498	150,275	19,162	131,113	134,278	17,138	117,140	88,809	1,037

Source: *Nonagricultural Employment*, p. 136.

of all handicraftsmen, were set up during these years (table 5). In 1954, however, the pace of conversion was greatly accelerated. By the end of the year, the number of cooperatives had increased sixfold and cooperative membership nearly threefold. In the following year. the number of cooperatives rose to 65,000, an increase of 55 percent, and the number of members to 1.9 million, an increase of 65 percent. Socialization was virtually completed in 1956, when the number of cooperatives exceeded 100,000 and membership reached 4.7 million. A large number of others classified as handicraftsmen before 1956—probably more than 2 million—were transferred to agricultural cooperatives and state-sector industry and trade.[98]

There were three principal types of handicraft cooperatives. Members of handicraft producer cooperatives turned over their tools and other assets to the cooperative and received in return shares in the cooperative's assets. Supply and marketing cooperatives purchased raw materials and sold the products of members, who were otherwise free to produce as they pleased. In rural areas, where there were only a few widely scattered handicraftsmen, cooperative small units worked under contract to state and cooperative industry. The cooperative constituted a new form of control imposed on the handicraft household, which had traditionally been free to manage its own affairs. The cadres who managed the cooperatives were selected on the basis of political reliability rather than experience or knowledge of handicrafts. They were generally disliked by cooperative members, and even the Party soon recognized that the performance of these cadres left much to be desired.[99]

TABLE 5.—*Number of handicraft cooperatives and cooperative members, by type of cooperative, 1952–56*

[Numbers of cooperatives and handicraftsmen are yearend figures, except for 1956, which is a midyear figure; (*) indicates data not avilable and no estimate made; cadres and other workers and employees in handicraft cooperatives are excluded]

Type of cooperative	1952	1953	1954	1955	1956
Total:					
Number of cooperatives	3,658	5,778	41,619	64,591	103,870
Number of members	227,786	301,487	1,139,009	1,874,590	4,687,817
Producer cooperatives:					
Number of cooperatives	(*)	(*)	11,755	20,928	70,049
Number of members	218,018	271,297	521,209	849,485	3,570,171
Supply and marketing cooperatives:					
Number of cooperatives	(*)	(*)	1,053	3,475	3,983
Number of members	4,288	15,851	227,216	507,343	750,515
Producer small units:					
Number of units	(*)	(*)	28,811	40,188	29,838
Number of members	5,480	14,339	390,584	517,762	367,131

Source: *Nonagricultural Employment*, p. 83.

During the latter part of the First Five-Year Plan period, when rural society underwent major economic and social reorganization, many rural handicraftsmen abandoned their trades and joined agricultural producer cooperatives as ordinary peasants. The number

[98] It was planned that handicraft cooperative membership would total only 4.9 million at the end of the socialization drive in 1956; the remaining 2.4 million handicraftsmen were to be reclassified and socialized under agricultural, trade, and local industry administrations, according to *TCKT* Data Section, "Great Victory Won in Socialist Transformation in the First Quarter of 1956, New High Tide Begun in National Economy," *TCKT*, No. 9, May 14, 1956, p. 1.

[99] *Nonagricultural Employment*, pp. 84–85.

of rural handicraftsmen fell off sharply between 1954 and 1957. Since there was no corresponding increase in the number of urban handicraftsmen (table 6), apparently few, if any, migrated to cities, at least as handicraftsmen.

TABLE 6.—*Handicraftsmen, by rural and urban location, 1952, 1954, 1957, and 1961*

[Figures are in thousands and are yearend]

Location	1952	1954	1957	1961
Total	7,364	8,910	6,560	6,000
Rural	4,654	5,702	3,100	2,000
Urban	2,710	3,208	3,460	4,000

Source: Total:
1952, 1954, and 1957: Table A-1.
1961: Chi Lung, "Vital Role of Handicrafts," *China Reconstructs*, Vol. XI, No. 10, October 1962, p. 8.
Urban:
1952 and 1957: Sung P'ing, "The Problem of Employment," *LT*, No. 21, Oct. 4, 1957; translated in *ECMM*, No. 117, Feb. 3, 1958, p. 19.
1954: In the absence of other information, it was assumed that the urban proportion of all handicraftsmen was the same as for individual handicraftsmen, reported as 36 percent in P. V. Yevseyev, *Sotsialisticheskoye preobrazovaniye Kustarnoy promyshlennosti Kitaya* (Socialist Transformation of the Handicraft Industry of China), Moscow, 1960, p. 11.
1961: Chao Yen, "Give Full Play to the Role of Handicraft Industry in Giving Support to Agriculture," *JMJP*, Apr. 19, 1963, translated in *SCMP*, No. 2981, May 17, 1963, p. 9.
Rural: *All years:* Residuals.

In the spring of 1958, before the handicraft cooperatives could work out the organizational and operational problems which beset them from the start, they began to be converted into industrial factories in both urban and rural areas. As a result, handicraftsmen lost even nominal title to the shares of cooperative assets which they had received when they first became cooperative members. By the end of 1958, in urban areas, 2.2 million handicraftsmen worked in these establishments under the control of local state industry. In rural districts, another 1 million worked in establishments which had been converted to cooperative industry plants.[100] Another 1.4 million handicraftsmen [101] were employed in industrial establishments of the new rural communes.[102]

Commune industry collapsed in 1961 with the disintegration of the commune as a centralized form of administration. In October of that year the Central Bureau for the Administration of Handicrafts was reestablished.[103] There were then reportedly 6 million full-time handicraftsmen in Mainland China, about the same number as in 1957, of whom two-thirds were urban and one-third rural (table 6). This distribution was the reverse of that in 1954. It represented a loss to rural districts of 1 million handicraftsmen during the 4 years of the Great Leap Forward and its disastrous aftermath, 1958–61. The loss was particularly serious because of the nearly total dependence of agricultural production on handicrafts for many essential farm imple-

[100] *Nonagricultural Employment*, 86. Cooperative industry consisted of small processing plants owned and operated by trade supply and marketing cooperatives.
[101] Teng Chieh, "The Historical Task of Transition of Handicraft Cooperatives to the System of Ownership by the Whole People Is Already Basically Completed," *JMJP*, May 8, 1959, p. 13.
[102] T'an Chen-lin, "A Number of Questions Concerning the Mechanization of Agriculture in Our Country," *Hung-ch'i (Red Flag)*, No. 6, Mar. 16, 1960, p. 4.
[103] "Handicraft Central Bureau Set Up in China," NCNA-English, Oct. 5, 1961; in *SCMP*, No. 2596, Oct. 11, 1961, p. 2.

ments. At the same time, many rural handicraftsmen classified as full time probably did not work full time in their handicraft specialties, since they did not have as much control over their own work as members of agricultural production teams as they had had before 1958 as members of handicraft cooperatives.[104]

(*c*) *Socialization of private trade.*—The socialization of private trade in the last months of 1955 and the first half of 1956 deprived several million persons who had previously been engaged in private trade of their usual means of livelihood.[105] This drop is partly explained by the treatment meted out earlier to private traders during the "Five-Anti" campaign, when most traders in large cities were investigated and fined by Party cadres for alleged crimes classified under the five headings of bribery, tax evasion, theft of state assets, fraud in government contracts, and leakage of state economic secrets.[106] Persecution of private traders by Party cadres continued after the campaign had officially ended. Because of the Party's nearly total statistical ignorance of private sector trade and food and drink industry before the completion of the 1955 census of the private sector of these branches,[107] and the nearly complete absence of any planning before the final phase of the socialization of private trade began at the end of 1955, no arrangements were made to help private traders who were in financial difficulties until 1956. State-private management of formerly private trade establishments was almost nonexistent before the 1955 census,[108] and during that year only 180,000 private trade establishments were socialized,[109] 6 percent of the 2,954,000 reported in the census.[110] Of the decline of 3.6 million private traders during 1955 and 1956 (table 12), 2.3 million were socialized (table 7). Some of the remainder were transferred to agricultural producer cooperatives or to the state sector of other branches of the economy. Many former private traders in rural areas became distributors or sales agents for state sector and marketing cooperatives[111] but were hard pressed to make a living in these positions because of the very small markups they were allowed on goods supplied them by the cooperatives.

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[104] Hsüeh Shin and Ho I-pu, "Views on Several Questions of Policy Regarding Handcraft in Rural Production Brigades," *JMJP*, Mar. 24, 1962; translated in *SCMP*, No. 2719, Apr. 16, 1962, pp. 6–13.

[105] Private trade employment fell from 4,464,000 in 1954 (Ch'ien Hua *et al., op. cit.*, p. 9) to 858,000 in 1956 (table 7). This loss of 3.6 million does not take account of the proportion of the 2.88 million persons reclassified as state-sector workers and employees who had been employed in private trade prior to 1956. Although the proportion cannot be estimated on the basis of available information, it was large, and may have reduced the actual employment decline among former private traders and peddlers to less than 2 million. The total of 2.88 million is reported in Editorial Board, Data Unit, "1956 Labor and Wage Conditions," *CHCC*, No. 3, Mar. 9, 1957, p. 14.

[106] Three-fourths of the 450,000 private trade and industrial establishments investigated in nine large cities were found guilty of some form of malfeasance, according to Po I-po, *New China's Economic Achievements, 1949–52*, Peking, 1952, pp. 132–133. Of this total, probably at least 300,000 were trade establishments, since there were only 150,000 private industrial establishments in all of Mainland China in 1952 (table 4). The "Five-Anti" campaign is summarized in Ygael Gluckstein, *Mao's China*, Boston, 1957, pp. 199–202.

[107] At a planning conference held just before the start of the 1955 census of private trade and the food and drink industry Hsüeh Mu-ch'iao, said that the regime knew little about private trade and nothing about the food and drink industry. See Hsüeh Mu-ch'iao, "Summary Report on the Nationwide Private Trade and Food and Drink Industry Work Conference," p. 16.

[108] Wu Cheng-ming, "Socialist Transformation of Private Trade," *People's China*, No. 10, May 16, 1956, p. 13.

[109] Li Hsien-nien, "Report on 1955 Accounts and the 1956 State Budget," NCNA, June 18, 1956: translated in *CB*, No. 393, June 28, 1956, p. 14.

[110] Total given in Ch'ien Hua *et al., op. cit.*, p. 9.

[111] Ch'en Hsing, "Petty Tradesmen and Pedlars on the Way to Socialism," *People's China*, No. 4, Feb. 16, 1957, p. 11.

TABLE 7.—*Socialization of private trade, June 1956*

[Absolute figures are in thousands; component figures are independently rounded and do not necessarily add to totals]

Type of socialization	Establishments		Personnel	
	Number	Percent	Number	Percent
Total	2,276	100.0	3,164	100.0
Socialized	1,520	66.8	2,307	72.9
State-private, jointly managed	585	25.7	1,133	35.8
Cooperative stores or units	819	36.0	998	31.5
State managed or cooperative	116	5.1	175	5.6
Not socialized	756	33.2	858	27.1

Source: Ch'ien Hua *et al.*, *op. cit.*, p. 163.

2. *The Military as a Source of Labor Supply*

Persons discharged from the military forces constitute a continuing source of labor supply for the economy as a whole, although since 1949 it has not been of great importance for the nonagricultural branches of the economy. Normally between one-fourth and one-fifth of the army is demobilized each year and replaced by about the same number of conscripts.[112] Of a total of 7 million demobilized during the first 10 years of Communist rule, 5 million reportedly were placed in agricultural work.[113] Of the remaining 2 million, some were disabled, others returned to families engaged in traditional occupations, and about 1 million obtained employment in state-sector establishments. Even in 1956, one of the peak years for hiring in the First Five-Year Plan period, there were only 130,000 demobilized servicemen among the 2,240,000 workers and employees hired in that year.[114] Civilian discrimination against demobilized servicemen may be one reason why so few have been hired by industry. Reportedly they have been better qualified for jobs in engineering, construction, and geological survey work than in industry, for which they generally required special training.[115]

The army itself engages in productive work, particularly in agriculture, by allocating the services of its members for what are euphemistically called "voluntary workdays." This form of labor has tended to be concentrated in sparsely populated areas where labor generally is scarce. It did not become a regular activity of the army until 1957,[116] when 20 million workdays were contributed.[117] In the next year, dur-

[112] The number demobilized in 1957 was somewhat smaller than in 1956, according to "620,000 Armymen Demobilized This Year," NCNA-English, July 29, 1957; in *SCMP*, No. 1582, Aug. 1, 1957, p. 8. It was still smaller in 1958, according to "Over 500,000 Demobilized Servicemen Resettled in Production Construction Posts in the Countryside," NCNA, May 19, 1958; translated in *SCMP*, No. 1783, May 23, 1958, p. 3.

[113] "Great Achievements Accomplished in Work of Demobilization and Relief in the Past 10 Years," NCNA, Sept. 25, 1959; translated in *SCMP*, No. 2108, Oct. 2, 1959, pp. 20–21.

[114] "Ranks of Our Working Class Have Grown * * *," p. 2. The 130,000 hired represented 17.5 percent of the 740,000 demobilized in 1956, according to "In 1956, 700,000 Demobilized Servicemen Took Part in National Construction," *JMJP*, Jan. 20, 1957; reprinted in *Jen-min shou-ts'e, 1957* (*People's Handbook, 1957*), p. 349.

[115] "Ranks of Our Working Class Have Grown * * *," p. 2.

[116] "Liberation Army Units To Make Work of Support of Government and Love of People Regular," NCNA, Feb. 17, 1957; translated in *SCMP*, No. 1477, Feb. 26, 1957, p. 5.

[117] Kan Szu-chi, "Army Building With Diligence and Thrift and Participation of Servicemen in National Construction," NCNA, Feb. 8, 1958; translated in *SCMP*, No. 1724, Mar. 5, 1958, p. 11.

ing the Great Leap Forward, a peak of 59 million was reached.[118] Thereafter, the number of workdays contributed declined, until by 1961 it had returned to the 1957 level. Probably much of the work done by servicemen in the years 1958–60 was, like most other Great Leap Forward projects, a waste of effort. This kind of labor service has been unpopular among servicemen and has been criticized by some officers as necessitating cutbacks in essential training. A new policy drastically restricting labor service of this kind apparently was enforced in 1962 or 1963.

D. WOMEN AS A SOURCE OF NONAGRICULTURAL LABOR

Before the Great Leap Forward of 1958, the regime paid little or no attention to women as a source of nonagricultural labor. The increase between 1949 and 1952 in the proportion of workers and employees who were women is largely fictitious, since it results mainly from significant under-reporting of women in the 1949 worker and employee total.[119] Although the number of women workers and employees rose by 1.4 million during the First Five-Year Plan period (table 8), a large proportion of the total were women previously employed in the private sector who were not classified as workers and employees when they were transferred to the state sector in 1956. The proportion of workers and employees who were women remained nearly unchanged throughout the First Five-Year Plan period.

TABLE 8.—*Workers and employees, by sex, 1949 and 1952–59*

[Absolute figures are yearend and are in thousands]

Year	Both sexes	Male	Female	Percent of total	
				Male	Female
1949	8,004	7,404	600	92.5	7.5
1952	15,804	13,956	1,848	88.3	11.7
1953	18,256	16,124	2,132	88.3	11.7
1954	18,809	16,374	2,435	87.1	12.9
1955	19,076	16,603	2,473	87.0	13.0
1956	24,230	20,964	3,266	86.5	13.5
1957	24,506	21,220	3,286	86.6	13.4
1958	45,323	38,323	7,000	84.6	15.4
1959	44,156	35,870	8,286	81.2	18.8

Source: Emerson, *op. cit.*, p. 25.

The difficulties faced by women in competing with men for nonagricultural jobs are reflected in the very small increases in the numbers of women workers and employees in 1955 and 1957, 38,000 and 20,000 respectively (table 8). During both years there were only a few new jobs available (table A–2), and there were large numbers of rural-to-urban migrants who had entered the cities in 1954 and 1956 and were still looking for work.

[118] "Officers and Men of Armed Forces Establish Reputation on Economic Front," *JMJP*, Jan. 13, 1959; translated in *SCMP*, No. 1944, Jan. 29, 1959, p. 1. The number of workdays reported for 1958 was roughly the equivalent of 200,000 men working a 300-day work year.

[119] This point is covered in detail in John Philip Emerson, *Sex, Age, and Level of Skill of the Nonagricultural Labor Force of Mainland China*, U.S. Bureau of the Census, Foreign Demographic Analysis Division, Washington, D.C., 1965, p. 3.

Early in 1958, planners and others concerned with problems of employment were faced with the gloomy prospect of several millions of urban adults, school graduates, and peasant migrants unemployed and looking for work. In the entire nonagricultural sector there were to be only 419,000 new jobs created in 1958, an increase of 1.7 percent above the 1957 level, according to the provisions of the original economic plan for that year.[120] At that time, An Tzu-wen, the Party personnel chief, suggested that some female cadres should prepare to give up their jobs and to return to the kitchen.[121] Before the year was over, however, nonagricultural employment rose by more than 40 percent, or more than 20 times the increase forecast in the economic plan, but, contrary to what might have been expected, there was no very marked increase in the proportion of women among these newly hired. Of the total nonagricultural employment increment of 17.2 million in 1958, only 3.3 million, or less than 20 percent, were women. The proportion of all persons employed in the nonagricultural branches of the economy who were women rose by less than 1 percentage point (table A–5).

The failure of women to gain a significantly larger share of the nonagricultural jobs available in 1958 is not to be attributed simply to discrimination against women or to their lack of industrial skills. In large measure it is accounted for by the nature and location of the jobs themselves. The great majority of the more than 10 million new industrial jobs in 1958 were in heavy industry (table A–6), in which women had traditionlly made up only a small proportion of the work force. In the two major branches of light industry, textiles and food processing, in which women comprised as much as 70 percent of the work force, workers and employees increased by only 428,000. Traditional preferences for men continued to prevail in coal mining, the iron and steel industry, and metal processing, which together accounted for 6.6 million new jobs. As a consequence, only 8.3 percent of the newly hired industrial workers in 1958 were women.[122]

Great numbers of rural women, however, were employed immediately before and during the Big Leap Forward in mass labor projects, which consisted essentially of earth moving. In the winter of 1957–58, 73 million women, or about half of the rural women in the working ages, reportedly worked on water conservancy projects. Later in 1958, 67 million women worked on afforestation projects, making up more than half of the total number of people engaged in those undertakings.[123] The Chinese Communists claimed that the organization of rural communes in September 1958 liberated 50 million women from household drudgery for productive farm work.[124] More than half of the 10 million workers in the new commune messhalls were women,[125] as were most of the 6 to 7 million workers in commune nurseries.[126]

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[120] Po I-po, "Draft Plan for Development of the National Economy in 1958," NCNA-English, Feb. 13, 1958; in *CB*, No. 949, Feb. 19, 1958, p. 18.

[121] An Tzu-wen, "A Correct Approach to the Problem of Retirement of Women Cadres," *Chung-kuo fu-nü* (*Women of China*), No. 2, Feb. 1, 1958, pp. 14–18.

[122] Emerson, *op cit.*, p. 9.

[123] "Chinese Women's Achievements in 1958," NCNA–English, Jan. 4, 1959; in *SCMP*, No. 1932, Jan. 13, 1959, p. 2.

[124] Li Chih-han, *op. cit.*, p. 18.

[125] Ma Ming-fang, "Launch a Mass Movement and Technical Revolution in a Big Way and Accelerate the Leap Forward in Finance and Trade Work," *JMJP*, May 25, 1960; translated in *SCMP*, No. 2287, June 29, 1960, p. 18.

[126] In early 1959, 7,000,000 were reported in 'People's Communes Develop Maternity Child Care Work," NCNA–English, Mar. 27, 1959; in *SCMP*, No. 1989, Apr. 9, 1959, p. 19. In the following year, 6,000,000 were reported in "Chinese Women in Cultural Revolution," NCNA–English, June 3, 1960; in *SCMP*, No. 2276, June 14, 1960, p. 2.

At the beginning of 1959 one Ministry of Labor official estimated that an additional 20 million women still at home could be mobilized for work in urban and rural areas.[127] However, one year later the goal was the mobilization of all women able to work, a total of 200 million, according to a 1960 estimate.[128] Urban women were to serve as productive laborers in urban commune industrial and other enterprises, which in 1960 employed a total of 4 million persons,[129] about 85 percent of whom were women.[130] Wages and working conditions in these makeshift establishments were greatly inferior to those in modern industrial and trade enterprises, and the work force of these enterprises consisted mainly of persons who could not obtain jobs open to regular workers and employees. The economic crisis of 1960–61 ended both the mass mobilization of women for earth moving and urban commune enterprises.

III. Demand for Nonagricultural Labor

In a Soviet-type economy such as the Chinese Communists tried to create during the 1953–57 period, the total demand for labor is equal to the number of people at work in all sectors—state, collective, and private. The anticipated demand is usually limited to that part of the economy controlled by the central planning authorities, that is only the state sector, and is represented by employment changes forecast in plans for the national economy. Planning for labor in Mainland China during the First Five-Year Plan period did not enjoy a high priority among the tasks of the SPC. Perhaps because the SPC regarded production and construction planning as much more important than labor planning, it did not exert as much pressure on the SSB for statistics on labor as it did for statistics on industrial output and construction. In any case, the development of both labor statistics and labor planning was retarded during the Frst Five-Year Plan period. Weakness in one contributed to weakness in the other.

A. Labor Planning

Economic planning as practiced in the Soviet Union was an entirely alien concept to most of the Chinese Communist administrators when they came to power in 1949. Their experience in economic management had been limited to levying and collecting taxes in kind in the rural areas of North China over which they had control. Since these areas included no cities, the Chinese Communists had acquired no experience whatever in administration of a modern economy. However, the decision to copy Soviet planning methods must have been made before the formal establishment of the People's Republic of China in October 1949, for the Northeast People's Economic Planning Committee began to publish a monthly periodical entitled *Chi-hua ching-chi* (*Planned Economy*) in March 1949 which seems to have consisted entirely of translations of Soviet articles on economic planning. The

[127] Mao Ch'i-hua, "Fully Bring out 'From Each According to His Ability' and Guarantee a Greater Leap Forward in Productive Construction," *LT*, No. 1, Jan. 3, 1959, p. 8.
[128] "New Stage in the Women's Emancipation Movement in Our Country," editorial *JMJP*, Mar. 8, 1960; translated in *SCMP*, No. 2215, Mar. 14, 1960, p. 9.
[129] Ma Wen-jui, "Arouse Enthusiasm, in a Positive Way Do a Good Job of Labor Protection Work, and Promote Production and Construction To Continue the Leap Forward," *LT*, No. 10, May 18, 1960, p. 5.
[130] "Women Can Do Anything and Do Anything Well," *Chung-kuo fu-nii* (*Women of China*), No. 1, Jan. 1960, p. 10.

Northeast was the first region to come wholly under Communist control, and its economy was more developed than that of any other region, a legacy of Japanese occupation and development, which had begun in 1931. As a result of the Japanese propensity for recordkeeping of all kinds, the extent, volume, and quality of the statistical information available on all aspects of the economy were greater for the Northeast than for any other part of Mainland China. In the early years of the regime other regions were encouraged to copy the systems of economic planning and data colection used in the Northeast.[131]

From its founding, the most important task of the SPC was the drafting of the First Five-Year Plan, which it did not finish until February 1955.[132] However, many important parts of the economy were either omitted entirely or incompletely covered in the published outline of the plan, as its employment data show. The difference between the 1952 nonagricultural employment total of about 21 million given in the First Five-Year Plan [133] and the estimate of nearly 35 million based on table A–1 data [134] indicates the extent of the gap in the employment data available to the SPC at the start of 1955. Thus, even after more than 2 years of work, the SPC still had only a very imperfect and incomplete picture of the demand for labor in the nonagricultural branches of the economy. The labor plan for 1955 was limited to parts of the state sector, covering only state-managed industry, some state-private industrial plants, capital construction, railways, and the centrally administered posts and telecommunications systems,[135] and included (1) levels of labor productivity in the material production branches of the economy, (2) numbers of workers and employees by branch of the economy, (3) the average wage, and (4) the total wage bill.[136] It was apparently a simplified version of that used in the Soviet Union. In 1956, the labor plan was expanded so that, for the first time, it covered all state-private enterprises, the remainder of the private sector, and all of the nonproductive branches of the economy (listed in table A–2), except mass organizations.[137] At the end of 1956, 22.4 million workers and employees, or more than 90 percent of the total number, were included in the national economic plan.[138]

The labor plan for 1956 apparently existed only in the central government offices. Its provisions were generally ignored by those responsible for overseeing actual hiring, which greatly exceeded needs, according to the planning authorities. The annual average number of workers and employees in branches of the economy covered by the plan grew by 1,821,000 during 1956, or more than twice as many as the 839,000 called for in the plan.[139] Complaints from the SPS and Min-

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[131] Six articles on economic planning and statistical data collection in the Northeast provinces from local Northeast and national periodicals and newspapers were reprinted in *Hsin Hua yüeh-pao* (New China Monthly), vol. 2, No. 4 (10), Aug. 15, 1950, pp. 827–834.

[132] Li Fu-ch'un, "Report on the First Five-Year Plan for Development of the National Economy," translated in *CB*, No. 335, July 12, 1955, p. 6.

[133] *First Five-Year Plan*, p. 190.

[134] The *First Five-Year Plan* figures do not include employment in fishing and salt farming If the estimates for these two branches in table A–1 are also omitted, the total employment in the remaining nonagricultural branches is 34,916,000.

[135] SPC, National Economic Summary Planning Bureau, Methods Office, "Explanations of Changes in 1956 National Economic Plan Forms," *CHCC*, No. 9, Sept. 27, 1955, p. 13.

[136] Sung P'ing, "The Labor and Wage Plan Is an Important Integral Part of the National Economic Plan," *CHCC*, No. 1, Jan. 27, 1955, p. 8.

[137] SPC, National Economic Summary Planning Bureau, Methods Office, *loc cit.*

[138] Cheng K'ang-ning, "Summarize 1956 Experiences and Improve Labor and Wage Planning Work," *CHCC*, No. 8, Aug. 9, 1957, p. 9.

[139] Annual average labor and wage data for 1956 are reported in Editorial Board, Data Unit, "1956 Labor and Wage Conditions," pp. 13–14.

istry of Labor about lack of enforcement of provisions of the 1956 plan resulted in tighter controls on hiring in the following year, when the number of workers and employees exceeded the planned increase of 140,000 by only 36,000.[140] But during the Great Leap Forward the quotas in the original labor plan for the year were completely ignored. According to SSB figures, workers and employees increased by 20.8 million during 1958 (table A–2) in contrast to the planned increase of 419,000.[141] Labor plan figures for 1959 were not published, but an increase of 1.8 million was called for in 1960.[142] This target was almost certainly meaningless, since with the deterioration of the whole economy in 1960 any such increase would have been out of the question. In the absense since 1960 of published plans and statistical reports on the economy, it is not possible to say whether the quality of labor and wage planning has ever regained the level it had reached in 1957.

The labor plan was the basis for the cadre development plan. The latter included (1) necesary additions to the numbers of workers and employees and sources of these personnel, (2) numbers of workers at work who were to be trained for higher level positions, (3) methods of raising levels of worker skills, (4) numbers of apprentices to be recruited, and numbers of students to be enrolled in factory training programs and worker technical schools, and (5) requirements for persons with higher education or technical middle school qualifications.[143] Arbitrary ratios of so many engineers and technicians per thousand workers, which varied by branch of the economy and type of work, were multiplied by the estimated increases in the numbers of workers and employees given in the labor and wage plan to obtain the estimated numbers of additional engineers, technicians, and other specialists who would be needed.[144]

Cadre development planning during most or all of the 1953–57 period consisted of little more than collecting target figures set by the central ministries for the number of students to be trained under ministry auspices in institutions of higher education, technical middle schools, and skilled worker training programs. One of the chief reasons for taking the 1955 census of state-sector workers and employees was to provide reliable information on the numbers of professional and semiprofessional personnel in the various branches of the economy, which could serve as a basis for planning the future needs for such personnel. Yet the SPC was never able to get beyond the experimental stage in planning cadre development. SPC planners could not produce reasonably realistic estimates of the numbers of professional and semiprofessional personnel needed in the long term, hence there was no way of determining the level of school enrollments which would have been required to furnish professionally trained graduates to meet future demands.[145]

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[140] The 1957 plan increase is given in Po I-po, "Working of the National Economic Plan for 1956 and Draft National Economic Plan for 1957," NCNA, July 1, 1957; translated in *CB*, No. 465, July 9, 1957, p. 18. Yearend worker and employee figures for 1956 and 1957 are given in table A–2.

[141] Po I-po, "Draft Plan for Development of the National Economy in 1958," p. 18.

[142] The planned increase in the number of workers and employed in 1960 is given in Li Fu-ch'un, "Report on the Draft 1960 Economic Plan," NCNA-English, Mar. 30, 1960; in *CB*, No. 615, Apr. 5, 1960, p. 19.

[143] SPC, National Economic Summary Planning Bureau, Methods Office, *op. cit.*, p. 13.

[144] Ch'en Chi-chen and Ch'en Chih-chang, "Lecture 11: Cadre Planning Forms," *CHCC* No. 11, Nov. 9, 1957, pp. 35–37.

[145] *Ibid.*, pp. 36–37.

B. SIZE AND DISTRIBUTION OF NONAGRICULTURAL EMPLOYMENT

Although it does not include all nonagricultural employment, the SSB total of workers and employees (table A–2) is the largest employment aggregate in common use in Mainland China. When the Chinese Communists discuss changes in employment in the modern sector of the economy, they talk in terms of workers and employees. The worker and employee figures show very high rates of increase for the years 1949–58. During the 1949–52 period the number grew by nearly 100 percent, during the First Five-Year Plan period by 55 percent, and in the single Great Leap Forward year of 1958 by 85 percent. If these figures are taken as indicative of trends in total nonagricultural employment, as they have been by several writers outside Mainland China, the rate of growth they imply is certainly phenomenal. However, the rate of growth of total nonagricultural employment, as the figures in table A–1 show, was much less rapid. The totals in table A–1 consist partly of reported SSB figures, partly of figures supplied by other agencies of the regime, and partly of estimates made to approximate unpublished figures.

1. *Total Nonagricultural Employment*

According to the figures in table A–1, nonagricultural employment as a whole grew from 26.3 million persons in 1949 to 36.8 million in 1952, an increase of 40 percent in the 3-year period, less than half the rate of increase for workers and employees alone (table A–2). Moreover, these figures probably exaggerate the actual growth of nonagricultural employment during this period because official data coverage was more complete in 1952 than in 1949.[146] However, there can be little doubt that a large increase in nonagricultural employment did take place during these years. Economic activity expanded considerably after the end of fighting between Communist and Nationalist armies, because of the gradual elimination of inflation and an increased demand for goods and services during the Korean war. During 1950 and 1951, the peak years of the war effort, nonagricultural employment growth averaged 15 percent per year, but it fell to 6 percent in 1952, when private sector trade and industry were paralyzed and manufacturers and tradesmen terrorized by the Party-led "Five-Anti" campaigns.[147]

During the First Five-Year Plan period, nonagricultural employment increased only 7.9 percent above the 1952 level, about one-eighth the rate of increase of workers and employees. The average annual rate of growth in nonagricultural employment was only 1.5 percent, compared with 11.9 percent for the preceding 3 years. Of the total increase of 2.9 million persons, 2.4 million were added in 1953 and the remainder during the next 4 years, during which years the average annual rate of growth was less than half of 1 percent.

In 1958, nonagricultural employment shot up 43 percent, reaching 56.9 million at the end of the year. For the most part, the increase was made up of workers hired by industrial plants which were attempting to fulfill Great Leap Forward production targets, regard-

[146] For further discussion of the problems of omissions in the 1949 data, see *Nonagricultural Employment*, pp. 63–76.
[147] See note 106.

less of costs. Since new laborsaving machinery and equipment were generally unobtainable, additions to the work force were considered the only way of increasing production. The sudden expansion of the industrial base during 1958 placed enormous strains on the production of raw materials in both industry and agriculture. Moreover, the replacement of experienced managers and technicians by inexperienced local Party secretaries, as part of the policy of relying on political orthodoxy rather than expertise during the Great Leap Forward, resulted in mismanagement and damage of production facilities. During 1959, 1960, and 1961, agriculture was afflicted by a series of droughts, floods, and typhoons of unusual severity. The combination of circumstances brought about the collapse of the Great Leap Forward in 1959 and 1960 and a drop in food production that brought the country to the brink of famine by 1961. In the cities, thousands of factories closed down, and, in rural areas, commune industry was almost entirely abandoned. The recall of all Soviet technicians from Mainland China in 1960 and a drastic reduction in the level of Soviet exports to China added to the general economic distress. The Party declared the Second Five-Year Plan fulfilled 2 years ahead of time, but actually it was abandoned. From 1961 through 1965 the regime devoted its energies to trying to repair the damage done to the economy.

The forced outmigration from urban to rural areas in the years 1960–61 probably included at least 10 million persons who had been employed in nonagricultural branches of the economy until the collapse of the Great Leap Forward in 1960. In addition, there were many others who lost their jobs but remained in urban areas. Altogether nonagricultural employment probably had fallen by well over 10 million persons by the end of 1962. By the end of 1964, nonagricultural employment stood at an estimated 45.8 million,[148] a level which may represent a slight recovery from a nadir reached earlier, although there is no firm evidence to support this supposition.

There is nothing to indicate that the nonagricultural branches of the economy have sustained a rate of growth during the years 1964–66 sufficient to provide jobs for the increasing numbers of middle school and college graduates. Continued forced outmigration of middle school graduates from the cities is ample proof that nonagricultural employment is growing very slowly, if at all. In fact, the capacity of the Mainland China economy to provide nonagricultural jobs for the increasing working-age population in urban areas may have been steadily shrinking since 1961.

2. *Sector and Branch*

A considerable amount of information is available for most of the numerically important branches of the economy, such as handicrafts, industry, and trade, but there is not enough on other branches, such as salt extraction, fishing, and water conservancy, to permit discussion of their development since 1949.

(*a*) *State and private sector employment.*—Of the increase of 10.5 million persons in nonagricultural employment during the 1949–52 period, 7.4 million were added to the state sector, raising the total

[148] The basis of this estimate is given in app. A. The actual level of nonagricultural employment may have been somewhat higher because of an increase in the number of self-employed persons in urban areas. There is no way of estimating the size of this group.

employment in this sector to 12.5 million and the state-sector proportion of nonagricultural employment from one-fifth in 1949 to one-third by the end of 1952 (table A–3). Most of the newly hired persons were absorbed by industry (1.8 million), education, medicine and public health, and cultural affairs (1.2 million), trade (1.5 million), and capital construction (900,000). Most of the increase of 3.1 million in private sector employment, which reached 24.3 million at the end of this period, was made in handicrafts (1.4 million), trade and the food and drink industry (551,000), fishing (436,000), and industry (413,000).

In the first 2 years of the 1953–57 period, state-sector employment rose sharply to 17.5 million. Of the 5 million increase, state-managed industry accounted for 1.4 million, and construction for 1.1 million, while 1.0 million handicraftsmen entered handicraft cooperatives. In these 2 years, private sector employment fell by 2.1 million persons, of whom 1.8 million were small traders and peddlers. During 1955 and 1956, state-sector employment rose to 35.2 million, double the 1954 figure, as a consequence of the socialization of the private sector, in which employment fell by 18 million to a total of 4.2 million. Many persons formerly employed in the private sector, especially private traders, lost their jobs, but in the state sector there was extensive hiring in 1956, most of it in industry and capital construction. By 1957, the state sector accounted for 90 percent of all nonagricultural employment. This proportion rose to 97 percent during the Great Leap Forward in 1958. From official complaints about "spontaneous outbursts of capitalism" during the disastrous aftermath of the Great Leap Forward in 1960 and 1961 [149] and other reports of peddlers again hawking wares on the streets of Peking, it is clear that the private sector had not died out entirely. However, the present level of employment in the private sector cannot be estimated for lack of data.

(*b*) *Material production and nonproductive branches of the economy.*—In economies which employ Marxian economic accounting, the branches of the economy producing the goods and service which are defined as making up the national income are called the material production branches. They include agriculture, mining, manufacturing, construction, freight transportation, some communications, trade, and restaurants. The branches which supply such basic services as education, public health, and government administration are known as the nonproductive branches (components of both groups are listed in tables A–1 and A–2). The material production branches absorbed 7.7 million of the net increase of 10.5 million persons in nonagricultural employment in the 1949–52 period (table A–1), reflecting a rapid expansion of economic output. However, during the 1953–57 period, employment in these branches showed a net increase of only 753,000 persons as a result of large declines in private sector employment which nearly canceled gains in the state sector. At the same time, employment in the nonproductive branches increased by 2.2 million persons, largely due to increases in state budgets for education and public health.

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[149] An example of these complaints is Li Fu-ch'un, "Hold High the Red Flag of the General Line and March On," *Hung-ch'i* (*Red Flag*), No. 16, Aug. 16, 1960; translated in *SCMM*, No. 226, Sept. 12, 1960, p. 13.

During the Great Leap Forward of 1958, there was a net increase of 17 million persons in the material production branches and only 235,000 in the nonproductive branches. The proportion of total nonagricultural employment in the latter declined from 22 to 16 percent. In industry, capital construction, and transport and communications, employment grew by 20.3 million persons, some 3 million more than the net increase in the material production branches as a whole. Transfers of workers from handicrafts, trade, and government administration to industry made up the difference.[150] Thereafter, with the collapse of the Great Leap Forward, the numbers of persons employed in industry and construction were greatly reduced, while teaching and medical personnel were increased. By 1964, the proportion of nonagricultural employment in the nonproductive branches had returned to the 1957 level of 22 percent.[151]

(*c*) *Modern and traditional forms of employment.*—Differences in the rates of employment growth in the modern and the traditional sectors since 1949 show the effects of the investment and socialization policies of the regime. The modern sector is defined here as consisting of workers and employees and the traditional sector as consisting of persons employed in nonagricultural branches but not classified as workers and employees. In the modern sector, which has received almost all of the investment made by the regime since 1949, employment nearly doubled during the first 3 years of Communist rule, reaching 15.7 million in 1952, and rose 52 percent to 23.9 million in the 1953–57 period (table A–4). This growth represented in large part an effort by the regime to increase the output of producer goods to or above levels specified in the First Five-Year Plan. Not until 1956, however, did employment in the modern sector constitute more than half of total nonagricultural employment.

After 1950 [152] and prior to the socialization of the economy in 1956, employment in the traditional sector remained constant at 20 to 22 million persons, in response to rising demands for most traditional goods and services consumed by the growing population. Employment in this sector fell by 5 million persons in 1956, partly as a result of transfers of persons to the modern sector (chiefly from handicrafts and trade) and partly because the disorganization during the final phase of the socialization of the private sector forced many handicraftsmen, carters, and peddlers to abandon their original trades.

The near doubling of the number of people in the modern sector in 1958 resulted from efforts to expand output of producer goods during the Great Leap Forward. During this drive, about 4.5 million handicraftsmen were transferred to factory production. It was chiefly because of this transfer that the number of persons engaged in traditional forms of employment fell from 15.7 to 12.6 million. Following the collapse of the Great Leap Forward and rural commune industry, one Communist source estimated that there were 6 million full-time

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[150] Detailed estimates of the numbers of persons transferred to industry from other branches of the economy are given in *Nonagricultural Employment*, pp. 147 and 157.

[151] The proportion of 22 percent in 1964 is taken from unpublished estimates of the U.S. Bureau of the Census, Foreign Demographic Analysis Division.

[152] The rise from 18.3 to 20.1 million persons in traditional forms of employment in 1950, shown in table A–4, is largely fictitious, since 1949 SSB data are underestimates, particularly those on traditional forms of employment. An evaluation of the extent of overall underestimation of nonagricultural employment in tables A–1, A–3, A–4, and A–5 is given in *Nonagricultural Employment*, pp. 63–73.

handicraftsmen in 1961, about the same number as there were in 1957. The reestablishment of handicrafts increased the number of persons in traditional forms of employment to 15.6 million, or nearly the same as the 1957 total. Since 1961, there has been no indication of a substantial change in the level of this kind of employment. By 1964, the number of persons in the modern sector had fallen by 14 million to 30.2 million, a drop of about 32 percent below the 1958 peak.[153] They constituted only 66 percent of total nonagricultural employment, as compared with 78 percent in 1958.

TABLE 9.—*Handicraftsmen by sector and by major product group, 1954*

[Figures are yearend and are in thousands]

Sector and product group	*1954*
Total	8,910
Individual handicraftsmen	7,697
Coal extraction	43
Metal production	42
Chemical production	42
Building materials	293
Metalware	855
Porcelain and pottery	117
Wood processing	987
Bamboo, rattan, hats, and mats	899
Textiles	670
Knitted wear	85
Sewing	927
Leather processing	99
Art goods	143
Papermaking	189
Cultural goods	89
Food processing	604
Repair	207
Other	1,404
Handicraftsmen in cooperatives	1,213
Of whom, members of textile cooperatives	(207

Source: *Nonagricultural Employment*, p. 116.

(*d*) *Handicrafts.*—Before 1956, handicrafts employed more people than any other branch of the economy except trade (table A–1). Handicraftsmen were concentrated in the production of consumer goods (table 9), which in 1954 accounted for 78 percent of the gross value of handicraft output.[154] Although there were more than twice as many handicraftsmen in consumer goods production as there were workers and employees (table A–5), handicraftsmen accounted for only about 25 percent of the gross value of output of consumer goods.[155] The socialization of handicrafts in 1955 and 1956 resulted in a sharp decline in the total number of handicraftsmen from 8.9 million to 5.8 million (table 3). In 1958, most handicraftsmen were transferred to factory industry production, and in 1961 handicrafts were reestablished within the organizational framework of handicraft cooperatives.

[153] From unpublished estimates of the U.S. Bureau of the Census, Foreign Demographic Analysis Division.

[154] P. V. Yevseyev, *op. cit.*, p. 11. The gross value of handicraft output in 1954 was ¥10.46 billion, according to *The Great Ten Years*, p. 15.

[155] The gross value of output of consumer goods in 1954 was ¥31.98 billion (*ibid.*, p. 76), of which the handicraft production constituted ¥8.20 billion, according to Yevseyev, *loc. cit.*, and *The Great Ten Years*, p. 15.

(*e*) *Industry.*—Employment in industry increased from 3.1 million workers and employees in 1949 to 5.3 million in 1952 (table 3), an average annual increase rate of 20 percent. The increase occurred in the private as well as the state sector. Of the net increase of 2.2 million industrial workers and employees for the 3-year period, 2 million were added in 1951 and 1952 during the height of the Korean war. State-sector industrial employment grew much more rapidly than private-sector employment, absorbing 1.8 million, or 82 percent of the total increase. At that time, industry under state management consisted of factories earlier owned by the Nationalist Government, Japanese built plants in the northeast provinces, and formerly foreign owned enterprises throughout Mainland China which had been confiscated after 1949. Most of the plants in the Northeast had been stripped by Soviet armies in 1945, and the formerly foreign owned enterprises were in disrepair and only partial operation. Because new equipment and replacement parts were for the most part unobtainable, the Chinese Communists attempted to raise output by increasing labor inputs. Investment in industry was small during the period and most of it was used to restore production in plants shut down prior to 1949 as a result of war damage or inflation.[156]

From branch of industry employment data (given in table A–6), it is clear that during the 1949–52 period an emphasis was placed on the expansion of metalworking facilities and machine shops to meet war demands for metal products. Of the increase of 1.2 million workers and employees in heavy industry, 469,000, or nearly 40 percent, were added to metal processing (including the manufacture and repair of machinery), raising total employment in this branch to 846,000. Small additions were made in the coal and electric power branches, which were already well established. Employment in the infant petroleum industry was nearly doubled by the addition of 10,000 workers and employees, apparently in an effort to reopen the Yümen oil field, to restore production in the oil shale refinery at Fushun in Liaoning, and to develop the Karamai oil field in northwest Sinkiang. Employment in both the ferrous and the nonferrous metals branches also nearly doubled as a result of efforts to restore production in the Anshan Iron & Steel Co. and other major metal producers.[157] Employment increases of nearly 100 percent in the chemical and timber industry branches and of nearly 200 percent in the building materials branch exaggerate the actual growth, since the 1949 data for these branches probably are underestimated to a significant degree. The two largest branches of industry, textiles and food processing, accounted for about three-quarters of the 1 million workers and employees added to light industry branches during this period. Employment in these two branches rose by 57 percent.

During the First Five-Year Plan period, industrial employment grew by 2.6 million workers and employees (table 3). The growth was very uneven from year to year. There was an increase of 900,000 workers and employees in 1953 and of only 250,000 in 1954, a decline

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[156] Capital construction investment totaled only ¥784 million during the 1949–52 period, compared with ¥5.5 billion during the First Five-Year Plan period, according to *The Great Ten Years*, p. 46.

[157] SSB, Industrial Statistics Section, *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)*, pp. 8–9.

of 250,000 in 1955, and increases of nearly 1.4 million in 1956 and of 400,000 in 1957. Hiring was greatly in excess of needs in both 1953 and 1956.[158]

During the First Five-Year Plan period, newly hired industrial workers and employees were distributed between producer and consumer goods production roughly in proportion to the shares of industrial investment made in heavy and light industry.[159] Of the total increase of 2.6 million industrial workers and employees, 2 million, or 78 percent, were added to producer goods industry (table A–6), while 85 percent of the total investment in industry was allocated to heavy industry.[160]

Within heavy industry, however, relative employment increases by branch varied inversely with the amount of investment. Employment increased by only 20 percent in the fuels and electric power branches, to which 45 percent of industrial investment was allocated.[161] On the other hand, employment increased by 44 percent in the chemical, building materials, and timber industry branches, which received only 13 percent of the heavy industry investment total. And employment in the metal processing branch, which received only 20 percent of the heavy industry investment total, increased by 66 percent. From this relationship, it appears that the allocations of investment during the First Five-Year Plan period were not designed to maximize the growth of employment. In 1958, because of the large expansion of existing industrial plants and the establishment of some 300,000 new factories and workshops at local levels of administration,[162] 7 million workers and employees were added to the old plants and another 8 million employed in the new enterprises.[163] These increases resulted in a trebling of industrial employment, which reached 23 million at the end of 1958 (table A–2). Nearly two-thirds of the increase consisted of newly hired personnel. Reclassification of most handicraftsmen as industrial workers and employees accounted for another 4.5 million, and 1.3 million workers and employees were transferred to industry, most of them from trade and government administration.[164] The increase was concentrated in heavy industry branches (table A–6), which were required to meet very large targets in producer goods output.

In some of the provinces which had attempted sudden industrialization in 1958, the Great Leap Forward in industry apparently collapsed

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[158] For information on 1953, see *Nonagricultural Employment,* p. 85, note 42. In 1956, the annual average number of industrial workers and employees included under the labor plan increased by 342,000, or 2.4 times the increase of 142,000 provided for in the plan, according to Editorial Board, Data Unit, *op. cit.,* pp. 14–15.

[159] Since not all of heavy industry output consists of producer goods and not all of light industry output consists of consumer goods, the heavy and light industry categories do not correspond exactly to the producer and consumer goods industry categories. In order to aggregate production and employment data separately for producer and consumer goods industries, the SSB has subdivided the 28 major branches of industry (employment data for 12 of which are given in table A–6) into 67 producer goods and 36 consumer goods branches and subbranches. For further details, see *Nonagricultural Employment,* pp. 171, 208, and 211.

[160] *The Great Ten Years,* p. 52.

[161] Capital construction investment in heavy industry branches totaled ¥16.65 billion in the 1953–57 period (*Nonagricultural Employment,* p. 117, note 3). Of this, ¥7.54 billion was invested in the electric power, coal, and petroleum industry branches.

[162] [SSB], "Statistical Bureau's Report on China's Economic Growth in First 6 Months of 1958," NCNA-English, Aug. 2, 1958; in *SCMP,* No. 1830, Aug. 12, 1958, p. 17.

[163] *Nonagricultural Employment,* p. 86.

[164] The total number of workers and employees transferred to industry from other branches of the economy is given in Mao Ch'i-hua, *op. cit.,* p. 6, and their origin by branch indicated in [SSB], "Statistical Bureau's Report . . . in First 6 Months of 1958," p. 21.

even before the end of 1959.[165] By this time, the Leap Forward may have failed in the remainder of the country as well. The economic crisis was at its worst in 1961. The extent to which the economy has recovered since cannot be surmised from available information, but it is estimated that the industrial workers and employees numbered 14 million in 1965,[166] or 9 million fewer than in 1958.

(*f*) *Capital construction.*—The expansion of industry during the 1949–52 period produced a building boom which increased employment in capital construction from 200,000 at the start of the period to more than 1 million in 1952 (table A–1). In that year, the "Five-Anti" campaign all but wiped out the private sector of the building trades; employment fell from 150,000 to 18,000.[167] From 1952 through 1958, the growth of employment in capital construction fluctuated in response to changes in the amount of investment.[168] Overhiring was serious in 1953,[169] when capital construction employment doubled, rising to 2,170,000, and again in 1956,[170] when it increased by 1 million to 2.9 million. In 1957, it fell by the same amount, but in 1958 it nearly trebled, reaching 5.3 million during the construction of hundreds of thousands of industrial plants and workshops. Since 1958, the regime has released no data on employment in capital construction, but as a result of the collapse of the Great Leap Forward and stringent prohibitions against most kinds of construction, employment in capital construction unquestionably has been greatly reduced, probably to

TABLE 10.—*Workers and employees in capital construction, by type of work, 1952–58*

[Figures are yearend and are in thousands; (*) indicates data not available and no estimate made]

Year	Total	Building and installation	Survey and design	Geological survey
1952	[1] 1,048	1,400	29	30
1953	2,170	1,540	39	(*)
1954	2,100	(*)	(*)	(*)
1955	1,935	1,679	90	166
1956	2,951	2,601	110	240
1957	1,910	1,594	116	200
1958	5,336	4,716	200	420

[1] Does not equal the sum of the components. For a note on this inconsistency, see app. A of the source noted below.

Source: *Nonagricultural Employment*, p. 139.

[165] Very large industrial employment declines totaling 1.65 million are reported for the three provinces mentioned in the following titles: "Several Hundred Thousand Szechwan Workers Return to Villages to Help Agriculture," *JMJP*, June 14, 1959, p. 1; "More Than 400,000 Yunnan Workers and Employees Thrown Into the Agricultural Front;" and "Kweichow Factory and Mining Enterprises Let Go 500,000 Labor Force [Units]," *LT.*, No. 13, July 13, 1959, pp. 5 and 7, respectively.

[166] This estimate was derived on the basis of two pieces of information and one assumption. In "Women of China," NCNA-English, Mar. 6, 1966, in *SCMP*, No. 3654, Mar. 10, 1966, p. 24, it is stated that "the number of women workers in industry is now more than double what it was in 1957 . . .," when there were 1,370,000 (table A–5). Thus, in 1965 there were at least 2.8 million women workers and employees in industry. On the basis of the assumption that women in 1965 comprised the same proportion of industrial workers and employees as they did of the total number of workers and employees, reported presumably for 1963, or 20 percent (see app. A), there would have been 14 million workers and employees in industry in 1965.

[167] *TCKT* Data Section, "The Basic Condition of the Building Trades in Our Country," *TCKT*, No. 24, Dec. 29, 1956, p. 31.

[168] More detailed comparisons are made in *Nonagricultural Employment*, p. 87.

[169] Conditions in 1953 are described in part in "Distribution of Building Workers Successful in 1953," NCNA, Mar. 24, 1954; translated in *SCMP*, No. 780, Apr. 2, 1954, p. 19.

[170] The increase in the annual average number of capital construction workers and employees in 1956 was 490,000, nearly twice the planned increase of 260,000, given in Editorial Board, Data Unit, *loc. cit.*

about the level it had reached at the start of the First Five-Year Plan period.

During the First Five-Year Plan period, of the activities classified under capital construction, building and installation work employed between 1.5 and 1.7 million workers and employees, except for 1956 when the number shot up to 2.6 million (table 10). During the Great Leap Forward of 1957, most of the added capital construction workers and employees went into building and installation work, employment in which totaled 4.7 million by the end of the year. The sharp increase in industrial plant construction and development of mineral resources caused rapid increases in personnel in survey and design and geological survey work during the 1953–57 period. Employment in survey and design work quadrupled, reaching 116,000 by 1957 and employment in geological survey grew fivefold to 200,000. In 1958, employment in each of these activities increased by about 100 percent.

(*g*) *Transport, posts, and telecommunications.*—The number of workers and employees in modern forms of transport, posts, and telecommunications nearly doubled during the first 3 years of Communist rule, reaching 1.1 million in 1952 (table 11). Railways accounted for most of this increase, as service was restored on existing lines and construction of new lines was begun.[171] During the First Five-Year Plan period, employment in modern transport, posts, and communications rose to 1.9 million. More than 500,000 were added to the railway system, raising total railway employment to 1.3 million in 1957. Two-thirds of the investment of ¥9 billion allocated to transport, posts, and telecommunications under the First Five-Year Plan was made in rail construction.[172] In the same period, the number of workers and employees in posts and telecommunictions nearly doubled, reaching 255,000 in 1957.

TABLE 11.—*Employment in transport, posts, and telecommunications, by modern and traditional components, 1949–58*

[Figures are yearend and are in thousands; excludes camel and yak drivers and muleteers; (*) indicates data not available and no estimate made]

Component	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
All components	4,160	4,325	4,490	4,655	4,764	4,873	4,876	4,103	4,417	5,823
Modern components	634	799	964	1,129	1,238	1,347	1,426	1,564	1,878	2,955
Railways	(*)	(*)	(*)	650	(*)	(*)	1,000	1,223	1,300	2,000
Posts and telecommunications	103	(*)	(*)	135	(*)	(*)	(*)	221	255	290
Motor vehicles, water transport, and freight handling	(*)	(*)	(*)	(*)	(*)	(*)	(*)	120	323	665
Traditional forms of transport	3,526	3,526	3,526	3,526	3,526	3,526	3,450	2,539	2,539	2,868
Carters	2,350	2,350	2,350	2,350	2,350	2,350	2,350	1,739	1,739	1,712
Animal drawn	850	850	850	850	850	850	850	629	629	(*)
Man drawn	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,110	1,110	(*)
Operatives on junks	1,176	1,176	1,176	1,176	1,176	1,176	1,100	800	800	1,156

Source: *Nonagricultural Employment*, p. 140.

[171] Figures on the growth of Mainland China rail lines are given in *The Great Ten Years*, p. 127.
[172] *Ibid.*, p. 49.

The development of railways, modern shipping, and modern highways has been so limited in most parts of Mainland China that transport of goods, as in the past, still depends to a great extent on carts, junks, pack animals, and in some mountainous areas on porters. Yet, the First Five-Year Plan made no provisions for expanding or even maintaining these services. Although definite conclusions cannot be drawn from data on employment in traditional forms of transport, this kind of employment may have declined since 1949 because of the traditionally high rate of attrition among junks and the lack of incentive for junk owners to replace their vessels. Also, in 1956, the Chinese Communists attempted without adequate preparations to socialize junks and carts. However, because the preparations were not adequate, many carts formerly owned and operated by individuals were taken over by agricultural producer cooperatives and used only for work in agriculture, reducing the number available for general transport. This reduction averaged about 25 percent in 16 provinces and cities, but exceeded 50 percent in some provinces.[173] By 1957, 5,000 transport cooperatives had been established. Their membership totaled 1.6 million, or 70 to 80 percent of the total number of junkmen and carters.[174]

The extraordinarily heavy demands placed on all forms of transport by the Great Leap Forward led to an increase of 1.4 million persons in transport and communications employment of all kinds in 1958. Of this number, 1.1 million were added to modern transport, mostly to the railways, and the remainder to full-time work in traditional forms of transport. In addition, large numbers of people, reportedly more than 7 million people in one instance, were mobilized as porters for brief periods in 1958 and 1959 to break up freight jams at major railway stations, harbors, and transfer points throughout the country.[175]

(*h*) *Trade and the food and drink industry.*—Employment in trade and the food and drink industry rose by 32 percent during the first 2 years of Communist rule, totaling 10.4 million persons in 1951 (table 12). This gain resulted from employment increases in both the state and private sectors and reflected a general improvement in economic conditions after the end of fighting between the Communist and Nationalist armies in 1949. Total employment in these two branches of the economy during the next 3 years declined by 2.6 million due to losses in the private sector, and thereafter fluctuated between 7.5 and 8 million through 1958.

During the 1949–52 period, the regime did little to expand state economic operations except in trade and finance. The state sector (including cooperative trade) accounted for by far the largest portion (1 million persons) of the net trade employment gain of 1.6 million. During the First Five-Year Plan period, employment in state-sector trade more than trebled, reaching 5.2 million in 1957. Most of this growth resulted from the progressive expansion of state collection systems for grain and other major agricultural products, which was designed to bring all trade under state control.

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[173] *TCKT* Data Section, "The Gigantic Achievements in Socialist Construction and Transformation During the First Half of 1956," *TCKT*, No. 15, Aug. 14, 1956, pp. 6 and 26; translated in *ECMM*, No. 55, Oct. 29, 1956, p. 4.

[174] These data are given in two articles by Chang Pang-ying, "Let's Also Have a Big Leap Forward in Civilian Transport," *JMJP*, May 21, 1958, p. 3, and "China's Fast Developing Communications, Posts, and Telecommunications," *Cheng-hsieh hui-k'an* (*CPPCC Conference Bulletin*), No. 6, Dec. 31, 1959, p. 5.

[175] Transport congestion in 1959 is described in "Fighting Call Issued to All Communications and Transport Workers," NCNA, Oct. 27, 1959; translated in *SCMP*, No. 2130, Nov. 4, 1959, p. 17.

TABLE 12.—*Employment in trade, by sector, and in the food and drink industry, 1949–58*

[Figures are in thousands and are yearend, except as noted; (*) indicates data not available and no estimate made]

Branch and sector	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Total	7,850	8,202	10,400	9,900	9,008	7,819	7,823	8,085	7,819	7,500
TRADE										
Total	6,850	7,002	9,000	8,450	7,591	6,436	6,473	7,002	6,719	6,400
State sector, workers and employees	183	382	(1)	1,682	1,512	1,972	2,572	4,506	5,245	4,835
State-managed trade	(*)	216	(*)	535	660	807	1,122	(*)	2,300	(*)
Cooperative trade	(*)	166	(*)	711	840	1,023	1,101	1,377	1,400	(*)
Other	(*)	(*)	(*)	436	12	142	349	(*)	1,545	(*)
Private sector	6,667	6,620	7,400	6,768	6,079	4,464	3,901	(*)	(*)	(*)
Workers and employees	(*)	967	1,167	917	766	437	315	(*)	(*)	(*)
Others	(*)	5,653	6,233	5,851	5,313	4,027	3,586	(*)	(*)	(*)
FOOD AND DRINK INDUSTRY										
Total	1,000	1,200	1,400	1,450	1,417	1,383	1,350	1,083	1,100	1,100
Workers and employees	(*)	72	126	125	167	209	222	293	(*)	(*)
Others	(*)	1,128	1,274	1,325	1,250	1,174	1,128	790	(*)	(*)

[1] The estimated number of workers and employees in state-sector trade derived in *Nonagricultural Employment*, app. A, is 722,000. However, the difference of 1,600,000 between the reported trade employment total of 9,000,000 and the private sector total of 7,400,000 should logically all have been included in the state sector. The discrepancy between the estimates of 722,000 and 1,600,000 cannot be resolved on the basis of available information.

Source: *Nonagricultural Employment*, p. 141.

The increase of almost 800,000 persons in private trade employment in 1951 was nearly wiped out in the following year, when hundreds of thousands of merchants were investigated, fined, and/or imprisoned during the "Five-Anti" campaign. Private trade never recovered from this campaign. In later years, the regime increased the restrictions on private traders, while employees of state-sector supply and marketing cooperatives openly discriminated against them. Even in 1953, which was generally more prosperous than 1952, 1954, or 1955, employment in private trade fell 10 percent from 6.8 to 6.1 million. In 1954, which was a poor year for trade because of the damage done to agriculture by serious and widespread floods, private trade employment dropped 27 percent to 4.5 million. Much of the decline occurred in rural districts.[176] The decline in the number of rural private traders continued in 1955,[177] and may have accounted for nearly all of the loss of 600,000 in private trade employment. Private trade was practically eliminated during the 1956 socialization drive.[178] Thereafter, much of what remained of it consisted of black market operations.[179] The regime has released no estimates of the total number of people engaged in illegal trade.

(*i*) *Medicine and public health.*—The large increase in the number and kinds of medical and public health personnel trained since 1949 is attributable to efforts of the regime to control epidemic diseases and to reduce infant and maternal mortality. The total number employed in medicine and public health work nearly trebled between 1950 and 1958, reaching 2.2 million in the latter year (table 13). Of the 1.4 million medical and public health personnel added between 1950 and 1958, 1 million, or 70 percent, worked outside the state medical system, more than 700,000 of them as midwives, whose formal training in Western medicine consisted of short courses in modern delivery techniques and care of infants. Of the 400,000 personnel added to the state medical system, 100,000 were nurses, 78,000 were feldshers (medical technicians with specialized secondary education), and 34,000 were doctors or pharmacists. Only members of the last group, more than 10 percent of whom were pharmacists,[180] had received medical

[176] The number of rural private traders fell from 4.5 million in 3 million establishments in 1953 to 3.5 million persons in 2.4 million establishments in 1954, according to data of the All-China Federation of Supply and Marketing Cooperatives given in Ch'u Ch'ing and Chu Chien-chung, "Changes in Our Rural Market Commodity Turnover," *CCYC*, No. 3, June 17, 1957, p. 104. Although it has not been possible to reconcile these data with SSB figures on private trade employment in rural areas, there is no doubt whatsoever that the number of rural private traders was greatly reduced in 1954.

[177] A total of 2.67 million rural private traders in 1955 reported by the All-China Federation of Supply and Marketing Cooperatives is given in "Rural Private Traders Take to Cooperation," NCNA-English, Dec. 26, 1955, in *SCMP*, No. 1198, Dec. 30, 1955, p. 21. This figure is 800,000 less than the comparable total for 1954, reported in Ch'u Ch'ing and Chu Chien-chung, *loc cit.*

[178] Only 858,000 private traders remained as of June 1956, according to official data (table 7).

[179] In 16 large and medium cities in 1957, 158,000 persons were reportedly engaged in unlicensed trade and 120,000 in "spontaneous" industrial production, according to Hsü Ti-hsin, "Some Facts and Problems About Present Work in Transforming Capitalist Industry and Trade," Dec. 23, 1957; in *Jen-min shou-ts'e 1958 (People's Handbook, 1958)*, p. 573. These cities (Peking, Tientsen, Shanghai, Canton Wuhan, Chungking, Mukden, Sian, Tsinan, Tsingtao, Chengtu, Harbin, Kweiyang, Wushih, Soochow, and Chengchow) are estimated to have had a population of 24 million in 1956, about one-quarter of the urban population of Communist China. If the proportion of unlicensed traders to the remaining urban population was the same as in this population, there would have been a total of 632,000 black market operators throughout the cities of Mainland China.

[180] More than 3,600 students graduated from colleges and departments of pharmacology between 1949 and 1957, according to Ch'en Chih-chiu, "The Development of Pharmacological Education in New China," *Yao-hsüeh t'ung-pao (Pharmacology Bulletin)*, No. 9, September 1957, p. 390.

training comparable in any way to that given in Western medical schools and colleges of pharmacy.

TABLE 13.—*Public health and medical personnel, modern and traditional, by occupation, 1950–58*

[Figures are yearend and are in thousands; (*) indicates data not available and no estimate made]

Occupation	1950	1951	1952	1953	1954	1955	1956	1957	1958
Total	780	910	1,040	1,142	1,245	1,347	1,628	1,908	2,160
State system personnel	216	256	295	348	401	540	545	545	553
Of which, state professional medical personnel	148	(*)	202	(*)	275	(*)	(*)	373	379
Doctors and pharmacists	41	(*)	52	56	63	70	75	74	75
Feldshers	53	(*)	67	(*)	86	(*)	(*)	136	131
Nurses	38	(*)	61	(*)	94	(*)	(*)	128	138
Midwives	16	(*)	22	(*)	32	(*)	(*)	36	35
Personnel outside the state system	564	654	746	794	844	807	1,083	1,363	1,607
Of which—									
Practitioners of Chinese medicine	(*)	(*)	(*)	(*)	(*)	487	500	550	(*)
Midwives	45	(*)	269	(*)	(*)	312	570	679	775

Source: *Nonagricultural Employment*, p. 142.

During the First Five-Year Plan period, the facilities and personnel of the state medical system were confined for the most part to urban areas. The benefits of Western medicine enjoyed by Chinese peasants were limited to vaccinations, inoculations, and maternity advice. The great majority of the Chinese people still depended for treatment of illness on practitioners of traditional Chinese medicine, who numbered about half a million during most of the First Five-Year Plan period.

With the formation of rural communes in 1958, medical facilities in rural areas were greatly expanded, according to Chinese Communist claims. Most of the 100,000 midwives added in 1958 (table 13) probably worked in newly opened commune public health stations. Public health facilities organized under rural commune administration apparently were abandoned during the height of the food crisis in 1961, when the scope of commune administrative functions was greatly reduced. In the next 2 years, the number of full-time professional medical personnel outside the state system remained unchanged at the 1959 level of 1.4 million.[181] In the fall of 1964 a press account of public health work announced the "initial formation" of a medical and public health network in urban and rural areas,[182] an indication that another effort was being made to expand rural public health facilities. This would have required a further increase in the number of public health personnel, but no figures are available.

(*j*) *Education.*—Between 1949 and 1952 the number of teaching personnel rose from 930,000 to 1,526,000, an increase of nearly 65 percent,[183] while the educational system was consolidated and reorga-

[181] The source of this figure is given in the note in app. A on the estimated number of medical and public health personnel not classified as workers and employees in 1964.

[182] "Initial Formation of an Urban-Rural Medical and Public Health Network," *JMJP*, Sept. 29, 1964, p. 5.

[183] The estimate for 1952 is based on the assumption that the proportion of teachers among all education workers and employees was the same in 1952 as in 1955, when they accounted for 76.3 percent of the total (tables A–1 and 14). The number of education workers and employees in 1952 was 2 million (table A–1).

nized to meet Chinese Communist goals for education. In the First Five-Year Plan period, the regime's policy for education emphasized the expansion of middle schools to provide larger numbers of applicans for admission to to institutions of higher education. Enrollments in the latter were also to be expanded to supply the number of scientists, engineers, and technicians called for in the First Five-Year Plan. Little expansion of primary schools was planned.

It appears that this policy was closely adhered to during the first 3 years of the Plan period. Primary school enrollment grew by less than 4 percent, but there were steady and sizable increases in enrollments in middle schools and institutions of higher education. The training of primary school teachers was greatly reduced; only 57,000 students were admitted to primary school teacher training during these 3 years, as compared with 136,000 in 1952 alone. In 1956, the number of primary school students increased by 10,300,000, and in 1957, by 800,000 (table 1). Very few primary schools were built to meet these unplanned increases in enrollment, but 155,000 new teachers were hired in 1956 and 261,000 in 1957 (table 14).[184] Most of the new

TABLE 14.—*Number of teachers by level of school, selected years, 1949–64*

[Figures are yearend and are in thousands; (*) indicates data not available and no estimate made]

Level of school	1949	1950	1954	1955	1956	1957	1958	1961	1964
Total	930	1,008	1,740	1,823	2,044	2,320	2,780	3,185	3,335
Higher education	16	20	40	42	58	70	(*)	135	145
Middle schools	82	87	179	187	237	240	(*)	550	590
Primary schools	832	901	1,555	1,594	1,749	2,010	(*)	2,500	2,600

Source:

Total, *1949 and 1958:* Yang Hsiu-feng, "The Great Revolution and Great Development in China's Educational Program," *JMJP*, Oct. 8, 1959, p. 7; reprinted with some changes in *Hsin-Hua pan-yueh k'an (New China Semi-Monthly)*, No. 20 (166), Oct. 27, 1959, p. 54. The original *JMJP* article reports 2,500,000 teachers in 1958.

Other years: Sum of components.

Higher education, *1949 and 1956: TCKT* Data Section, "Developments in the Educational Program of New China," *TCKT*, No. 22, Nov. 29, 1957, p. 31.

1950: Derived by interpolating between the 1949 figure and the total of 26,482 teaching personnel in higher education in 1952, reported in Tseng Chao-lun, "Higher Education in New China," *People's China*, No. 12, June 16, 1953, p. 8.

1954: Rounded down from the reported 1955 figure in consideration of the smaller enrollment in institutions of higher education in 1954 than in 1955.

1955: TCKT Data Section, "China's Workers in 1955 . . .," p. 31.

1957: F. E. Nord, editor, *The Scientific and Academic World*, published by the Donors Association for German Science, Essen-Bredeney, 1962, p. 38.

1961: Claude Bissell, "China Makes Big Strides in Education," *The Washington Post*, Sept. 30, 1962, p. E–1. It was assumed that the figures cited referred to 1961.

1964: 10,000 added to the 1961 figure to allow for expansion during the 3-year period.

Middle schools, *1949 and 1956: TCKT* Data Section, "Developments in the Educational Program of New China," pp. 31 and 32.

1950, 1954, and 1955: Rudi Walther, "Die Entwicklung der Volksrepublik China zur sozialistischen Grossmacht" ("The Development of the People's Republic of China into a Socialist Power"), *Viertel jahreshefte zur Statistik der Deutschen Demokratischen Republik*, No. 2, 1957, p. 79.

1957: Derived by rounding the 1956 figure to allow for expansion of personnel in the 1-year period.

1961: Bissell, *loc. cit.*

1964: 40,000 added to allow for expansion during the 3-year period.

Primary schools, *1949:* Residual.

1950, 1954, and 1955: Walther, *loc. cit.*

1956: TCKT Data Section, "Developments in the Educational Program of New China," p. 32.

1957: "Teachers Trained in Standard Spoken Chinese," NCNA-English, Dec. 11, 1957; in *SCMP*, No. 1673, Dec. 17, 1957, p. 7.

1961: Bissell, *loc. cit.*

1964: "Training of Primary School Teachers in China," NCNA-English, May 27, 1964; in *SCMP*, No. 3229, June 2, 1964, p. 11.

[184] There were 547,000 primary schools in 1957, 11 percent more than the 504,000 reported for 1955. The sources of these figures are: 1957: *TCKT* Data Section, "Revolutionary Progress in Cultural, Educational, and Health Undertakings Rapidly Made Throughout the Country," *TCKT*, No. 19, Oct. 14, 1958, p. 26; 1955: ———, "The Development of China's Education in the Last Few Years," *TCKT*, No. 20, Oct. 29, 1956, p. 5.

teachers had little or no formal teacher training, and this fact, combined with the overcrowding of classrooms, led to a serious decline in the quality of primary education.[185]

Despite these conditions, enrollments in primary schools grew by 22 million in 1958. In that year, primary school education included 85 percent of all Mainland China school-age children and was universal in urban areas, according to one source.[186] The number of primary schools increased by more than 70 percent to reach 936,000, while the number of middle schools increased by 154,000, or 12 times the number in existence at the start of the year.[187] Both increases were made for the most part in rural areas. To staff the new schools, 500,000 persons were added to the total number of teachers, the great majority of them, probably 300,000 to 400,000, at the primary school level.

In the next 3 years, teaching personnel increased by nearly 15 percent, totaling 3,185,000 at the end of 1961, of whom 2.5 million were primary school teachers. Since 1961, the rate of increase in the number of teachers has fallen off sharply. In 1964 there were only 100,000 more primary school teachers than in 1961, implying an average rate of growth of less than 2 percent per year.

C. THE STRUCTURE OF EMPLOYMENT

1. *Level of Skill*

The first systematic effort by the SSB to collect information on levels of skill among workers was the 1955 census of state-sector workers and employees. The standard used to measure levels of skills was the eight-grade wage system,[188] which state-sector branches of industry had been gradually adopting during the First Five-Year Plan period. Because wage grades were assigned on the bases of level of skill and of supervisory responsibility under this system, the number of workers by wage grade in theory indicated levels of skill in the branch of industry to which the workers belonged. The low average wage grades found in selected heavy and light industry branches in the 1955 census were interpreted by the SSB as a reflection of shortages of highly skilled workers (table 15). The generally low level of skills throughout the industrial labor force was attributed to its youthfulness and inexperience.[189]

No official explanation is available of the differences in average wage grade level by branch of industry shown in the 1955 data, but presumably they resulted from combinations of such factors as the age of each industry, its rate of employment growth, and its level of technology. The coal and textile industries were the oldest and most developed of modern industries in 1949. Employment in these two branches grew by less than 20 percent during the years 1953–55 (table A–6). The wage grades in these two branches are generally higher than those in the other branches shown in table 15. In the metal

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[185] See the discussion in Leo Orleans, *Professional Manpower and Education in Communist China*, Washington; National Science Foundation, 1961, pp. 82–84.

[186] *The Great Ten Years*, p. 166.

[187] *TCKT* Data Section, "Revolutionary Progress . . .," *loc. cit.*

[188] Grades 1 to 3 included jobs requiring only simple skills, grades 4 and 5 covered jobs classified as semiskilled, and grades 6 to 8 were reserved for skilled work, according to Statistical Work Handbook Editorial Committee, *Labor Statistical Work Handbook*, pp. 23–24.

[189] *TCKT* Data Section, "China's Workers in 1955 . . .," pp. 29–30.

processing, iron and steel, building materials, and nonferrous metals branches, employment increases were also generally less than 20 percent during these 3 years. But, since levels of technology in these branches were low, especially in the mining of nonferrous ores and in the production of traditional building materials where they were not much above handicraft levels, there were few workers in the higher grades.

In the electric power industry, which was well established in some major cities before 1949, there was a fairly large proportion of highly skilled workers because of high technical requirements and also a large proportion of inexperienced workers in the lowest grades hired in 1953 and later years as the power system was enlarged. In the petroleum industry, which was very small in 1949 and expanded rapidly during the First Five-Year Plan period, a shortage of skills was apparent from the small proportion of workers in higher grades.

TABLE 15.—*Percent distribution of state industrial workers in selected branches of industry by wage grade, Sept. 30, 1955*

Branch of industry	Wage grade [1]									Average grade
	Total	1	2	3	4	5	6	7	8	
HEAVY INDUSTRY										
Metal processing	100	5.0	19.0	26.7	20.9	14.5	8.9	4.0	1.0	3.7
Electric power	100	6.7	14.7	24.5	21.3	15.2	11.2	5.2	1.2	3.8
Coal	100	1.1	4.4	13.1	28.3	29.6	18.7	4.5	.3	4.6
Petroleum	100	3.4	10.9	31.2	30.8	14.2	6.2	2.5	.8	3.7
Iron and steel	100	2.9	12.1	27.6	26.9	18.4	8.0	3.2	.9	3.9
Building materials	100	4.3	15.8	30.6	25.8	14.2	6.7	2.0	.6	3.6
Nonferrous metals	100	2.2	12.1	31.7	32.3	14.8	5.3	1.4	.2	3.7
Chemicals	100	6.8	20.2	31.2	23.7	10.8	5.0	1.9	.4	3.4
LIGHT INDUSTRY										
Textiles	100	2.1	10.5	21.7	29.0	19.5	12.0	4.4	.8	4.1
Other light industry and food processing	100	6.3	12.5	21.9	24.3	18.0	10.8	4.9	1.3	3.9

[1] Workers covered by the 8-grade wage system reportedly numbered 1,535,399 persons as of Sept. 30, 1955.

Source: *TCKT* Data Section, "China's Workers in 1955 . . .," p. 30.

Although the SSB made a survey of wages in the latter part of 1956,[190] as a check on the first major wage reform undertaken by the Chinese Communists, the results of the survey have never been published,[191] and no other comprehensive wage data have since become available. Therefore, it is not possible to compare levels of industrial skills in recent years with those in 1955.

2. *Engineering and Technical Personnel in Industry and Capital Construction*

During the First Five-Year Plan period, the number of engineers and technicians trebled, reaching nearly half a million in 1957 (table 16). The proportion of engineers and technicians among workers and

[190] Survey operations are discussed in "State Statistical Bureau Holds Conference on Nationwide Wage Survey," *TCKT*, No. 15, Aug. 14, 1956, p. 10, and "Strengthen Labor and Wage Statistical Work," editorial, *TCKT*, No. 16, Aug. 29, 1956, p. 1. For the contents of the survey, see Hsü Kang, 'Several Problems in the Contents of the Nationwide Workers and Employees Survey," *TCKT*, No. 16, Aug. 29, 1956, pp. 13–15.

[191] Even SSB personnel could not obtain summary data from this survey 2 years after it was made, according to Ch'en Chih-ho, "Several Opinions on Improving Labor and Wage Statistical Work," *TCYC*, No. 5, May 23, 1958, p. 12. There is no indication that any data from the survey were subsequently published.

employees in the production branches of the economy rose from 1.57 percent in 1952 to 2.78 percent in 1957.[192] Most of these were added to capital construction and industry, which together employed about 80 percent of all engineers and technicians. Of the numbers of engineers and technicians given in table 16, during the First Five-Year Plan period, at least,[193] probably not more than 10 percent were engineers.

TABLE 16.—*Engineers and technicians, 1952–59*

[Figures are yearend and are in thousands; (*) indicates data not available and no estimate made]

Year	Total (1)	Of which, industry (2)
1952	164	58
1953	210	83
1954	262	116
1955	344	125
1956	449	160
1957	496	175
1958	618	259
1959	1,000	(*)

Source:
Col. 1, 1952–58: *The Great Ten Years*, p. 163.
1959: "Vice-Premier Lu Ting-i Addresses Conference of Heroes," NCNA, October 30, 1959; translated in *CB*, No. 603, Nov. 16, 1959, p. 16.
Col. 2, 1952 and 1957: *TCYC* Data Section, "The Flying Development of Industrial Construction in China," *TCYC*, No. 9, Sept. 23, 1958, p. 5; Chou En-lai, "Report on Government Work," NCNA-English, Apr. 18, 1959, in *CB*, No. 559, Apr. 23, 1959, p. 2.
1953–55: Estimated on the basis of the assumption that the ratios of engineering and technical personnel per thousand production workers in all industry increased at the same rate as those for state and state-private industry, reported in Chao I-wen, *Hsin Chung-kuo ti kung-yeh* (*The Industry of New China*), Peking, 1957, p. 30. The ratios for 1952 were taken as a base in making these calculations.
1956: Estimated on the basis of the assumption that the increase in the number of industrial engineers and technicians in 1956 constituted the same proportion of the increase between 1955 and 1957 as that for engineers and technicians in all branches of the economy.
1958: *The Great Ten Years*, p. 75.

Of the increase of 330,000 engineers and technicians during the First Five-Year Plan period, at most only about 80 percent could have received their technical training in the regular educational system.[194] The proportion actually supplied from this source probably was considerably smaller than 80 percent, because many engineering and technical graduates went into teaching, or into jobs not classified as engineering or technical specialties, or were not given engineering or technical job titles despite their educational qualifications. Some of the 330,000 were persons on the job who were upgraded and reclassified from the worker to the technician category. In addition, a very large number of engineering and technical positions were filled by persons who lacked educational qualifications and were not classified as engineers or technicians.[195]

[192] Almost all engineers and technicians are employed in the production branches of the economy (listed in table A–2). Meteorology is probably the only nonproductive branch in which an appreciable number of engineers and technicians are employed.
[193] According to the Sept. 30, 1955, census of state-sector workers and employees, there were only 31,940 engineers among the 353,868 persons classified as engineers and technicians. These figures are given in *TCKT* Data Section, "China's Workers in 1955 . . .," p. 30.
[194] During the years 1949–56, 95,000 students who specialized in engineering graduated from institutions of higher education according to *The Great Ten Years*, p. 174, and 178,000 from technical middle schools, according to *TCKT* Data Section, "Developments in the Educational Program of New China," *TCKT*, No. 22, Nov. 29, 1957, p. 31.
[195] According to the Sept. 30, 1955, state-sector census, there were only 354,000 persons classified as engineers and technicians among those who filled 609,000 engineering and technical positions (*TCKT* Data Section, "China's Workers in 1955 . . .," p. 30).

Of the engineers and technicians produced during the Plan period (table 16), about 50 percent were added to capital construction activities (85,000 to building and installation, 50,000 to survey and design, and 25,000 to geological survey work),[196] while 35 percent were absorbed by industry. Water conservancy, transport, and communications took most of the remaining 15 percent. About half of the 100,000 added to industry during the first 4 years of the Plan period were employed in the electric power, coal, textile, and papermaking branches of industry.[197] These branches, which employed only 28 percent of all industrial workers and employees in 1956 (table A–6), averaged 41 engineers and technicians per 1,000 workers. This was substantially higher than the ratio of 25 per 1,000 in the remaining branches of industry. A large proportion of the engineers and technicians added to these branches probably went to work in the petroleum industry, in a handful of large steelworks, in a few modern plants manufacturing machinery and transport equipment, and in several large chemical and cement plants. The food processing, metalworking, and most of the nonferrous metals, building materials, and timber industry branches employed only a few engineers and technicians, and the minor branches of light industry employed almost none.

In the capital construction branch, the ratios of engineers and technicians per 1,000 workers were substantially above the ratio in industry: 67 in building and installation work in 1956,[198] considerably more than 150 in geological survey work in 1957,[199] and probably more than 1,000 in survey and design work.[200]

During the Great Leap Forward of 1958, the number of engineers and technicians rose by 25 percent to 618,000. Of this increase of 122,000, 84,000, about 70 percent, were allocated to industry and most of the rest to capital construction. The high proportion of engineers and technicians allocated to industry was intended to meet the needs of the many industrial plants which had been rushed to completion ahead of schedule in 1958.

The 62-percent increase in the number of engineers and technicians in 1959 shown in table 16 was made by shortening engineering courses at the cost of a reduction in the quality of training, and a further deterioration has probably taken place since. The graduates in subsequent years were in school during the worst of the food crisis, when undernutrition was acute and many students were physically unable to pursue a normal course of studies. Probably very few recent

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[196] Unpublished estimates of the U.S. Bureau of the Census, Foreign Demographic Analysis Division.

[197] SSB, Industrial Statistics Division, *Wo-kuo kang-t'ieh tien-li mei-t'an chi-hsieh fang-chih tsao-chih kung-yeh (Chinese Iron and Steel, Electric Power, Coal, Machinery, Textile, and Paper Industries—Past and Present)*, pp. 67, 99, 174, and 211.

[198] *TCKT* Data Section, "Basic Conditions of Production Activities in the Building Enterprises of Our Country," *TCKT*, No. 18, Sept. 29, 1957, p. 32.

[199] In 1957 there were 200,000 geological survey workers and employees (table 10) and 26,000 engineers and technicians in geological survey work, according to "Technical Cadres and Machines," Chinese Home Service, Sept. 26, 1957. These figures yield a ratio of 149 engineers and technicians per 1,000 geological survey workers and employees (not including engineers and technicians). The ratio would be much higher, if it could be derived on the base of geological survey workers alone.

[200] For yearend 1956, of the 150,000 workers and employees in survey and design work 70,000 were engineers and technicians, according to *TCKT* Data Section, "Great Achievements in Capital Construction in Our Country in the Last Seven Years," *TCKT*, No. 17, Sept. 14, 1957, p. 3. A ratio of engineers and technicians to workers alone would be above 1,000 (see note 200).

graduates have obtained positions as engineers and technicians because of the great scarcity of job openings since 1960.

3. *Level of Educational Attainment of Engineers and Technicians*

Even in 1955, the general level of educational attainment among engineers and technicians was low, according to an analysis of the results of the September 30, 1955 census of state-sector workers and employees published in the SSB journal, *T'ung-chi kung-tso t'ung-hsin* (*Statistical Work Bulletin*). Among chief engineers and high level technicians, only 56 percent were college graduates and 9 percent were graduates of technical middle schools. Of all engineers and technicians, only 16 percent were college graduates and 22 percent were graduates of technical middle schools. Only 5.7 percent of the nearly 15,000 top level industrial management personnel had graduated from college and 2.7 percent had graduated from technical middle schools.[201] The low average level of education among this last group probably was a result of the practice of assigning men to top level managerial and administrative positions on the basis of their Party records alone.

4. *Levels of Professional Attainment in Education*

The very rapid growth of the number of teaching personnel between 1949 and 1958 was achieved only at the cost of their having attained greatly lowered levels of education. Of the 1.63 million teachers reported in the 1955 census of state-sector workers and employees, only 136,000 were college graduates and only 687,000 had graduated from secondary normal schools.[202] These schools, which trained primary schoolteachers, were rated as the equivalent of junior middle schools, but the level of education they offered was more elementary.

College faculties grew by 54,000 persons after 1949, reaching 70,000 in 1957 (table 14); 10,000 were added between 1949 and 1952, 16,000 during the years 1953–55, and 28,000 in 1956 and 1957. Teaching assistants made up most of these additions. There was only a very small increase in the number of lecturers, and the number of professors declined below the pre-Communist peak.[203]

Of the 187,000 middle schoolteachers in 1955, probably only about one-half were college graduates,[204] as prescribed by official standards for middle schoolteachers. Conditions were even worse at the primary school level, where in 1956 only about 1.1 million, or 61 percent of the teachers were junior middle or secondary normal school graduates, the official minimum level of educational attainment for primary schoolteaching.[205] The high proportion of unqualified persons teaching in primary schools appears to be attributable in part at least to a high rate of separation, voluntary and involuntary, among pri-

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[201] *TCKT* Data Section, "China Workers in 1955 . . .," p. 31.
[202] *Ibid.*, p. 29–31.
[203] *TCKT* Data Section, "The Development of Chinese Education in the Last Few Years," *TCKT*, No. 20, Oct. 29, 1956, p. 6.
[204] Of the 136,000 college graduates among teaching personnel (*TCKT* Data Section, "China's Workers in 1955 . . .," pp. 30 and 31), probably 36,000 taught in colleges (85 percent of the 42,444 college members reported for 1955), and at least 10,000 taught primary school, leaving about 90,000 college graduates at the secondary school level. In 1957, 52 percent of junior middle school and 17 percent of senior middle schoolteachers did not meet the minimum official educational requirements, according to Ko Ch'ü-po and Liu Ts'un, *op. cit.*, p. 21.
[205] *Ibid.*

mary school teachers after 1949.[206] Only a very few of the 300,000 to 400,000 added to help staff the 389,000 new primary schools opened in 1958 could have had much teacher training. Since 1958, the numbers of teachers have increased at a much slower rate. Presumably those added during these years have received somewhat more training than their colleagues in the preceding 4 years.

5. *Levels of Professional Attainment in Medicine and Public Health Work*

Between 1950 and 1955 the number of doctors and pharmacists trained in Western medicine grew to 70,000, an increase of 29,000 (table 13). However, since there were only 15,000 graduates of medical and pharmacological schools during these years, half of the new doctors and pharmacists were persons without the prescribed formal training.[207] Of the total number of state-sector doctors in 1955, only 49 percent were graduates of institutions of higher education.[208] Information is not available on what the qualifications of the others may have been, but it seems reasonable to assume that length of job experience and medical reputation were among the most important considerations for giving nurses and medical technicians the title of medical doctor.[209] Many of the untrained medical practitioners who had been able to acquire experience and some degree of reputation during the period of upheaval after 1945 probably continued to practice after 1949. They may have made up a sizable proportion of the state-sector "doctors" who lacked the prescribed formal medical training.

The professional qualifications of most of the 15,000 doctors and pharmacists who actually graduated were also low, according to one professor of medicine who spoke out during the "Hundred Flowers" campaign in June 1957. He said that during the first few years of Communist rule medical students received only 2 to 3 years of training and that this short training period did great damage to medical work. In 1953, the period of training was lengthened to 5 years, but many practicing doctors and professors of medicine thought it should be extended to 6 years, the standard length of medical training in the Soviet Union after 1947.[210] The Soviet system of medical education

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[206] Most of the 832,000 primary school teachers in 1949 would have met the minimum Communist standards of 1956. In the 7 years, 1949–55, secondary normal schools graduated 555,000 students, according to *TCKT* Data Section, "Developments in the Educational Program of New China," p. 31. These total 1,400,000, or only 200,000 less than the number of primary schoolteachers in 1955. Normal rates of mortality and retirement, however, can hardly be adduced to explain much of the discrepancy between this figure and the nearly 700,000 teachers unable to qualify as junior middle or secondary normal school graduates in 1956. Large-scale separations for a variety of reasons seem to provide the only plausible explanation.

[207] According to *The Great Ten Years*, p. 174, 15,182 medical students graduated during the years 1949–54. Few, if any, students graduating in 1955 would have been classified as doctors or pharmacists in that year. Not all these who graduated from medical schools went into medical work. For example, many dissatisfied graduates in sanitation and epidemiology did not go to their assigned posts, according to Yang K'o-ch'in, "Problems in the Educational Systems of Medical Schools," *Cheng-ming (Contending)*, No. 6, June 10, 1957, p. 5.

[208] *TCKT* Data Section, "China's Workers in 1955 . . .," p. 31.

[209] In 1965 promotion of middle grade medical technicians to the classification of "high grade personnel" (fully qualified doctors) was evidently common. Some young persons with secondary medical education who later had attended spare-time medical schools, reportedly made subsequent contributions to medical science, and had outstanding records in their work. Examples of promotion in recognition of such achievements are reported in "Shanghai Promotes 100 Middle Grade Medical Personnel," *JMJP*, May 12, 1966, p. 5.

[210] World Health Organization, *Health Services in the U.S.S.R.*, Geneva, 1960, p. 33.

and specialization was taken as the model in Mainland China after 1949, although it was often greatly modified. As a consequence, post-1949 graduates of Mainland China medical schools were so narrowly specialized that they were not competent to deal with the normal range of common medical problems. For example, "a pediatrician knew only pediatrics, but could not work in other fields.[211]

The training of pharmacists, feldshers, nurses, and other medical technicians in secondary level medical schools seems to have been no better and may well have been worse than that given students in institutions of higher education.[212] At this level also, training periods were too short. In 1954, the 2-year pharmacy course was lengthened to 3 years.[213] But as late as 1957 nurses were given only 2 years of training, although a 3-year course was recommended by medical educators.[214] Moreover, many persons classified as feldshers and nurses had not received even the minimum prescribed periods of training.[215]

In the 6-year period 1958–63, 76,000 medical students graduated from institutions of higher education,[216] and approximately 130,000 from secondary medical schools.[217] During the food crisis these students studied under the same adverse conditions as did other students. Although the length of the course of medical study was 5 years, the manual labor required of medical students reduced the actual time available for study to the equivalent of a 4-year course.[218]

IV. Summary and Prospects

Although the transformation of Mainland China's backward agricultural economy into one based on modern industry has been the primary economic goal of the Chinese Communist Party and administration since 1953, the means employed to achieve this objective have varied greatly. A series of major changes in economic policy during the 17 years of the Communist regime has been matched by great variations in the rate of growth of nonagricultural employment. The

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[211] Yang K'o-ch'in, *loc. cit.*

[212] Shortages of teachers, lack of textbooks in Chinese, and other similar problems were common to medical training at both levels of education, but the expansion of secondary school training was much greater and more rapid than of institutions of higher education, according to *TCYC* Data Section, "A Synopsis of the Development of Our Country's Health Work," *TCYC*, No. 5, May 23, 1958; translated in *ECMM*, No. 138, Aug. 11, 1958, p. 48. From this it appears probable that the problems at the secondary school level became more and not less acute.

[213] Ch'en Chih-chin, *loc. cit.*

[214] Yang K'o-ch'in, *loc. cit.*

[215] According to *TCYC* Data Section, "A Synopsis of . . . Health Work," p. 48, between 1950 and 1958, 131,000 persons graduated from secondary medical schools, but feldshers and nurses alone increased by 173,000 (table 13).

[216] The total of 76,000 is the difference between the 110,000 medical school graduates reported for the years 1949–63 in Ch'ien Hsin-chung, "Chinese Medicine: Progress and Achievements," *Peking Review*, Feb. 28, 1964, in *SCMM*, No. 409, Mar. 23, 1964, p. 35, and the 34,000 who graduated during the years 1949–57 (*The Great Ten Years*, p. 174).

[217] Between 1949 and 1965, 450,000 students graduated from secondary and higher medical schools, according to "New Developments in Chinese Medical Education," NCNA–English, Sept. 10, 1965; in *SCMP*, No. 3537, Sept. 15, 1965, p. 13. Of these, an estimated 150,000 were from institutions of higher education (110,000 such students graduated through 1963, according to "New China's Higher Medical Education," NCNA–English, Aug. 17, 1963, in *SCMP*, No. 3044, Aug. 21, 1963, p. 14, and an additional 40,000 probably graduated in 1964 and 1965). This would leave 300,000 as graduates of secondary medical schools, of whom 110,000 graduated during the years 1949–57 and 190,000 graduated between 1958 and 1965. The number graduating from secondary medical schools was probably at least half again as large as the number graduating from higher medical schools. Therefore, in 1964 and 1965, about 60,000 secondary medical school students would have graduated, as compared with 40,000 from higher medical schools.

[218] Notes on the quality of medical education since the food crisis years 1959–61 are contained in "Training in Medicine," *China News Analysis*, No. 577, Aug. 20, 1965, pp. 1–7.

inability of the urban economy to provide employment for a rapidly growing urban labor force has proved to be one of the most intractable problems confronting the regime. In the 3 years of comparative *laissez faire* in economic policy after the Chinese Communists came to power in 1949 nonagricultural employment grew at an average rate of 12 percent per year. During the First Five-Year Plan period, 1953–57, the growth rate fell to an average of 1.5 percent per year. Employment increases resulting from investment in and expansion of the state sector of the economy were offset to some extent by losses in the private sector attributable in part to neglect on the part of the regime of private interests and in part to economic disorganization caused by the socialization of the private sector in the years 1954–56. In 1958, nonagricultural employment shot up by an unprecedented 43 percent, as the Party in effect abandoned the First Five-Year Plan policy of gradual, planned economic expansion following Soviet practices, and tried to achieve very rapid economic expansion by means of large inputs of unskilled labor. The effort proved to be more than the economy could bear, and, in the near collapse which followed, the Second Five-Year Plan was abandoned. By 1964, nonagricultural employment was still 25 percent below the 1958 level, an indication that the economy had not recovered from the disastrous aftermath of the Great Leap Forward and had since grown very slowly, if at all. Industrial expansion since 1960 has been limited for the most part to the petroleum industry, the production of agricultural machinery and chemical fertilizer, and the manufacture of weapons.

Since the beginning of the Third Five-Year Plan period in 1966, political concerns have once again taken precedence over economic planning. A purge, known in Mainland China as the "Great Proletarian Cultural Revolution," is sweeping the ranks of the Party from top to bottom. This purge has no parallel in the history of China or any other Communist country, and its end is not yet in sight. Meanwhile, Peking's split with Moscow has deprived Mainland China of access to most of its foreign sources of investment credit, industrial plant equipment, and technical assistance. This self-imposed economic isolation and the uncertainty of the political future of Mainland China together with the severe economic setbacks of 1959–61, from which the economy still has not fully recovered, almost certainly will drastically limit economic growth in the near future. Consequently, new nonagricultural jobs probably will continue to be very scarce. Domestic production of nuclear devices and conventional weapons constitutes a nonproductive drain on the very limited investment resources available to Peking. This will have the effect of further restricting the growth of nonagricultural branches of the economy.

The only likely alternative to very gradual development of a modern industrial economy is another Leap Forward. Mao Tse-tung has said recently that the Great Proletarian Cultural Revolution is preparing the people of Mainland China for such a venture. If in fact the Party does undertake a new Leap, nonagricultural employment will undoubtedly shoot up for the duration of the drive. However, maintenance of employment at the peak level of the Leap is very unlikely. Whatever line of economic policy is pursued, Mainland China's persistent employment problems may, therefore, be expected to remain critical for some years to come.

APPENDIX TABLES

TABLE A-1.—*Nonagricultural employment, by branch of the economy, 1949-58*

[Figures are yearend, except for 3d quarter data marked by (†), and are in thousands; (*) indicates data not available and no estimate made]

Branch of the economy	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Total	26,267	30,314	34,730	36,752	39,116	39,750	38,864	39,366	39,667	56,867
Material production branches	22,485	25,322	29,003	30,200	31,954	32,310	31,258	30,808	30,953	47,918
Handicrafts and carrier services	5,855	7,229	7,258	7,364	7,789	8,910	8,202	5,780	6,560	1,465
Salt extraction	500	500	500	500	500	500	500	500	500	700
Fishing	800	1,200	1,268	1,336	1,404	1,472	1,540	1,500	1,500	2,000
Industry	3,059	3,386	4,379	5,263	6,121	6,370	6,121	7,480	7,907	23,734
Water conservancy	61	80	108	134	198	266	†261	409	340	1,360
Capital construction	200	400	600	1,048	2,170	2,100	†1,935	2,951	1,910	5,336
Transport, posts, and telecommunications	4,160	4,325	4,490	4,655	4,764	4,873	4,876	4,103	4,417	5,823
Modern	634	799	964	1,129	1,238	1,347	1,426	1,564	1,878	2,955
Traditional	3,526	3,526	3,526	3,526	3,526	3,526	3,450	2,539	2,539	2,868
Trade, and the food and drink industry	7,850	8,202	10,400	9,900	9,008	7,819	7,823	8,085	7,819	7,500
Trade	6,850	7,002	9,000	8,450	7,591	6,436	6,473	7,002	6,719	6,400
Food and drink industry	1,000	1,200	1,400	1,450	1,417	1,383	1,350	1,083	1,100	1,100
Nonproductive branches	3,782	4,992	5,727	6,552	7,162	7,440	7,606	8,558	8,714	8,949
Finance, banking and insurance	(*)	(*)	(*)	351	396	632	704	677	621	400
State	(*)	(*)	(*)	346	377	384	384	417	400	300
Rural credit	(*)	(*)	(*)	5	19	248	320	260	221	100
Services	417	425	434	443	452	461	470	479	489	489
Traditional medicine	564	564	654	746	794	844	807	1,083	1,363	1,607
State education, medicine and public health, and cultural affairs	1,176	(*)	(*)	2,392	2,607	2,715	2,824	3,211	3,211	3,811
Education	(*)	(*)	(*)	2,005	2,159	2,206	2,168	2,542	2,542	3,127
Medicine and public health	(*)	216	256	295	348	401	540	545	545	553
Cultural affairs	(*)	(*)	(*)	92	100	108	116	124	124	131
Government administration	(*)	(*)	(*)	1,523	1,698	1,598	†1,576	1,748	1,698	1,183
Mass organizations	(*)	(*)	(*)	1,053	1,143	1,090	1,096	1,215	1,184	1,281
Urban public utilities	(*)	(*)	(*)	41	69	96	†123	133	133	150
Meteorology	1	1	2	3	3	4	6	12	15	28

PERCENT DISTRIBUTION

Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.
Material production branches	85.6	83.5	83.5	82.2	81.7	81.3	80.4	78.3	78.0	84.3
Handicrafts and carrier services	22.3	23.8	20.9	20.0	19.9	22.4	21.1	14.7	16.5	2.6
Salt extraction	1.9	1.6	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.2
Fishing	3.0	4.0	3.7	3.6	3.6	3.7	4.0	3.8	3.8	3.5
Industry	11.6	11.2	12.6	14.3	15.6	16.0	15.7	19.0	19.9	41.7
Water conservancy	.2	.3	.3	.4	.5	.7	.7	1.0	.9	2.4
Capital construction	.8	1.3	1.7	2.9	5.5	5.3	5.0	7.5	4.8	9.4
Transport, posts, and telecommunications	15.8	14.3	12.9	12.7	12.2	12.3	12.5	10.4	11.1	10.2
Modern	2.4	2.6	2.8	3.1	3.2	3.4	3.7	4.0	4.7	5.2
Traditional	13.4	11.6	10.2	9.6	9.0	8.9	8.9	6.4	6.4	5.0
Trade, and the food and drink industry	29.9	27.1	29.9	26.9	23.0	19.7	20.1	20.5	19.7	13.2
Trade	26.1	23.1	25.9	23.0	19.4	16.2	16.7	17.8	16.9	11.3
Food and drink industry	3.8	4.0	4.0	3.9	3.6	3.5	3.5	2.8	2.8	1.9
Nonproductive branches	14.4	16.5	16.5	17.8	18.3	18.7	19.6	21.7	22.0	15.7
Finance, banking, and insurance	(*)	(*)	(*)	1.0	1.0	1.6	1.8	1.7	1.6	.7
State	(*)	(*)	(*)	.9	1.0	1.0	1.0	1.1	1.0	.5
Rural credit	(*)	(*)	(*)	(1)	(1)	.6	.8	.7	.6	.2
Services	1.6	1.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	.9
Traditional medicine	2.1	1.9	1.9	2.0	2.0	2.1	2.1	2.8	3.4	2.8
State education, medicine and public health, and cultural affairs	4.5	(*)	(*)	6.5	6.7	6.8	7.3	8.2	8.1	6.7
Education	(*)	(*)	(*)	5.5	5.5	5.5	5.6	6.5	6.4	5.5
Medicine and public health	(*)	.7	.7	.8	.9	1.0	1.4	1.4	1.4	1.0
Cultural affairs	(*)	(*)	(*)	.3	.3	.3	.3	.3	.3	.2
Government administration	(*)	(*)	(*)	4.1	4.3	4.0	4.1	4.4	4.3	2.1
Mass organizations	(*)	(*)	(*)	2.9	2.9	2.7	2.8	3.1	3.0	2.3
Urban public utilities	(*)	(*)	(*)	.1	.2	.2	.3	.3	.3	.3
Meteorology	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

[1] Less than ½ of 0.1 percent.

Source: *Nonagricultural Employment*, app. A.

TABLE A–2.—*Workers and employees, by branch of the economy, 1949–58*

[Figures are yearend, except for 3d quarter data marked by (†), and are in thousands; (*) indicates data not available and no estimate made]

Branch of the economy	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Total	8,004	10,239	12,815	15,804	18,256	18,809	19,076	24,230	24,506	45,323
Material production branches	5,203	6,236	8,176	10,446	12,359	12,922	13,067	17,494	17,865	38,570
Industry	3,059	3,386	4,379	5,263	6,121	6,370	6,121	7,480	7,907	22,984
State farms, forestry, and water conservancy	88	153	218	282	385	487	†476	700	925	2,460
Capital construction	200	400	600	1,048	2,170	2,100	†1,935	2,951	1,910	5,336
Transport, posts, and telecommunications	634	799	964	1,129	1,238	1,347	1,426	1,564	1,878	2,955
Trade, and the food and drink industry	1,222	1,498	2,015	2,724	2,445	2,618	3,109	4,799	5,245	4,835
Nonproductive branches	2,801	4,003	4,639	5,358	5,897	5,887	6,009	6,736	6,641	6,753
Finance, banking, and insurance	(*)	(*)	(*)	346	377	384	384	417	400	300
State education, medicine and public health, and cultural affairs	1,176	(*)	(*)	2,392	2,607	2,715	2,824	3,211	3,211	3,811
Government administration	(*)	(*)	(*)	1,523	1,698	1,598	†1,576	1,748	1,698	1,183
Mass organizations	(*)	(*)	(*)	1,053	1,143	1,090	1,096	1,215	1,184	1,281
Urban public utilities	(*)	(*)	(*)	41	69	96	†123	133	133	150
Meteorology	1	1	2	3	3	4	6	12	15	28
PERCENT DISTRIBUTION										
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Material production branches	65.0	60.9	63.8	66.1	67.7	68.7	68.5	72.2	72.9	85.1
Industry	38.2	33.1	34.2	33.3	33.5	33.9	32.1	30.9	32.3	50.7
State farms, forestry, and water conservancy	1.1	1.5	1.7	1.8	2.1	2.6	2.5	2.9	3.8	5.4
Capital construction	2.5	3.9	4.7	6.6	11.9	11.2	10.1	12.2	7.8	11.8
Transport, posts, and telecommunications	7.9	7.8	7.5	7.1	6.8	7.2	7.5	6.5	7.7	6.5
Trade, and the food and drink industry	15.3	14.6	15.7	17.2	13.4	13.9	16.3	19.8	21.4	10.7
Nonproductive branches	35.0	39.1	36.2	33.9	32.3	31.3	31.5	27.8	27.1	14.9
Finance, banking, and insurance	(*)	(*)	(*)	2.2	2.1	2.0	2.0	1.7	1.6	.7
State education, medicine and public health, and cultural affairs	14.7	(*)	(*)	15.1	14.3	14.4	14.8	13.3	13.1	8.4
Government administration	(*)	(*)	(*)	9.6	9.3	8.5	8.3	7.2	6.9	2.6
Mass organizations	(*)	(*)	(*)	6.7	6.3	5.8	5.7	5.0	4.8	2.8
Urban public utilities	(*)	(*)	(*)	.3	.4	.5	.6	.5	.5	.3
Meteorology	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	.1	.1

[1] Less than ½ of 0.1 percent.

Source: *Nonagricultural Employment*, app. A.

TABLE A–3.—*Nonagricultural employment by branch of the economy and sector, 1949–58*

[Figures are yearend and are in thousands; (*) indicates data not available and no estimate made]

Branch of the economy and sector	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
STATE										
Total	5,079	7,100	9,903	12,459	14,963	17,539	19,966	35,183	35,777	55,329
Material production branches	2,278	3,097	5,264	7,096	9,047	11,404	13,637	28,187	28,915	46,380
Handicrafts and carrier services	89	260	140	228	301	1,213	2,206	5,183	5,890	795
Salt extraction	0	0	0	0	0	0	270	500	500	700
Fishing	0	0	0	100	200	331	462	1,275	1,400	2,000
Industry	1,415	1,570	2,356	3,206	3,890	4,574	4,811	7,466	7,907	23,734
Water conservancy	61	80	108	134	198	266	261	409	340	1,360
Capital construction	130	300	450	1,030	2,170	2,100	1,935	2,951	1,910	5,336
Transport, posts, and telecommunications	400	505	610	716	776	948	1,120	3,164	3,478	4,955
Trade, and the food and drink industry	183	382	1,600	1,682	1,512	1,972	2,572	7,239	7,490	7,500
Nonproductive branches	2,801	4,003	4,639	5,363	5,916	6,135	6,329	6,996	6,862	8,949
Finance, banking, and insurance	(*)	(*)	(*)	351	396	632	704	677	621	400
Services	0	0	0	0	0	0	0	0	0	489
Traditional medicine	0	0	0	0	0	0	0	0	0	1,607
State education, medicine and public health, and cultural affairs	1,176	(*)	(*)	2,392	2,607	2,715	2,824	3,211	3,211	3,811
Government administration	(*)	(*)	(*)	1,523	1,698	1,598	1,576	1,748	1,698	1,183
Mass organizations	(*)	(*)	(*)	1,053	1,143	1,090	1,096	1,215	1,184	1,281
Urban public utilities	(*)	(*)	(*)	41	69	96	123	133	133	150
Meteorology	1	1	2	3	3	4	6	12	15	28
PRIVATE										
Total	21,188	23,214	24,827	24,293	24,153	22,211	18,898	4,183	3,890	1,538
Material production branches	20,207	22,225	23,739	23,104	22,907	20,906	17,621	2,621	2,038	1,538
Handicrafts and carrier services	5,766	6,969	7,118	7,136	7,488	7,697	5,996	597	670	670
Salt extraction	500	500	500	500	500	500	230	0	0	0
Fishing	800	1,200	1,268	1,236	1,204	1,141	1,078	225	100	0
Industry	1,644	1,816	2,023	2,057	2,231	1,796	1,310	14	0	0
Capital construction	70	100	150	18	0	0	0	0	0	0
Transport, posts, and telecommunications	3,760	3,820	3,880	3,939	3,988	3,925	3,756	939	939	868
Trade, and the food and drink industry	7,657	7,820	8,800	8,218	7,496	5,847	5,251	846	329	0
Nonproductive branches	981	989	1,088	1,189	1,246	1,305	1,277	1,562	1,852	0
Services	417	425	434	443	452	461	470	479	489	0
Traditional medicine	564	564	654	746	794	844	807	1,083	1,363	0

Source: *Nonagricultural Employment, pp. 130–131.*

TABLE A–4.—*Nonagricultural employment by branch of the economy and modern and traditional components, 1949–58*

[Figures are yearend and are in thousands; (*) indicates data not available and no estimate made]

Branch of the economy and component	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
MODERN [1]										
Total	7,977	10,166	12,705	15,656	18,069	18,588	18,861	23,939	23,921	44,223
Material production branches	5,176	6,163	8,066	10,298	12,172	12,701	12,852	17,203	17,280	37,470
Industry	3,059	3,386	4,379	5,263	6,121	6,370	6,121	7,480	7,907	22,984
Water conservancy	61	80	108	134	198	266	261	409	340	1,360
Capital construction	200	400	600	1,048	2,170	2,100	1,935	2,951	1,910	5,336
Transport, posts, and telecommunications	634	799	964	1,129	1,238	1,347	1,426	1,564	1,878	2,955
Trade, and the food and drink industry	1,222	1,498	2,015	2,724	2,445	2,618	3,109	4,799	5,245	4,835
Nonproductive branches	2,801	4,003	4,639	5,358	5,897	5,887	6,009	6,736	6,641	6,753
Finance, banking, and insurance	(*)	(*)	(*)	346	377	384	384	417	400	300
State education, medicine and public health, and cultural affairs	1,176	(*)	(*)	2,392	2,607	2,715	2,824	3,211	3,211	3,811
Government administration	(*)	(*)	(*)	1,523	1,698	1,598	1,576	1,748	1,698	1,183
Mass organizations	(*)	(*)	(*)	1,053	1,143	1,090	1,096	1,215	1,184	1,281
Urban public utilities	(*)	(*)	(*)	41	69	96	123	133	133	150
Meteorology [1]	1	1	2	3	3	4	6	12	15	28
TRADITIONAL [1]										
Total	18,290	20,148	22,025	21,096	21,047	21,162	20,003	15,427	15,746	12,644
Material production branches	17,309	19,159	20,937	19,902	19,782	19,609	18,406	13,605	13,673	10,448
Handicrafts and carrier services	5,855	7,229	7,258	7,364	7,789	8,910	8,202	5,780	6,560	1,465
Salt extraction	500	500	500	500	500	500	500	500	500	700
Fishing	800	1,200	1,268	1,336	1,404	1,472	1,540	1,500	1,500	2,000
Urban commune industry	0	0	0	0	0	0	0	0	0	750
Transport, posts, and telecommunications	3,526	3,526	3,526	3,526	3,526	3,526	3,450	2,539	2,539	2,868
Trade, and the food and drink industry	6,628	6,704	8,385	7,176	6,563	5,201	4,714	3,286	2,574	2,665
Nonproductive branches	981	989	1,088	1,194	1,265	1,553	1,597	1,822	2,073	2,196
Finance, banking, and insurance	(*)	(*)	(*)	5	19	248	320	260	221	100
Services	417	425	434	443	452	461	470	479	489	489
Traditional medicine	564	564	654	746	794	844	807	1,083	1,363	1,607

[1] Workers and employees in the nonagricultural branches constitute employment in the modern components; persons engaged in nonagricultural occupations and not classified as workers and employees constitute employment in the traditional components.

Source: *Nonagricultural Employment*, p. 133.

TABLE A–5.—*Nonagricultural employment by sex and branch of the economy, 1955, 1957, and 1958*

[Figures are yearend, except those marked by (†), which are 3d quarter, and are in thousands; (*) indicates data not available and no estimate made]

Branch of the economy	1955			1957			1958			Percent distribution								
										1955			1957			1958		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Total	38,864	32,759	6,105	39,667	32,915	6,752	56,867	46,781	10,086	100	84.3	15.7	100	83.0	17.0	100	82.3	17.7
Material production branches	31,258	26,556	4,702	30,953	(*)	(*)	47,918	39,970	7,948	100	85.0	15.0	100	(*)	(*)	100	83.4	16.6
Handicrafts and carrier services	8,202	5,741	2,461	6,560	4,592	1,968	1,465	1,025	440	100	70.0	30.0	100	70.0	30.0	100	70.0	30.0
Salt extraction	500	300	200	500	300	200	700	350	350	100	60.0	40.0	100	60.0	40.0	100	50.0	50.0
Fishing	1,540	1,386	154	1,500	1,350	150	2,000	1,350	650	100	90.0	10.0	100	90.0	10.0	100	67.5	32.5
Industry	6,121	4,995	1,126	7,907	6,537	1,370	23,734	19,420	4,314	100	81.6	18.4	100	82.7	17.3	100	81.8	18.2
Water conservancy	† 261	† 253	† 8	340	(*)	(*)	1,360	1,224	136	100	96.9	3.1	100	(*)	(*)	100	90.0	10.0
Capital construction	† 1,935	† 1,871	† 64	1,910	(*)	(*)	5,336	4,562	774	100	96.7	3.3	100	(*)	(*)	100	85.5	14.5
Transport, posts, and telecommunications	4,876	4,695	181	4,417	(*)	(*)	5,823	5,439	384	100	96.3	3.7	100	(*)	(*)	100	93.4	6.6
Modern	1,426	1,356	70	1,878	(*)	(*)	2,955	2,687	268	100	95.1	4.9	100	(*)	(*)	100	90.9	9.1
Traditional	3,450	3,339	111	2,539	2,459	80	2,868	2,752	116	100	96.8	3.2	100	96.8	3.2	100	96.0	4.0
Trade, and the food and drink industry	7,823	7,315	508	7,819	6,873	946	7,500	6,600	900	100	93.5	6.5	100	87.9	12.1	100	88.0	12.0
Modern	3,109	2,907	202	5,245	4,608	637	4,835	4,065	770	100	93.5	6.5	100	87.9	12.1	100	84.1	15.9
Traditional	4,714	4,408	306	2,574	2,265	309	2,665	2,535	130	100	93.5	6.5	100	88.0	12.0	100	95.1	4.9
Nonproductive branches	7,606	6,203	1,403	8,714	(*)	(*)	8,949	6,811	2,138	100	81.6	18.4	100	(*)	(*)	100	76.1	23.9
Finance, banking, and insurance	704	640	64	621	(*)	(*)	400	250	150	100	90.9	9.1	100	(*)	(*)	100	62.5	37.5
Services	470	376	94	489	391	98	489	391	98	100	80.0	20.0	100	80.0	20.0	100	80.0	20.0
Medicine and public health	1,347	792	555	1,908	(*)	.....	2,160	1,136	1,024	100	58.8	41.2	100	(*)	(*)	100	52.6	47.4
Modern	540	297	243	545	(*)	(*)	553	304	249	100	55.0	45.0	100	(*)	(*)	100	55.0	45.0
Traditional	807	495	312	1,363	684	679	1,607	832	775	100	61.3	38.7	100	50.2	49.8	100	51.8	48.2
Education and cultural affairs	2,284	1,919	365	2,666	(*)	(*)	3,463	2,942	521	100	84.0	16.0	100	(*)	(*)	100	85.0	15.0
Government administration	† 1,576	† 1,343	† 233	1,698	(*)	(*)	1,183	933	250	100	85.2	14.8	100	(*)	(*)	100	78.9	21.1
Mass organizations	1,096	1,017	79	1,184	(*)	(*)	1,076	999	77	100	92.8	7.2	100	(*)	(*)	100	92.8	7.2
Urban public utilities	† 123	† 111	† 12	133	(*)	(*)	150	135	15	100	90.2	9.8	100	(*)	(*)	100	90.0	10.0
Meteorology	6	5	1	15	(*)	(*)	28	25	3	100	83.3	16.7	100	(*)	(*)	100	89.3	10.7

Source: John Philip Emerson, *Sex, Age, and Level of Skill of the Nonagricultural Labor Force of Mainland China*, U.S. Bureau of the Census, Foreign Demographic Analysis Division, Washington, D.C., 1965, p. 26.

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TABLE A-6.—*Workers and employees by branch of industry, 1949-58*

Figures are yearend, except for annual averages marked by (†), and are in thousands; they include persons employed in factory handicrafts, but exclude those employed in individual and cooperative handicrafts, in fishing, and in salt extraction; (*) indicates data not available and no estimate made]

Branch of industry	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Total	3,059	3,386	4,379	5,263	6,121	6,370	6,121	7,480	7,907	22,984
1. Producer and consumer goods industry:										
Producer goods industry	(*)	(*)	(*)	2,684	3,238	3,495	3,483	4,415	4,744	(*)
Consumer goods industry	(*)	(*)	(*)	2,579	2,883	2,875	2,638	3,065	3,163	(*)
2. Heavy and light industry branches:										
Heavy industry:										
Electric power	54	57	60	64	70	79	99	124	143	251
Coal	432	444	466	494	517	538	563	589	669	2,500
Petroleum	12	(*)	(*)	22	31	39	48	56	67	124
Iron and steel	121	157	193	233	268	270	291	318	347	3,304
Nonferrous metals, mining and processing	87	(*)	(*)	158	183	209	265	320	346	731
Metal processing	377	(*)	(*)	846	934	983	960	1,338	1,403	4,204
Chemical processing	63	(*)	(*)	113	129	145	145	214	253	800
Building materials	150	(*)	(*)	421	453	459	502	589	600	1,320
Timber (state managed)	160	(*)	(*)	†292	†290	†300	†280	†245	†333	1,126
Light industry:										
Papermaking	51	64	75	84	90	87	82	90	94	96
Textiles	770	829	917	1,022	1,080	1,096	1,163	1,277	1,282	1,500
Food processing	†553	(*)	(*)	†1,021	(*)	(*)	1,200	1,200	1,200	1,410

PERCENT DISTRIBUTION

Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1. Producer and consumer goods industry:										
Producer goods industry	(*)	(*)	(*)	51.0	52.9	54.9	56.9	59.0	60.0	(*)
Consumer goods industry	(*)	(*)	(*)	49.0	47.1	45.1	43.1	41.0	40.0	(*)
2. Heavy and light industry branches:										
Heavy industry:										
Electric power	1.8	1.7	1.4	1.2	1.1	1.2	1.6	1.7	1.8	1.1
Coal	14.1	13.1	10.6	9.4	8.4	8.4	9.2	7.9	8.5	10.9
Petroleum	.4	(*)	(*)	.4	.5	.6	.8	.7	.8	.6
Iron and steel	4.0	4.6	4.4	4.4	4.2	4.2	4.8	4.3	4.4	14.4
Nonferrous metals, mining and processing	2.8	(*)	(*)	3.0	3.0	3.3	4.3	4.3	4.4	3.2
Metal processing	12.3	(*)	(*)	16.1	15.3	15.4	15.7	17.9	17.7	18.3
Chemical processing	2.1	(*)	(*)	2.1	2.1	2.3	2.4	2.9	3.2	3.5
Building materials	4.9	(*)	(*)	8.0	7.4	7.2	8.2	7.9	7.6	5.7
Timber (state managed)	5.2	(*)	(*)	5.5	4.7	4.7	4.6	3.3	4.2	4.9
Light industry:										
Papermaking	1.7	1.9	1.7	1.6	1.5	1.4	1.3	1.2	1.2	.4
Textiles	25.2	24.5	20.9	19.4	17.6	17.2	19.0	17.1	16.2	6.5
Food processing	18.1	(*)	(*)	19.4	(*)	(*)	19.6	16.0	15.2	6.1

Source: *Nonagricultural Employment*, app. B.

Appendix A

This appendix presents the sources and methods used in preparing the estimate of total nonagricultural employment in 1964 given earlier in this chapter. This total, 45.8 million persons, consists of an estimated 30.2 million workers and employees in the nonagricultural branches of the economy and an estimated 15.6 million persons engaged in nonagricultural work but not classified as workers and employees.

The worker and employee estimate is based on a report, presumably referring to the end of 1964, that "the number of women functionaries and workers has doubled since 1957, and is 10 times that of early liberation days," [1] and on another published early in 1964 that "at present there is one woman worker in every five workers in China." [2] There were 600,000 women workers and employees in 1949, and 3,286,000 in 1957, according to SSB data (table 8). On the assumption that the proportion of workers and employees who were women remained unchanged during 1964, the yearend total of workers and employees would have been 30 million using the 1949 base figure, or 32,860,000 using the 1957 total. The latter figure is selected for incorporation in the present estimate, since it is not clear whether the phrase "early liberation days" refers to 1949 or to a later year when the total number of women workers and employees would have been somewhat larger.

The estimate of 32,860,000 workers and employees in 1964 includes the numbers of workers and employees in forestry and on state farms, which must be subtracted since these are agricultural branches. One source gives a total of 150,000 workers and employees in forestry in 1964.[3] The number of workers and employees on state farms in 1964 is estimated at 2,500,000 on the basis of a report that the population of state farms in 1963 was 5 times as large as in 1957,[4] an official total of 500,000 state farm workers and employees in 1957,[5] and the assumptions that changes in the number of state farm workers and employees were proportional to changes in the population of state farms and that there was no significant change in the number of workers and employees on state farms between 1963 and 1964. A total of 2.8 million state farm workers and employees was reported for the end of 1960.[6] However, the acreage of state farms was reduced during the next 3 years, and there are other indications of curtailed state farm activity which would imply a reduction in the size of the state farm work force.

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[1] "Women's Status in Socialist China," NCNA-English, Mar. 4, 1965; in *SCMP*, No. 3412, Mar. 9, 1965, p. 5.

[2] "Chinese Women Workers March Along the Road of Socialist Construction," *The Chinese Trade Unions*, No. 2, 1964, p. 2.

[3] "Summing Up Forestation Work in the Past 13 Years," *Chung-kuo lin-yeh* (*Chinese Forestry*), No. 5, May 6, 1964; translated in *SCMM*, No. 367, June 3, 1963, p. 2.

[4] "The National Conference on State Farms Calls Upon Farms All Over the Country To Strengthen Ideological and Political Work and To Strive for Overfulfillment of This Year's Production Tasks," *JMJP*, Mar. 14, 1964; translated in *SCMP*, No. 3194, Apr. 8, 1964, p. 4.

[5] *The Great Ten Years*, p. 119.

[6] Reported in Wang Chen, "Strengthen Establishment of State Farms," *Hung-ch'i* (*Red Flag*), No. 7, Apr. 1, 1961; translated in *SCMM*, No. 258, Apr. 24, 1961, p. 6.

Most of the persons employed in the nonagricultural branches of the economy but not classified as workers and employees are engaged in traditional occupations. The levels of such employment normally vary little from year to year. Therefore, in the absence of current figures, the most recent figures available have been used for 1964. Where the most recent figures are 1958 totals which seem to have been inflated for Great Leap Forward purposes, 1957 figures have been substituted or the 1958 figure has been appropriately reduced. The figures for employment by branch of the economy are:

	Number (millions)	Sources
Total	15.6	
Handicraftsmen	6.0	Reported, probably for 1961, in Chi Lung, "Vital Role of Handicrafts," *China Reconstructs*, vol. XI, No. 10, October 1962, p. 8.
Salt extraction	.5	The 1957 estimate from table A-1.
Fishing	2.0	The 1958 total from table A-1. This is consistent with the mention of "several million collective fishermen" in "Step Up Work of Propagation and Protection of Marine Resources," *TKP*, July 22, 1964; translated in *SCMP*, No. 3287, August 26, 1964, p. 6.
Traditional forms of transport	2.5	A reduction of the 1958 total of 2,900,000 estimated for the height of the Big Leap Forward (table A-1).
Traditional forms of trade, and the food and drink industry.	2.5	A reduction of the 1958 estimate of 2,700,000 (figure in table A-1 minus that in table A-2).
Rural credit cooperatives	.2	The 1957 estimate from table A-1.
Services	.5	Do.
Medicine and public health	1.4	There were nearly the same number of full-time (*chuan-yeh*) public health professionals and technicians in 1963 as in 1959, a year in which total employment in medicine and public health differed little from 1958. Total employment in 1964 also apparently was about the same as in 1963. Therefore, the 2,200,000 persons reportedly engaged in medicine and public health work in 1958 (table 13) minus an estimated 800,000 medical and public health workers and employes in 1963 (from unpublished estimates of the U.S. Bureau of the Census, Foreign Demographic Analysis Division) approximates the number of persons engaged in medicine and public health work not classified as workers and employees in 1964. The correspondence between these totals of full-time professionals and technicians and the estimate of persons employed in medicine and public health work not classified as workers and employees is coincidental. For 1959, 1,460,000 full-time public health professionals and technicians are reported in Li Te-ch'uan, "By Changing Manners and Habits Transform the Ways of the World and Develop a Patriotic Health Movement," *JMJP*, Apr. 5, 1960, p. 3. For 1963, 1,400,000 are reported in Ch'ien Hsin-chung, "Chinese Medicine: Progress and Achievements," *Peking Review*, Feb. 28, 1964; reprinted in *SCMM*, No. 409, Mar. 28, 1964, p. 35.

WORK INCENTIVES IN CHINESE INDUSTRY AND AGRICULTURE

By

Charles Hoffmann

CONTENTS

WORK INCENTIVES IN CHINESE INDUSTRY AND AGRICULTURE

I. Introduction [1]

In their efforts to develop and modernize Chinese industry quickly Chinese Communist Party (CCP) leaders have given wages and other incentives an important role to play. That role has been shaped within the framework of Marxist doctrine and a pragmatic consideration of technological, economic, and social limits, though the miscarriage of the Great Leap Forward indicates a grave misjudgment of these factors. Ideally the regime would like to achieve sustained, rapid economic growth through the concerted efforts of a work force whose willingness to sacrifice in the short run is enthusiastic. Until such a felicitous condition obtains, proper work attitudes will mainly be engendered through traditional motivational means and heavy doses of indoctrination.

Incentive policy has had clear-cut aims within the broader compass of economic growth strategy. The industrial and agricultural labor force is to deploy itself where wanted, to increase the fruits of its efforts, and to advance its skills continuously. Moving about requires workers to take jobs in greater numbers in favored branches and locations; producing more calls for constant attention to objective norms for output, costs, maintenance, et cetera; and learning new skills as rapid technological changes unfold demands keen awareness of evolving technical knowledge. Incentive mechanisms geared to these ends must systematically reward workers so that desired behavior is differentially compensated and thus reinforced.

Ideological considerations shape incentive and income policy, though the emphases of the moment reflect economic and political vicissitudes. So far as any promise to raise workers' levels of living is concerned, Chinese Communist Party leaders are quite conservative and adhere to a "rational low wage policy"—wage increases are to be limited generally to make possible rapid capital accumulation. Raises in wage levels are to be confined to one-half the increase in labor productivity. But even more constraining has been the regime's commitment to keep peasant income roughly on a par with the real income of the least skilled wage earners. Though fulfillment of this has undoubtedly been exceptional, operationally party leaders are careful to avoid a widening income disparity between peasant and unskilled worker. A corollary of this egalitarian restraint is that income differentials between peasants and industrial workers, industrial workers and salaried

[1] Much of the research upon which this chapter is based was supported by grants from the Joint Committee on Contemporary China (Social Science Research Council and American Council of Learned Societies) and the Committee on the Economy of China of the Social Science Research Council.

employees, salaried employees and higher professional and governmental work groups should be narrow. [15; 76] [2]

The successful attainment of optimum labor allocation, input, and productivity was impeded on the eve of 1953 by incentive mechanisms poorly attuned to the requirements of a planned industrializing economy. Serious shortcomings of the incentive system were reflected in the pressing operational problems prominent in the wage system which broadly lacked unity and motivation mechanisms consistent with modernizing industry along lines of the First Five-Year Plan (FFYP). First, wage patterns were quite diverse: Many wage scales had wide-ranging differences in maxima and minima in the same kind of work, and irrationalities and inconsistencies in payment existed. Second, the relation between performance and reward was often obscured. Pay differentials supposedly distinguishing gradation in skill commonly were minute; wage differences sometimes were based on sex or status; piecework mechanisms were not widely in use. Third, nonlabor income elements operated in the system—bonuses for good attendance and at year's end and traditional allowances in money and kind. Fourth, many interregional, interindustry, and interenterprise wage differentials stimulated the development of light industry in certain coastal areas. And fifth, a unified collective welfare program with benefits geared differentially to wage level was needed. [58]

In agriculture rationalization of payment schemes proceeded while farming units were being collectivized and communized. The difficulties of devising effective rational compensation devices for the varied activities of the peasants were compounded by the constant upheaval wrought by the almost continuous process of socializing agriculture.

In both industry and agriculture the incentive systems are required to adhere to the socialist principle of compensation. That is, "from each according to his ability, to each according to his work"—more pay for more work. Material incentives are to be supplemented with nonmaterial encouragement and eventually the Socialist principle of remuneration is to be superseded by that of communism—payment according to need.

II. Material Incentives in Industry

The overall incentive system in the People's Republic of China (PRC) is not a radical departure from such systems in modern industrial societies. Consciously modeling its system at the outset after that in the Soviet Union, CCP leaders have not departed in any important way from that prototype despite their sharp conflict with the Communist Party of the Soviet Union(CPSU).

BASIC WAGE MECHANISMS

Today in Chinese industry workers are paid according to a multiple wage-grade scale differentiated according to variations in skill from unskilled to highly skilled categories. Whether the individual works on a time, time plus bonus, or piece rate basis, there is a standard scale by branch of activity, except where special scales are used to attract

[2] Figures occurring in text in brackets refer to source references which are further identified in appendix to this chapter, p. 496.

workers to certain locations. These scales differ by branch in line with the regime's priorities for differential industrial development. Although the number of steps or grades still varies, in most instances there are eight payment steps. This conforms generally to the situation in Soviet industry.

Following is an eight-grade pattern which roughly corresponds to those in use throughout Chinese industry as to wage rates and ratio of highest to lowest grade:

	Wage grade							
	1	2	3	4	5	6	7	8
Coefficient	1	1.17	1.37	1.60	1.87	2.19	2.56	3
Monthly wage (¥)	35	41	48	56	65.5	76.7	89.6	105

The official exchange rate, 1¥=$0.42, does not consistently reflect the yuan's purchasing power. The 3-to-1 ratio of pay of most skilled to least skilled is not a rigid one but differs according to branch of industry: Industries with highest priority for development usually have scales with ratios somewhat above 3 to 1, while those slated for less rapid growth generally have ratios below 3 to 1. The intergrade differentials in the above pattern are constant at about 17 percent. This is not always so; sometimes the increments by grade rise proportionately. [29; 74; 75]

The above wage payments pattern is used as the basic pay mechanism for time-rate workers in various industries. Each worker is classified by grade according to skill and function. Overall satisfactory performance entitles the worker to the standard wage rate for his category. Thus, the least skilled worker in an enterprise employing the above scale would receive a standard monthly wage of ¥35. Other workers of varying skills would receive standard wages ranging up to ¥105 for the most advanced. [29]

PIECE RATE MECHANISMS

Piece rate mechanisms in China vary considerably, but almost all such means of payment are based upon the multiple wage-grade system already discussed. The type used widely is the ordinary piece rate mechanism; there is no evidence of general use of progressive piece rates in which rates rise more rapidly than overquota output. This differs from the Soviet Union where, in 1955, about 35 percent of industrial workers were paid progressive piece rates. In China piece rate and bonus payments above standard have totaled up to 20 percent of all wages but are usually less. [69; 18:33,60; 32]

The basic element in piece rates is payment of wages above or below the standard for a particular grade, depending on the quantity and quality of the worker's output. For each grade there is a standard wage, *higher by a few percent than the time-rate standard*, which is paid if the worker approximates the quota. Output below the norm occasions a payment less than the standard amount; output above results in wages exceeding the standard.

Piece rate systems are either limited or unlimited. In the first type premium pay for production above the quota is limited to a certain maximum amount, regardless of the degree of overfulfillment. Thus, the overquota part of the wage might be limited to 50 percent of the total wage. When the work group is capable of meeting its overall quota in a sustained way at or above a specified level, the unlimited piece rate system is allowed to operate with piece rate pay commensurate with output. [12]

Another classificatory distinction in piece rates is that between direct and indirect systems. The direct system bases premium payments on the output of the individual or the small group. In the indirect type a large number of workers receive wages above or below the standard grade rate depending upon the volume of output of basic production workers rather than on their own performance. [8; 18:28.]

One interesting piece rate technique employed in a coal mine includes incentive awards, performance deductions, and subsidies. The team of workers is the measurement unit, and wages are a function of the degree of norm fulfillment. When the quota is exceeded, team members are all paid the standard amount for their respective wage grades plus an additional amount equal to 80 percent of the scheduled piece rate value of the extra production. If the team fails to meet the norm, workers are paid a wage proportionate to the amount of realized output. In addition, they are given a subsidy payment of 30 percent of the scheduled piece rate value of the unfulfilled output portion to diminish the severity of the wage deduction. Thus, if the team produces only 90 percent of the norm, each worker gets a wage of 90 percent of his standard wage grade pay *plus* a subsidy of 30 percent of the unfulfilled 10 percent of production for a total of 93 percent of the standard pay for the respective grades. [63; 18:19.]

Another piece work mechanism illustrates how quantity and quality of output are motivated. Three quality classes are set up for each of the usual eight grades. Those whose work quality satisfies all specifications are graded "A" and receive the full standard pay for their wage grade, if their output quota is fulfilled. (Additional output means higher pay.) For those whose quality of work does not meet "A" criteria the grade "B" is given, yielding 92 to 94 percent of the standard pay for their grade (again assuming production targets were met). When "B" specifications are not reached the grade is "C" and the work is returned; no payment is received until minimum criteria are satisfied. [29]

In textiles a complicated variation of piece rates also based on quantity and quality of production employs multiple grades as well as vertical classes within each grade. Each of the eight multiple wage steps has a regular standard rate; but in addition there are four other payment categories, two above and two below the standard rate, for a total of five different rates within each wage grade. To illustrate, if the wage grade's standard rate is ¥68, the other four rates (with differentials of ¥2) are: ¥72, ¥70, ¥66, and ¥64. Thus, a worker in that grade satisfying quantity and quality norms receives a wage of ¥68 for the month. If he meets the quota for either quantity or quality and sufficiently exceeds it for the other one, his wage is ¥70, while overfulfillment in both by the required degree yields the highest wage for

that grade, ¥72. On the other hand, the worker who fails to satisfy either target by a set amount gets a wage below the standard amount—¥66. If norms for both quantity and quality are missed by a certain degree, the worker's wage is ¥64, the lowest for that grade. The rate of pay for workers in each of the eight grades is determined in the same manner. [30]

BONUS PAYMENTS

When piece rates cannot be employed due to difficulties of calculating individual and small group performance precisely, bonuses are often used to supplement time wages. The work goals are usually the same as for piece rates—production exceeding plans, economy in the use of materials, achievement of safety standards, and superior quality. Extra pay comes only if basic norms have been achieved; then outstanding performance in any one of the specified areas warrants a bonus. Such payments are based on worker and group evaluation by supervisory personnel rather than on objective norms as in piece work. (This pattern in China also follows that in use in the U.S.S.R.). When production-cost reduction is the goal, 20 to 30 percent of the economized amount has frequently been made available for bonuses. Such payments to individuals, however, have in many instances been restricted to a maximum of 15 percent of the monthly standard wage, a more severe limitation than usually applies to piece rates, with many enterprises keeping bonus pay substantially below this level. [28; 29; 18:31]

Several types of bonus techniques have been used: (1) direct limited awards; (2) direct progressive awards; and (3) direct unlimited and contractual awards. The first involves bonuses paid to a specified limit on the basis of an individual's or group's quota overfulfillment. The second technique, whose use has not been widespread, pays increasing bonus amounts as norms are surpassed. These two types often have led to rises in labor costs along with increase in output and to a wide disincentive effect on workers who felt discriminated against. The third type pays bonuses out of a planned total amount of wages. Since the amount for bonuses is fixed absolutely, added output stimulated by extra pay does not raise the wage bill. [31]

In many enterprises a negative bonus mechanism also operates in which the time wage for each grade is reduced below the standard if the worker fails to achieve his output quota. Higher wage-grade workers have their time wage reduced below the standard in proportion to the below normal performance. In many units this rule is not rigidly applied to lower wage-grade workers who, in effect, enjoy a minimum wage guarantee. A worker below the third wage grade often gets his full standard time wage if he fulfills at least 90 percent of the quota. Sometimes lower grade workers are assured of 75 percent of the standard time wage even if output fails to reach the quota by more than 25 percent. [31]

OTHER WAGE PAYMENTS

Wage supplements exist in the form of various allowances—for overtime, night, or holiday work and for difficult or hazardous working conditions. Pieceworkers temporarily assigned to jobs paying

less than the average in their permanent positions receive extra pay. Other pieceworkers who lose some earnings due to unfavorable working conditions (inadequate supplies, poor tools and equipment, and technical plant dislocation) are also given extra compensation.

Payments not directly related to work done on the job are made to workers too. Remuneration is often given to workers in training who are still assigned to an enterprise where they worked prior to training, a type of retainer payment. Those who instruct apprentices, foregoing perhaps high piece rate pay, frequently receive extra recompense. Some workers who write articles and give lectures in addition to, but connected with, their regular jobs receive supplementary income. [68]

PAYMENTS FOR INVENTION AND INNOVATION

Schedules of monetary awards for inventions and innovations stimulating industrialization have also been devised. Official regulations provide both award classes and an administrative arrangement for evaluating and processing these creative endeavors. The strong emphasis on such activities parallels Soviet exertions to stimulate industry in the same way. [26:54–64; 56; 10; 16]

The procedures for bestowing awards and administering inventions and technical improvements are the responsibility of the Scientific and Technological Commission of the PRC (also known as the State Scientific Commission) except for those relating to national defense, which are carried out by the Ministry of Defense. Recognition for inventions and technical improvements links the honorary and pecuniary parts of the award in five grades:

Grade	Honorary award	Cash payment
1st	Certificate and 1st-grade medallion	¥10,000
2d	Certificate and 2d-grade medallion	5,000
3d	Certificate and 3d-grade medallion	2,000
4th	Certificate	1,000
5th	do	500

Inventions may be rewarded only once. Those of particular importance are honored separately as special awards after recommendation by the State Scientific Commission and approval by the State Council. [56; 16]

Awards for technical improvements also fall into five grades:

Grade	Improvement value [1]	Honorary award	Cash payment
1st	Over ¥1,000,000	Commendation and certificate	¥500 to ¥1,000.
2d	Over ¥100,000	do	¥200.
3d	Over ¥10,000	Commendation	¥100 to ¥200.
4th	Over ¥1,000	do	Under ¥100.
5th	Less than ¥1,000	do	No money.

[1] Represents the actual value of higher production and economy in 1 year resulting from the improvement after the costs of implementation have been deducted.

In their nature, technical improvements relating to industrial safety have to be rewarded without recourse to annual value of higher pro-

duction and economy. Grades of awards are set up according to the effectiveness and technical complexity of such improvements. [56; 10; 16]

SOCIAL INSURANCE BENEFITS

The social insurance system in China, paralleling the system in the U.S.S.R., provides benefits in money and kind to augment the wages of industrial workers. Under its provisions, laborers in industry as well as in other activities are covered for sickness, injury, and disability; death and maternity; retirement; and miscellaneous other benefits. The system is noncontributory with enterprises earmarking 3 percent of the total payroll for the various categories. Thirty percent of the amount collected each month is turned over to the All-China Federation of Trade Unions, which administers the system, for financing a variety of communal activities, such as sanatoriums, rest homes, and orphanages. The remainder is retained by the plant or factory for current costs of pensions, allowances, relief payments, and welfare units such as hospitals and clinics directly under its control. The Government estimated that in 1958, the last year for which such data were made available, almost 14 million of 45 million industrial workers and employees were qualified to receive benefits. [25 : 1–8; 26; 31–36; 62 :218; 18 :67–72]

Although the system's main purpose is to provide minimal protection against certain hazards of living, there are also built-in incentive elements. Most benefits are graded according to wages. Another material encouragement is that additional rights are bestowed on model workers and combat heroes (ex-servicemen) who work in covered units. [26 :41–47]

A. *Sickness, Injury, and Disability.*—The worker sustaining injury or disablement on the job is entitled to his full wages. Treatment is at the enterprise's or a designated hospital. Ordinary costs of medicines, therapy, hospitalization, meals while at the hospital, and traveling are the responsibility of the enterprise. [26 : 35–37; 25 : 9–10.]

Disability resulting from injury at work entitles a worker to a pension or allowance. Total disability and the need for attendant care qualify the worker for a life pension of 75 percent of his wages. Total disability alone yields a pension of 60 percent for life or until the disability is overcome. The disabled worker who can still perform some functions is to be given a suitable job in the enterprise and an invalid allowance which ranges from 10 to 30 percent of his predisability wages, depending on the extent of his incapacity. The total of wages and allowance may not exceed the worker's wages prior to disablement. [26 :35–37; 25 :9–10]

The benefit provisions covering sickness, injury, or disablement unrelated to the job parallel, at a lower level, those just reviewed. Some costs must be shouldered by the worker. Free medical treatment is provided in an enterprise clinic or hospital or by doctors serving the enterprise. Ordinary costs of operations, hospitalization, therapy, and medicines are included in free treatment. Costs of "expensive" medicines, traveling, and meals at the hospital are borne by the patient, unless he is unable to pay. Then, provision is made for allowances from the labor insurance fund according to the individual situation. [26; 37–39; 25; 10–12]

While a worker is under medical care, he is entitled to weekly payments commensurate with his length of service in the enterprise. Such payments from the enterprise range from 60 to 100 percent of his wages not to exceed 6 months. If his disability continues beyond 6 months, he is eligible for further payments (ranging from 40 to 60 percent of wages) from the labor insurance fund until he returns to work or his disability qualifies him for continuous relief benefits. If his disability is total and requires attendant care, he receives an allowance of 50 percent of his wages; if he needs no attendant care the percentage is 40, paid him until he returns to work or for the rest of his life. Partially disabled workers capable of performing some work are not entitled to such benefits, but may receive financial assistance according to the degree of disability. When disabled workers are medically certified as capable of returning to their jobs, management is required to provide "suitable" work. [26; 37–39; 25; 10–12]

When workers' dependants are ill, they also qualify for benefits which include free clinic or hospital treatment and doctors' services. The worker's enterprise is required to pay half the expense of ordinary medicines and operations. The other half, as well as costs of expensive medicines, extended hospitalization, and traveling, is borne by the patient. [26:37–39; 25; 10–12]

B. *Death and Maternity.*—A funeral benefit is paid by management to the family whether the death is work connected or not. If death occurs at work, then the family is entitled to an amount equal to 3 month's wages, based on the average wage. In addition to the funeral benefit, the family of someone dying on the job has claim to a monthly pension based on the number of dependents and ranging from 25 to 50 percent of the deceased's wages, paid until the dependents are able to provide for themselves. The family of someone whose death is not job connected is entitled to an amount equal to 6 to 12 months of the deceased's wages, depending again on the number of dependents. Families of retired workers who die qualify for either of the above benefits, depending on whether the deceased had a job connected total disability or not. A funeral benefit is also mandated when a worker's lineal dependent over the age of 1 dies. If the deceased is 10 years old or younger, the benefit is one-third of the monthly average wage in the enterprise. If the deceased is over 10 years old, the benefit is one-half of the monthly average wage. [26; 39–41]

Maternity benefits include leave with full pay and a cash payment of ¥4 at childbirth. Women workers are entitled to a total of 56 days off with pay before and after confinement. If difficulty is encountered in delivery or if multiple birth occurs, fourteen additional days with pay are granted. Where a miscarriage occurs during the first 7 months of pregnancy, the worker is granted 30 days' leave with pay. Expenses of prenatal examinations and confinement in the enterprise's clinic or hospital or an enterprise-designated facility are borne by management. Other costs are covered by the provisions on sickness applying to all workers. If, after maternity or miscarriage leave, a worker is medically certified as incapable of returning to her job, she likewise is eligible for sickness benefits. [26:43–44; 25; 14–15]

C. *Retirement.*—A most important part of the social insurance program in Communist China is the retirement system which provides workers in industry with old-age pensions at different ages and in

variable amounts depending on length of job tenure, age, sex, and conditions of work. Eligibility ages and pension payments are much the same as in the U.S.S.R. Four classes of workers are entitled to regular pensions: (1) those performing under ordinary conditions; (2) those working in hazardous environments; (3) those certified as physically weak; and (4) physically incapacitated revolutionary workers of long standing. [70:166–167]

The first category of workers includes males reaching the age of 60 with 5 years of consecutive service in the same enterprise and 20 years' total service and female workers and staff members attaining the ages of 50 and 55, respectively, with 5 years' consecutive service and 15 years' total service. The second class of covered workers are men of age 55 and women of age 45 who work "in shafts, in high altitudes, or under conditions of high temperature or who are engaged in other types of work which require more physical strength or which are detrimental to health . . ." and who meet the consecutive and total service requirements of the first class. [55]

These two classes of workers qualify for pensions varying from 50 to 70 percent of wages. Those with consecutive service of 5 to 10 years are entitled to pensions amounting to 50 percent of their wages. For those whose consecutive service is 10 to 15 years the percentage is 60; for those whose consecutive service is 15 years or more the pension is 70 percent. In the U.S.S.R. the retirement percentage is about 60 percent on the average. [55; 70:166–167]

The third and fourth classes consist of incapacitated workers. In the third group are males of age 50 and females of age 45 with 5 years consecutive and 15 years total service and workers of any age who have been medically certified as unable to work. In the fourth one are all those who for 20 years were occupied in revolutionary work and who ask to be retired on account of physical incapacity to work. [55.]

The workers in the third and fourth classes are entitled to pensions varying from 40 to 70 percent. In the third category, those with consecutive service of 5 up to 10 years qualify for pensions equal to 40 percent of wages; those whose consecutive service is 10 up to 15 years draw pensions of 50 percent; and those whose consecutive service is or exceeds 15 years are eligible for pensions amounting to 60 percent of wages. The workers in the fourth category are qualified for pensions of 70 percent of wages. [55]

D. *Other benefits.*—These are not made available to all covered workers precisely as indicated above; some qualify for lesser, others for greater amounts. Following a common pattern in Communist countries, eligible workers who are not members of trade unions qualify for "only half of the amount prescribed of wages and relief benefit during sickness, medical care for injury not sustained while at work, relief for their lineal dependents, old-age pensions, and funeral allowances." The effect is to keep the number of nonunion members to a minimum. [26:45]

Those workers who are either models or army combat heroes (ex-servicemen) and are recommended by trade unions are entitled to more liberal benefits. They have a prior claim on communal labor insurance institution facilities. Their sickness rights include the expenses of all medicines, traveling, and meals at the hospital. While under

medical treatment for illness or injury not job connected, workers' wages are paid in full for the first 6 months, rather than within the 60–100 percent range, depending on length of service. Relief benefits for sickness, injury, or disability not job connected are at the rate of 60 percent of wages, rather than 40 to 50 percent. Invalid pensions for disablement on the job are equal to wages, instead of falling between 60 and 75 percent. Allowances for job-connected disability are scheduled at an amount equal to the disparity between wages before and after disability, instead of 10 to 30 percent of predisability wages. When death occurs on the job, dependents can expect a payment of 30 to 60 percent of the deceased's wages, instead of 25 to 50 percent. [26:35–47; 55]

The old-age retirement benefits of model workers and army combat heroes likewise are more liberal. Pensions are set at the 60 to 80 percent range rather than between 50 to 70 percent for ordinary workers. For those superannuated workers who choose to continue working beyond the statutory age limits, the pension is 20 to 30 percent of wages, instead of the regular 10 to 20 percent. [26:35–47; 55]

III. Material Incentives in Agriculture

While material incentives were being developed in industry, a parallel, if slower, evolution occurred in agriculture. Material inducements were an important feature of the collectivization movement, though they were naturally shaped by the very different conditions in agriculture where private ownership of animals, equipment, and land and income payment for their use in cooperatives existed until the advent of communes. Even today incentives in commune work are affected by the material attractions of working on private plots. The principle of reward according to labor could, therefore, only be partially applied in the earlier period. In the phased transition from individual peasant ownership to mutual aid teams, to the elementary agricultural producer's cooperatives (APC), and finally, to the advanced APC's (collectives), material rewards were used both to soften the impact of eliminating the most capitalistic forms of agriculture and to stimulate production in the new collectivist units. With the advent of communes material spurs were at first downgraded; nevertheless, over time material rewards have been further developed. [73]

The pattern of material incentives in agriculture evolved from the more crude type of work-point or work-day payments, analogous to wage points in industry, to labor quotas and elaborate piece work mechanisms. As in industry, a major aim has been to rationalize income payments; that is, to set up payment systems tying the quality and quantity of performance directly to the rewards. [20]

Agricultural Cooperatives

Under the work-points payment system in APC's, peasants were to receive points valued in terms of a staple, such as rice, according to the quantity and quality of output. The awarding of work points was usually made every day on the basis of the total points allotted for each division of the day (where chores varied over the workday).

The daily evaluation rested on such variables as time put in, quantity and quality of output, basic skill used, and attitude toward labor as evaluated by cadres or the work team group. On agricultural units with widely diverse activities, problems arose when compensation for specific chores (gathering hog manure or plowing a field) were out of line. Usually, cooperative sideline activities were less well paid than major cropping, with a resulting decline in many such important operations as dairy and vegetable farming. [20; 5:22–29, 241–259]

Over time the work-points method was transformed into a workday system with points still being used but in a more systematic fashion. A standard workday or production quota (based on quantity and quality) was set up for various jobs according to skill. Fulfillment of the norm for each job entitled the peasant to a standard number of work points. Ten work points were equal to one workday, but all peasants working a full day did not necessarily get 10 points. The standard number of work points for each job was decided in terms of skill and labor intensity necessary to carry out the tasks. An unskilled peasant might only get five points for a full day's work, while a skilled farmer got 10 points and others with varying skills got points ranging between five and 10. This paralleled the system developed in Soviet collectives where peasants were also credited with fractions of workdays. [9:22–25; 39:33–39; 4:164]

Such a graded workday system lent itself readily to piecework payments. Once norms were set for particular skills and jobs, they became the basis for paying more or less for the same type of work, depending upon the number of units produced. Payments were based on fulfilling the norm for each job. When that was accomplished the standard wage points were credited. Those exceeding their quota received work points above the standard amount; those who failed to meet the required level were credited with fewer than the standard work points. Peasants who made inventions or innovations were also given extra work points as were others performing distinguished service. The value of the work point in such systems was calculated eventually by dividing total work points or work days into the total net income of the APC. [39:33–39; 38:18–32]

Communes

The existence first of about 24,000 communes and more recently of three times that number has led to implementation of payment mechanisms varying widely. Criticism in the press of egalitarian income distribution, irrational piecework schemes, and different payment for the same work gives partial testimony to the wide range of practices in communes often arising from sheer mass operations.

Supply-Wages System

With the advent of the rural communes, a supply-wages system was reintroduced. (Such a method had been used during the revolutionary period before 1949 in Communist-controlled areas.) Whatever the division between supply (payment in food grain and other necessities) and wages—and as time elapsed the extreme ratio of 70 percent supply to 30 percent wages was reversed—the wages part was to be distributed through a straight graded workday or piecework

technique. Some communes employed a wage-grade scale analogous to that used in industry (though the number of grades was usually less than eight—five and seven being frequently set up); others scaled payments on the basis of the particular chore (planting, weeding, tilling, or gathering manure); some used a basic workday as in the APC's; still others arranged payments quite haphazardly and untidily. The supply part provided a minimum income for all families, and, to the extent that this portion of income (distributed pretty much in egalitarian fashion) was great, the material incentive was very slight. [58:21; 43:163; 37a]

To see these mechanisms in perspective, the institutional and total income context of the rural commune must first be clear. Whatever the payment technique for rewarding agricultural workers, the actual value of the unit of payment would depend on several factors determining the total net harvest and money available for distribution to commune members.

Total gross income derives, first, from output of staples such as rice, wheat, and cotton, which communes specialize in according to location and history. Income also comes from sideline activity of an agricultural, service, light industrial, or handicraft nature. From this gross income certain cost deductions are necessary: cost of production and management; seed reserve; and amounts for investment in equipment, machinery, improvements, and other items. The commune must pay taxes and make compulsory grain deliveries to the state. The amount and price for such deliveries are usually set in advance and these, together with tax deliveries, are the main source of feeding the cities, supplying industrial raw materials, and providing some general investment funds. [19]

Net income left after these deductions is available for distribution. One payment goes to the welfare fund for members' social insurance or welfare needs—insufficient income, illness, injury, pregnancy, old age, and death benefits. Another amount, the supply part of wages, has already been used up throughout the period since the last accounting and distribution to meet members' basic food requirements. The residual income is what is paid out in cash or kind to the members according to the particular incentive mechanism employed in the commune and the differential claims credited individual members. [19; 66; 21:77–90]

Clearly, the amount of income left for distribution is crucial in determining the impact of a particular wage payment system on peasant motivation. If very little is left for distribution, all peasants receive roughly the same income, and the wage technique will not provide strong material impetus. Thus, even if the payment mechanism rewards performance perfectly, unless the units of reward are substantial, the differential impact on efficient workers will be slight and the price to workers of leisure or less intense labor input will be low. Also, the lower the value of a work unit, the more attractive will work on private sideline activity be. In this context, the role of taxes, of the prices and quantities of compulsory deliveries to the state, and of the amount accumulated by the commune for investment purposes is quite significant.

Commune payment mechanisms take one of two broad forms: time and piece-rate wages. The latter form was officially preferred, though

the former is considered necessary under certain technical, organizational, and human conditions. [72]

Time-Rate Mechanisms

One method of implementing time rates assigns basic work points according to each commune worker's skill and "attitude," as in the APC's preceding the communes. For each full day's stint, there is a specific number of work points for workers of different grades, ranging from four to 10 points (seven grades). In other words, the lowest grade farmer receives four points and the highest grade 10 points for performing a 10-hour day's work regardless of quantity of output. To receive the standard month's pay for the wage grade, the number of points actually accumulated for a certain grade worker must be equal to the standard number of points per workday times the number of days of work in a month, 25 for women and 28 for men. If the total is greater due to working longer hours, the worker's monthly wage is raised proportionately above the standard wage for his grade. If, on the other hand, the number of points accumulated is less, then the monthly wage is reduced accordingly. [72; 13]

Table I shows how male and female workers in a particular production brigade were distributed among the seven payment grades. Grade 1 is the lowest and grade 7 the highest in the range. As one would expect, the higher skilled grades have the fewest in number, the preponderant proportion of whom are men. The lowest three grades include about 55 percent of all commune workers with over 68 percent of them being women.

Piece-Rate Mechanisms

The time-rate mechanism outlined lent itself readily to use as an individual piece-rate method once norms for individual members were established. Those surpassing quotas then would receive payments in addition to the standard wage. In like manner, failure to meet requirements would lead to reduction of payment below the standard wage.

TABLE 1.—*Distribution of 1,453 male and female agricultural workers by wage grades, Sun Yen production brigade, Kuang-Ming people's commune, 1958*

[In percent]

Wage grade	Distribution in each grade			Proportion in each grade	
	Total	Men	Women	Men	Women
1	12.4	5.8	18.4	22.2	77.8
2	16.0	12.7	18.9	38.0	62.0
3	26.4	21.2	31.2	38.3	61.7
4	23.4	23.1	23.7	47.0	53.0
5	9.5	14.1	5.3	71.0	29.0
6	7.5	13.4	2.1	85.3	14.7
7	4.8	9.7	.4	95.7	4.3
Total	100.0	100.0	100.0		

Source: *Ts'ai-ching Yen-chiu (Financial and Economic Research)*, Peking, No. 16, Jan. 15, 1959, p. 35 in ECMM-164, Apr. 13, 1959, pp. 35-39.

Under piece-rate arrangements two general types have arisen: individual and collective piecework. The individual type is suitable where the quantity and quality of a peasant's performance can easily

be calculated and recorded, such as carrying manure, plowing fields, and plowing mud. The collective type can be divided into family piecework, collective contracting with individual piecework, and collective piecework. The first of these involves a team commitment to complete chores that a family can do, though individual performance cannot be continuous or readily recorded on a piece-rate basis. Auxiliary labor of children and old and partially disabled people can also be used in discontinuous spare-time periods on such tasks as weeding, pruning trees, and loosening earth. The second of these entails work which must be done collectively but in which an individual's operations can be checked without difficulty. The last type involves activities which must be collectively done and where calculating individual piece rates is not possible, such as when consecutive operations preclude goal accomplishment by individuals, as in the process of cotton planting. The collective group gets paid on a piecework basis and then the group allots points to individuals according to the quality of each one's work. [13]

Other Incentives

Besides these techniques of payment in rural communes, other arrangements have been devised to stimulate agricultural workers' output both for the commune's and their own benefit. Sideline activity has been encouraged both within the commune's organization, using techniques already described for major crops, and on behalf of the individual or family.

The extension of sideline activity by making private plots of land available to individuals and families stimulates workers to wring more out of the soil for private gain. The official view on the principle inherent in the utilization of private plots is that "even if pay according to work is bourgeois, it helps socialist construction." The private plot, usually a fraction of an acre per family *in toto*, is limited to 5 percent of cultivated commune land. The importance of this activity is reflected in the estimate that from 1959 to 1961 40 percent of the eggs and pigs sold to the Government derived from family sideline activity. As a source of food and income for peasant families the private plot has contributed to the recovery of Chinese agriculture. [64; 57; 53; 73]

The existence of the private plot, however, does not by itself stimulate desired enterprise. Other necessary ingredients are time to work on the plot, money to translate the great needs of people for goods and services into effective demand, and markets whose prices make such work rewarding.

Recent changes in the regime's policies have helped to restructure markets so that sideline activity can be more fruitful. Rigid rules on attendance and holidays formerly made work outside the commune next to impossible. Now rules permit flexible regulation of attendance and holidays: "rest days" from commune work have been specified as the first and 15th of the month; holidays have been worked out to the convenience of the workers so long as prior notice is given; and such holidays may sometimes be anticipated and compensated for in a later month. The workday has been limited to insure 12 hours of rest and leisure for the commune member. As a result, in one commune 60 percent of the members raised pigs and all families averaged over 10 chickens, ducks, and geese. [6]

To heighten material incentives further, CCP leaders have advocated distributing income in cash as frequently as feasible. The ideal of quantifying performance and reward requires a medium of exchange with an effective command over the things people want most. Patterns of payment in communes had for a long time been far from this ideal—infrequent payments in kind were often the rule. Official pressure has been put on cadres to organize payments so that commune members receive their income more frequently and in cash. [41; 49; 42]

The rural free markets make possible the effective functioning of sideline activity as a spur to commune output. Not only do they link peasant suppliers of food with consumers in the countryside and in the city, but they also provide important exchange channels for production brigades and teams, communes, and other enterprises. The rural market has recently been developed as a key element in the pattern of economic activity in the countryside. [23]

The extent of commune accumulation, which determines peasants' incomes, is determined in a major way by taxes. Direct taxes levied on the communes have never been high, being about 10 percent. But the real tax picture is quite different since, in addition to the agricultural tax and taxes on commodities sold in rural markets, the compulsory deliveries at Government-fixed prices must be viewed as a form of tax. So, too, does the resale by Government of such commodities at higher prices, often to commune members, involve an implicit tax, allowing for marketing costs. The Government's raising or lowering of taxes thus influences the amount of income available for distribution among commune members. For the most part, the tax rate has been a relatively constant factor in the countryside, though recently easing of taxes has aided commune income. [24]

Certainly the compulsory delivery of grain to the Government at fixed prices instituted in 1954 has become a major factor in commune income distribution and consumption levels. Adjustments of these prices have affected the commune's well-being. In recent years, prices paid for commune grain and raw material deliveries to the state have been raised, increasing the income of commune members by raising the value of their workpoints and heightening material motivation further. [51]

IV. Nonmaterial Incentives

One constant in incentive practice in China is the continuous reliance on nonmaterial encouragement in industry and agriculture. Since 1953 these techniques have not only been widely put to use, but have also been experimented with, and many forms have taken shape. Although such mechanisms often produce negative impacts, ideological commitment and the vast potential of increased output at low cost foreshadow perpetuation of these practices. Generally, the Chinese seem to have relied upon and emphasized nonmaterial encouragement more than the Russians.

CCP leaders maintain that, for the time, nonmaterial techniques must be joined with the material, a "bourgeois" remnant; but they do not question the superiority, in time, of the former. The heavy dependence on material incentives also necessitates constant use of indoctrination with nonmaterial incentives to forestall the undermining of socialism. [61]

Effective transmission of emulation drives and mass movements depends on the organization and operational efforts of various social, economic, and political agencies. The central role of the CCP in such campaigns is patent, but also involved are trade unions, youth organizations, women's groups, lower political organs, and non-Communist political bodies (e.g., Democratic Party). Even "capitalist" groups have been recruited. All potentially useful organizations become "transmission belts" for implementing drives that are part of the complex of nonmaterial incentives. [11]

The nonmaterial incentives employed involve individuals and groups vying with, as well as working closely with, one another. While many of these activities—especially when extended in extreme and onerous ways—produce disincentive effects, good results may accrue when the individual's and the group's commitment are heightened. The success of most nonmaterial incentives depends on the participant's outlook. Thus, nonmaterial incentives by themselves may not work effectively unless they are accompanied by effective political indoctrination and education. Such propaganda is aimed at heightening personal awareness, putting a particular campaign or drive in proper perspective, and making its technical requisites clear.

We divide nonmaterial incentives into two types, competitive and cooperative, which are not strictly mutually exclusive, but may reinforce or blend into one another. They rest on the grounds that greater productivity or product derives mainly from (1) the desire to excel and surpass other individuals and groups—an individual and group competitive motive; and (2) the inclination to do better because of one's strong and close identification with the group—a social or cooperative drive, the opposite of alienation.

A. COMPETITIVE INCENTIVES

Competitive contests, involving individuals or groups, have been fashioned for such interrelated ends as increasing output, improving the quality of production, raising labor productivity, lowering incidence of accidents, and reducing costs. The exhortation in this kind of match has often focused on very specific means to these ends, as well as on the ends themselves. Veteran workers are urged to help tyros to adjust quickly and effectively to work situations; agile workers and peasants are encouraged to transform the slow into likenesses of themselves; all workers are invited to contribute to technical improvements and inventions and to assist in the improvement of management and administration. [45:15,32–37,54–57]

The emulation campaigns which conform mainly to our competitive category are many in number. Such drives may be organized on any one of several levels according to the specific purpose in view—production group, shift, department, factory, industry or production team, production brigade, commune. Whatever the unit involved, the contest may be on a local, provincial, regional, or national basis.

1. *Individual Competition*

Individual workers are spurred on by a variety of formal and informal rewards all of which aim at raising the self-esteem of the honored and perhaps inspiring, by example, numerous unknown

admirers to improve their work performance. The contests and campaigns in themselves motivate workers through their desire to win, but in addition this type of competition distributes a large number of nonmaterial rewards (sometimes tied to a token material award) linked to outstanding performance. These include titular honors, opportunities for occupational advancement, attendance as representatives at conferences of outstanding peasants and workers, meetings with Chairman Mao and other celebrities, chances to join the Communist Party and to be elected to various political and governmental bodies, and special vacation and travel privileges.

The bestowal of honorific titles on outstanding workers and peasants is one simple manner of encouraging large numbers on to greater effort. Labeled "model," "labor hero," "advanced," or "outstanding," the honored worker or peasant enjoys a status of esteem and qualifies for certain perquisites in proportion to his accomplishments, in the Stakhanovite tradition of the U.S.S.R. Advanced or outstanding producers are those who surpass a certain standard of performance. Models are higher on the scale; they excel over time and are named from among the best advanced workers. Labor heroes are at the pinnacle of performance and are honored for unusual activity not frequently duplicated. Special mention and treatment serve not only to stimulate those who seek honor but also those who learn from the models' examples. [33; 40; 10:128–129]

Individuals honored with these various titles are also often given tangible evidence symbolizing their elite status, such as medals, banners, and money. Gold star and regular gold medals as well as certificates of merit have been awarded publicly to those with outstanding achievements. Banners to signal great accomplishments are also bestowed upon those qualifying; such emblems may be red flags or other symbolic badges such as dragons of an hierarchic order. [46; 4:169–170]

Individuals in emulation contests are also spurred on by honorary awards. One such example reveals a technique employed in appropriate industrial or agricultural units. An emulation contest in a steel company's coke factory set up honorary award classes based on six aspects of work—hence "six-good workers." Each day whoever met the standards in all six regards had a small red flag placed on the wall poster. At the end of the month, awards were made according to the number of flags posted:

Category A—25 or more flags: designation—
"Standard-Bearing Six Good Work Soldiers"
Category B—20 to 24 flags: designation—
"Red Standard Bearers"
Category C—15 to 19 flags: designation—
"Reserve Red Standard Bearers"

Such a work contest was expected to speed up output and especially to prod laggard workers on to better performance. [34]

Model and advanced workers and peasants realize gain in other ways. Extra paid vacation periods at well-known, attractive locations give further meaning to honorary awards. Sometimes elite workers and peasants, individually or in groups, are sent on special trips to foreign countries on vacation or in political or technical exchanges.

They may also help serve as hosts and guides for visiting foreigners. [47]

The crowning achievement for some model and advanced workers is to be sent as representatives to the periodic conferences, regional and national, held to extol elite workers and peasants and to glorify their image in the public eye. At these meetings they are greeted, lionized, and propagandized by the highest level officials of the Party and of their particular field. They live in relatively luxurious surroundings, eat well, see the sights, taste of various cultural activities, and generally get a feel of life at the higher levels of society in Peking or in a provincial capital. A few may even be presented with token gifts by Mao Tse-tung. [44]

2. *Group Competition*

Many group competitive incentives are very much like those employed to encourage individual output: challenging another unit to a production contest, attempting to surpass the unit's previous record, trying to exceed a quota, and working with a backward unit to raise its levels of performance. The success of the unit involved is rewarded, as with individuals, through a variety of honorary awards, reaching up in the same way to the national conferences already mentioned.

The keen rivalry among units is often harnessed to generate large increments in output. Many of these rivalries have all of the earmarks of an athletic league contest in which the standings constantly change as all units vie to win or be close to the top, the symbols of success being dragon names or flags. [67]

Another competitive form which exerts heavy psychological pressure on group members is the family emulation drive. In one such publicized contest a father, son, and two daughters working on closely related operations in the Tientsin No. 1 dyeing and weaving mill undertook the family competition after a plantwide emulation drive for reduced waste and increased output was started. The standards set in the plant campaign provided the index for each family member's operations so that comparisons among the four could be readily made. Discussion at home dealt not only with relative progress and how to improve individually, but also with the technical problems each met and how they could be overcome. The older daughter became the lagging member of the family team and was subject at home to criticism of her shortcomings. As a result, it was claimed, she stepped up her work and became a top-quality performer. The family's overall performance eventually received public praise. Such techniques are used in many industrial and farm units. [35]

B. COOPERATIVE INCENTIVES

Cooperative incentives are also used widely in China. Most of them contain competitive elements, but for ideological and pragmatic reasons the main emphasis is on cooperation. The ideological and production aims are clear: to aid in developing a Communist society in which material incentives will no longer be of great motivational significance; and to increase output and to elevate the technical production levels of workers and peasants.

These incentives usually involve mass participation techniques dealing with various production problems. Mass meetings are held: to discuss and review production experiences and concrete programs for improvement of performance; to deal specifically with the ways of raising labor productivity; to "exploit the masses' wisdom" on how to increase output; to devise means for stimulating innovations and rationalization proposals; to raise the level of "backward" units through disseminating the experiences of "advanced" units; and to rectify individual work attitudes and habits through criticism and self-criticism. Paralleling emulation drives, and often intertwined with them, mass participation or mass movements have been used both on large-scale projects in the public's eye—such as the gigantic dam construction schemes—and on lesser pursuits. While most of those forms have been used in the U.S.S.R., the Chinese seem to have used them in more varied ways and with greater intensity. [7]

The successful organization and utilization of China's masses for sustained economic growth rests on the regime's ability to motivate large and small groups to exert themselves in a sustained fashion with relatively little material reward. Success in the conception and execution of cooperative incentives is one important means of achieving this end. A social psychological breakthrough here would unleash millions of extra man-days with minimal economic cost. The possibilities of successful mobilization of labor resulting from insightful application of social psychological precepts or stagnation from inept and mechanical implementation of Party doctrine must both be considered.

The manner in which cooperative incentives appear to operate is not inconsistent with what contemporary social psychological theory prescribes for increasing productivity. The successful operation of certain types of group decisionmaking, criticism, and goal-oriented mass movements is predicated on fundamental psychological needs being met. The individual's needs for affection, for a sense of being included in important affairs, and for feeling some control or influence over events which shape his life may be positively carried out through some or all of these cooperative incentives. [60; 2; 1:249–260]

Communist reliance on worker fervor to achieve special output goals has not been confined to capital formation projects, but has also been a means of increasing output in the industrial sector. For example, a campaign to increase coal output sharply was based on the "revolutionary zeal" of the miners. The mass movement to achieve this output goal was carefully organized to control the production efforts of the miners through education and psychological pressure. The blueprint for executing the campaign was set forth: first, about 150 cadres were convened by a Party committee to be oriented on the existing conditions, the desired output goals, likely problems, and the necessary approach to the workers. The cadres were than sent to organize about 250 mass meetings among their respective working groups in which the tasks ahead were projected and heavy indoctrination doses were also dispensed. The miners were to be made aware of all key points in the production process. The meetings also made explicit individual and group production guarantees. The attempt was made to try to give every miner the sense that the success of the campaign was inextricably lined with and dependent upon his

efforts being tied to those of the others. These activities resemble production conferences in the Soviet Union. [22; 4 : 44–46]

Another technique aims at increasing labor input through public evaluation of workers, an aspect of the "evaluate-rectify work-style" movement (*Cheng-tun tso-feng*). In the 1950's, the emphasis was on criticism and self-criticism; more recently the meetings have stressed praise rather than criticism. The former method is supposed to lead to improved individual performance positively through intensifying identification with the group or negatively through fear of lowered status. The latter method aims at better individual work habits through closer group identification. [59; 37; 36:16–27]

Another method employed to arouse worker and peasant ardor is mass decisionmaking, developed during the Great Leap Forward as an aspect of political emphasis and control in industrial and farm units. (Mass decisionmaking does not mean that the workers make managerial decisions for a plant or mine or production team but rather that they discuss basic management alternatives, under Party guidance, and come to conclusions as to what the "correct" decision is and why.) In the U.S.S.R. production conferences carry out most of the same functions. In industry, decisionmaking authority was moved from the manager to the Party committee.

Still another type of mass participation technique is the exchange of technical experiences between so-called advanced and backward individuals and groups. In its earlier form the emphasis was on individuals and small groups and was mainly competitive. More recently, the stress has been on larger groups in which "comparing, learning from, overtaking, and helping" is the means by which large masses are to raise significantly their contributions to production. [52]

V. Conclusions

Since 1953 the CCP has fashioned a modern system of incentives in industry and agriculture, eliminating many earlier shortcomings. The development of systematic payment systems has been paralleled by growth of nonmaterial incentives familiar in other Communist countries. The CCP has also filled out the incentive system with a web of supporting institutions in industry. Millions of industrial workers have been placed under the coverage of a social insurance program. Benefits cover pregnancy, illness, disability, old age, and death. In agriculture welfare is more informally administered.

Material incentives in industry and agriculture are much the same as those of the Russians. The Chinese copied Soviet techniques and were thus readily able to implement sophisticated payment methods in industry despite their less-developed economy. They have not, however, pushed material incentives as far as the Russians. In 1956 in the U.S.S.R. over 77 percent of all industrial workers were paid piece wages, while the peak in China, occurring in the same year, was only about 42 percent. In the Soviet Union, 35 percent of industrial workers were paid progressive piece rates, while in China there is no evidence of widespread use of that technique. Nor have salaried workers in China been encouraged as much with raised payment scales or generous bonus provisions. The ratio of their average earnings to those of wage earners in the U.S.S.R. both in 1928 and 1934, years

when the regime was implementing a modern wage system and encouraging improvement of labor productivity, was higher than that in China in 1955 and, most probably, in 1964. In 1928 and 1934 earnings of salaried workers in the Soviet Union were 172 and 192 percent of wage earners' wages unadjusted, respectively, or 181 and 209 percent if adjusted for the impact of derationing; in China in 1955 the ratio was probably close to 150 percent and the available evidence suggests that in 1964 no significant change had occurred in that ratio. Special monetary awards for invention and innovation in China were reduced in 1963 from the higher schedules of the 1954 Soviet-inspired provisional scales, reflecting further the policy of keeping technical and engineering personnel's salaries in line. [3:117,121; 65; 71:138]

In Chinese agriculture payment mechanisms are also similar to those in the U.S.S.R. with parallel use of fractional and whole workdays according to the level of skill. Resulting scaled work grades and piecerate mechanisms characterize both Soviet collective farms and Chinese communes. The departures that communes make from Soviet practice lie in areas other than payment techniques.

Many of the forms of nonmaterial incentives evolved in the Soviet Union have also been employed in China, though they have been pushed to greater lengths by the CCP. Generally, it seems that the Chinese have relied more on nonmaterial incentives and persuasion than the CPSU. This undoubtedly was a factor of great moment in the miscarriage of the Great Leap Forward.

In the period from 1953 to 1958, for which data on overall performance exist, the quantity of labor input and output and the rate of capital formation increased significantly. Industrial output was up sharply and in general economic growth was extremely good. The level of living probably rose to a degree with much of the rise being in increased social services. [59]

Changes in distribution of the labor force between 1955 and 1958 conformed to the aims of the Chinese planners who desired more workers in producers' goods and heavy industry as well as capital construction and trade. Nonagricultural employment rose sharply from 38.9 to 50.9 million. In 1955, 56 percent of workers and employees were in producers' goods industries; by 1957, 60 percent were so located. The proportion of workers in the material production branch increased from 68.5 to over 85 percent from 1955 to 1958. Employment in metal and chemical processing industries rose from 1955 to 1957 from about 18 to 21 percent of the total, in textiles and food processing it dropped from almost 39 to 31 percent of the total. From 1955 to 1958 capital construction workers almost doubled in number. [71:128–130,143]

During the FFYP, labor productivity rose significantly. The official Chinese data, which have technical shortcomings, show an increase of over 60 percent from 1952 to 1957. After these data have been refined labor productivity's growth exceeds 40 percent—still a substantial rise. Moreover, scrutiny of changes in productivity by industries reveals that increases were most marked in those industrial sectors for which rapid growth was planned and where incentives were pushed harder—ferrous metals, metal processing, chemical processing and building materials. In textiles and food processing productivity rose less than the average. These results were consistent with the

emphasis and form given to incentives in Chinese industry during the FFYP. [17]

Although hard data are not available for the period of the Great Leap Forward (1958–60), certain generalizations on incentives and productivity seem valid. The degree to which material incentives were deemphasized and nonmaterial incentives stressed was a principal factor in the decline in productivity in both industry and agriculture. Incentive policy, thus, looms as a major culprit in that strategic debacle.

Work incentives' role in these significant changes cannot, of course, be called determining. But clearly work incentive policy was aimed at achieving the ends realized by 1958. The differentiated general wage increases and varied wage grade scales of the wage reform of 1956 had as goals the reallocation of workers and their upgrading in skill in certain favored industries. These were the branches which generally showed most significant manpower growth and improvement in labor productivity, while downgraded branches experienced opposite changes.

In the first year of the Great Leap labor input was greatly stimulated and industrial workers were moved into industries according to plan. But material incentives were generally deemphasized and industrial workers were exhorted to produce more and more as evidence of their "Communist spirit." Over time reliance on nonmaterial spurs proved to be self-defeating and morale suffered. Industrial output declined as the flow of agricultural products into the cities slackened. Labor redundancy in the cities called for reallocation to the countryside by fiat. While incentive mechanisms in industry were less disrupted than in agriculture, worker performance in industry still showed the effects of dulled material incentive. [14]

The miscarriage of the Great Leap forced the regime to abandon its major strategic goals and to restructure material inducement in industry and agriculture. Major material concessions made to the peasant were paralleled by sharpening of wage and other material spurs in industry. Piece rates were again emphasized and extended to many industrial enterprises. Less stress was placed on nonmaterial techniques. In 1963 a general wage increase granted to about 10 million workers demonstrated clearly that greater output and higher skill were to be rewarded materially. Other differential rewards emphasized again the primary role that material inducement is to play in Chinese industry.

The CCP's income policy keeps payment ranges and disparities for peasants, workers, and other personnel rather narrow so that the limits within which material incentives operate are quite constrained. This policy stems from the conviction that greater income disparity between peasants and other classes of workers will cause grave political and economic problems and, in any event, is not befitting a revolutionary Communist society. Thus, income inequality is not to be great and broad absolute increases in pay for workers must not be granted unless peasant income has risen sufficiently so that no marked disparity develops between peasants and workers. The 1963 wage increase was implemented by elevating large numbers of workers to the next highest wage grade thus leaving the wage scale unchanged.

As peasant income rises, wage scales may be raised with higher minimums more in line with swollen peasant pay.

Thus in industry workers are motivated materially in a context of moderate income inequality. Most industrial workers are in the lower wage grades. The ratio of the highest to the lowest grade is still about 3 to 1, with variations according to desired differential effect. There has been some telescoping of the wage range in recent years with lower grade workers having their standard pay increased while upper grade pay remains the same. Absence of progressive piece rates has also militated against greater income inequality. Though technicians and plant managers receive maximum pay roughly double that of the highest grade worker, there is no evidence of bountiful bonuses, such as in the U.S.S.R., which would widen the range of income dispersion.

With wage policy tied to the peasant's income situation it is likely that upward movement of wages and other payments in industry will be slow and modest. Only if the peasant's general economic position improves markedly and steadily is any significant rise in workers' income likely. The attractions of another Great Leap in this context are great, but the memory of the wide-spread economic dislocation and breakdown of 1959–61 may exercise a restraining influence on radical plans to break through.

From 1961 on the Chinese peasant and worker, exposed again to fuller material encouragement, have contributed more labor input to spark the slow recovery of the economy. Agricultural output has recovered slowly and steadily, and industrial production has also grown at a modest pace. [14]

As conditions continue to improve and approximate the output levels of 1958, though with over 75 million more mouths to feed, material incentives continue in full play. At the same time, old and new nonmaterial spurs are also employed widely. With further improvement in economic conditions, it is probable that still greater use of some nonmaterial inducements with heavy indoctrination will be made in selected ways to spur certain kinds of labor performance. At the same time, material incentives will undoubtedly be further developed as the principal means for stimulating labor performance, though held in check list undesired income disparities among various worker groups arise.

Appendix

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COMMUNIST CHINA'S EDUCATION: POLICIES, PROBLEMS, AND PROSPECTS

BY

LEO A. ORLEANS

CONTENTS

COMMUNIST CHINA'S EDUCATION: POLICIES, PROBLEMS, AND PROSPECTS

Introduction

The vital role of education in accelerating economic growth has become axiomatic. Every scheme for the development of a backward economy, whether by the indigenous government or by an international organization, lays primary stress on education and on the qualitative improvement of the nation's human resources. Consequently, it would seem that given the necessary priorities and funds there should be no further problem in raising the people's educational level in an underdeveloped country. In practice, however, many problems arise that cannot be solved with money and good intentions. Among the most difficult problems in implementing educational policies is that of adjusting them to the economic conditions and specific requirements of the particular country. Furthermore, although the relationship of education to economy is rather direct, there is still inadequate exploration of the ways in which the contribution of education and training can best be made.

Communist China's efforts in the field of education over the past 17 years have resulted in both striking successes and significant failures—illustrating clearly many of the problems faced by developing countries. The new regime was quick to realize that education must be given top priority if China's economy was to fulfill the Communist prophecy of internal growth and serve as an example of achievement under a "correct" political system. This priority was expressed through policy and through a rapidly increasing educational budget. It was not long, however, before the burgeoning enrollment resulted in predictable shortages in facilities and personnel, in a deterioration of the quality of instruction as well as in numerous problems stemming from poor planning and inadequate integration of educational and economic plans. Faced by these obstacles, and under constant and vacillating political pressures, the educational system in Communist China has had to "shift gears" with regard to both approach and content. Nevertheless, it has been able to show considerable achievement in providing elementary education and training for the masses while, at the same time, furnishing the best education available to a relatively small number of specialists in the priority fields.

It is the intent of this short paper to provide a bird's-eye view of the Chinese educational system, describe some of the policies, some of the achievements and problems, present some of the basic statistics, and finally to cover the most recent developments and to speculate a little on the future of China's education.[1]

[1] More detailed treatment of the various aspects of education discussed in this paper may be found in the writings of such specialists as Robert D. Barendsen, Theodore Hsi-en Chen, Chang-tu Hu, and others. A comprehensive bibliography on education and related subjects may be found in Stewart E. Fraser, *Chinese Communist Education: Records of the First Decade,* Vanderbilt University Press, 1965, pp. 422–496.

Before proceeding into any discussion on Communist China, a caveat with regard to data has become almost a rule—a rule which I am not able to break. In brief, statistical data on education in Communist China follow the pattern set by all other statistics. After reporting some of the basic figures on education for most of the 1950's, there has been a virtual statistical blackout during the current decade. Textual materials on education provide some idea of the general trends and activities, but they are not very helpful in any effort to estimate or project the size and quality of China's human resources. The problem is accentuated by the proliferation of different types of educational institutions and by a lack of adequate and stable definitions and standards. For example, it would be almost meaningless to estimate that there are 10 million persons in China's secondary schools because the qualitative differences between urban and rural schools, full-time and part-time schools, or any of a dozen other types of secondary level institutions, are too great. A distribution of students among these various types of institutions on the basis of currently available information is simply not possible.

Goals and Policies

In assuming control over a largely illiterate and untrained population, it would seem that the primary goal of the Chinese Communist Party would be to establish a system that would raise the overall literacy and educational level of the masses and at the same time provide as many trained individuals as necessary to meet the demands of a growing economy. This pursuit of "expertness," however, is only part of the objective of China's education. Over the years, the pursuit of "redness," or political trustworthiness, has been given even more emphasis, and most of the vacillations in China's educational policies can be traced to the periodic shifts in emphasis between the "red" and the "expert." The ultimate goal of education is to "create conditions for the gradual elimination of differences between industry and agriculture, between town and countryside, and between manual and mental labor, and eventually to realize communism." [2]

Briefly, the educational system has gone through several distinguishable periods.[3] In education, as in all activities in China during the first few years under the new regime, the major emphasis was on reorganization, reorientation, and consolidation. A basic educational reform in 1951, which called for some changes in organization, established technical and specialized schools and colleges, stressed ideological "correctness," and guaranteed everyone in the country an opportunity to receive an education. The relative stability and development of the educational system that typified the first few years of the First Five-Year Plan (1953–57) was disrupted by developments resulting from Mao Tse-tung's invitation for a hundred flowers to bloom and for everyone to express opinions and criticisms of his personal lot under the new regime. The most vocal of the critics naturally were the country's students and teachers,[4] who quickly experienced the re-

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[2] *Jen-min Jih pao* (People's Daily), May 30, 1965, hereafter referred to as *JMJP*.

[3] For a more detailed discussion, see, for example, Robert D. Barendsen, "Education in China: A Survey," *Problems of Communism*, July–August 1964, pp. 19–27.

[4] See, for example, Roderick MacFarquhar, *The Hundred Flowers Campaign and the Chinese Intellectuals*, New York, 1960; Theodore H. E. Chen, *Thought Reform of the Chinese Intellectuals*, London, 1960.

taliatory power of the regime. Many of the critics had to undergo reform through labor and self-criticism, political education was strengthened, and greater emphasis was placed on correct political thinking for entrants into the middle and higher educational institutions.

The ill-fated Great Leap Forward, which was launched in 1958 in order to transform China rapidly into an advanced industrial nation, brought about a number of significant changes in the country's educational policy so that it could better reflect the new mood and the new requirements of the economy. All education was combined with productive labor; by integrating manual work and intellectual pursuits the regime could further its objective of creating the "all-around man." At the same time, local communities, industrial units, and other institutions were made responsible for establishing and maintaining their own schools while the existing schools incorporated a variety of labor programs into their basic curriculums—some of them actually operated limited production facilities. This resulted in a proliferation of different types of schools and an immediate and drastic increase in enrollments—all at minimal cost to the government in Peking.

These developments associated with the Great Leap Forward had predictable results on the quality of the education received by the majority of the students. With shortages in teachers and facilities, with great emphasis on productive labor and political purity, only a relatively small segment of the student population was able to pursue their education seriously. The combination of mismanagement and natural calamities that forced a retreat from the Great Leap policies within the Chinese economy had parallel repercussions in the field of education. The overrapidly expanded educational system started to contract, substandard schools were closed, productive labor for students was relaxed, and by the 1961-62 school year most of the emphasis was again placed on diligent study; i.e., "expertness."

Within the charged political atmosphere that exists in Communist China, this phase in education could not last long—and it did not. By 1963, ideological education and physical labor for students were again on the ascendancy, and the educational system was given the responsibility of supplying the state with revolutionary youth whose love of Mao and the motherland would transcend all personal considerations. Great emphasis was placed once again on the "work-study" and especially the "farm-study" schools. It was stated at a national educational conference that in the future these schools would "become the mainstay of our country's educational system." [5] And yet the reversal was not complete, and the conditions did not revert to the period of the late 1950's. As recently as September 1965 the *People's Daily* was still saying that schools should implement "the policy of less quantity and high quality to enable the students to assume more initiative and to be more lively and free in their studies, with a view to creating conditions for the overall development of students—morally, mentally, and physically." [6]

The reasons for the initiation of the "great cultural revolution" in Communist China in the summer of 1966 are complex and the subject of much speculation. The effect of this "cultural revolution" on the

[5] New China News Agency, May 28, 1965, hereafter referred to as NCNA.
[6] *JMJP*, Sept. 6, 1965.

country's educational system, however, is clear in its consequences. When the schools were supposed to have opened in September 1966 they did not. The Red Guards, who are the activists of the "cultural revolution," consist, almost entirely, of students from China's middle schools and colleges. Since the major force of this revolution is to curb revisionist tendencies and rededicate China to world revolution, much of the attack is centered on the institutions of higher education which presumably are the focal point of revisionist activity.

On June 13, 1966, the Communist Party's Central Committee and the State Council decreed the abolition of the existing system of entrance examinations for higher educational institutions and the closing down of all institutes of higher learning for half a year because "the system of examinations and enrollment . . . has failed to free itself from the stereotype of the bourgeois system of examinations."[7] According to this pronouncement, the old system "places school marks in command, encourages young people "to become bourgeois specialists." and makes them strive for "individual fame, wealth, and position." Also, "it is not only the system of enrollment that requires transforming; all the arrangements for schooling, for testing, for passing or not passing, and so on must be transformed, and so must the content of education."

Given their rein, the Chinese students took advantage of the existing turmoil—as would teenagers anywhere else in the world. Whether in or out of the Red Guards, everyone seemed to find major fault with the system, the school, or the individual teacher. Literally hundreds of articles appeared in the press proclaiming "enthusiastic support" for the pronouncement of the Central Committee and the State Council, with everyone "strongly demanding" drastic changes in the "vicious old educational system." The main points of these demands were (1) more emphasis on Chairman Mao's works and on class struggle; (2) more integration of study with "production and reality"; (3) remolding of all teaching staffs and abolition of all academic rank; and most important (4) abolition of college entrance examinations and deemphasis of academic competence in order to increase the proportion of outstanding workers and former poor and lower middle peasants and demobilized army men among the students.

The last point is worthy of special note, not only because of its drastic consequences (if actually implemented), but also because after 17 years of encouragement and of special privileges, the students of worker and peasant background still constitute only two-thirds of the total enrollment in the institutions of higher education.[8] This figure is generous; other sources have quoted figures that are as low as 50–55 percent of the total student body above the secondary level. In other words, a large proportion of the students continue to come from families which, according to Peking's definition, have a bourgeois character—an affliction that apparently leaves lifelong scars. An example of the many exceptions made in order to provide "higher education" for workers is the Shanghai University of Science and Technology, which, since 1960, recruited 479 advanced workers for enrollment. The authorities felt that although very few veteran workers had a "higher

[7] NCNA, June 18, 1966.
[8] *Chung-kuo Hsin-wen* (China News Service Bulletin), Sept. 23, 1965; translated by Joint Publications Research Service, No. 33,107, Dec. 1, 1965, hereafter referred to as JPRS.

cultural attainment," they should have an opportunity that was denied them under the old society. As a result, the following standards for admission were instituted in 1960: "good in politics, high awareness, 5 or more years of working experience, skilled in production techniques, a cultural standard equivalent to spare-time junior middle school, under the age of 30, in good health and capable of persisting in study." [9]

The apparent enthusiasm of the young people of China for the closing of all schools is easy to understand.[10] It is much more difficult to rationalize the actions of the leadership. One of the few consequences that is predictable in unpredictable China is the adverse effect of this "holiday" on the education system and consequently on China's economic goals.

Structure and Numbers

Basically, there are three standard levels in the educational system of Communist China: primary, secondary, and higher. The variations within this system are anything but standard, often appear to be completely unchecked, and, as the Chinese would say, very difficult to grasp. The slogan, "walking on two legs," was introduced during the years of the Leap Forward and proclaims the need to approach all the goals through every available means, be they old or new, efficient or inefficient. The slogan is particularly applicable to the field of education where, over the years, China has been walking on the legs of a centipede.

Chinese education has a unified character in that all the basic goals and policies are established by the central government in Peking and communicated through the various administrative channels to the most distant rural schoolhouse. This is expected in a totalitarian state. What may seem surprising is the degree of discretion that is left to the individual school district, or even school, as to how these directives and policies are to be implemented. In this sense, the educational system is extremely diversified and decentralized, assuming many forms and utilizing many different methods and practices. When this multiple character of implementation is superimposed on the vacillating policies of the Peking regime, it is possible to appreciate the reason for the emerging confusion. Thus there are government-managed schools and schools that are run by factories, mines, people's communes, and other enterprises; general and technical schools; schools for adults and for children; full-time, part-time, and spare-time schools; free schools and those that require tuition; permanent and temporary schools. Within each category of schools, there are variations in terms of courses, their content, and length of the program so that there are both secondary and higher schools that may run anywhere from 2 to 6 years. A student who has completed, let us say, 9 years of schooling in a commune-run school may be years behind a student who has completed the same number of years in a better

[9] *Kuang-ming Jih-pao* (Kuang-ming Daily), Mar. 13, 1965, hereafter referred to as *KMJP*.

[10] As of this writing, China's institutions of higher education are still closed, while, according to the dispatch of a Canadian correspondent, primary schools are finally reopening in the provinces of China. (*The Washington Post*, Dec. 3, 1966, as reported by David Oancia in *The Toronto Globe and Mail*). There is still no indication as to when the secondary and higher schools will again open their doors.

urban school. The quality of education also varies depending on the particular period during which the individual was attending school.

Before discussing the more formal educational system, perhaps a few words should be said about adult education and preschool facilities. When the Chinese Communists took over the mainland and started to expand and reorganize the existing educational system, they knew that the greater part of the working force was beyond the school age and beyond the reach of formal education. In order to include this segment of the population in the educational system, the regime inaugurated a nationwide adult literacy program for the masses and a variety of technical and vocational training courses for persons already in the urban labor force.

Although the established criteria for literacy were extremely low, especially for the peasants, in 1956 the Minister of Education complained that almost four-fifths of the people were still illiterate. At the time of the Great Leap Forward, some 40 million people were presumably enrolled in "anti-illiteracy classes," but it was a slow battle. Not only were the illiterates continuing to enter adulthood at a rapid rate, but many of the peasants who apparently managed to get their "certificate of literacy" had no occasion to utilize their shaky knowledge and quickly forgot most of what they learned. At present, not too much is written about adult literacy programs. Obviously, China decided to concentrate on getting the children into school and not to spend too much effort in teaching adults to read.

In addition to the literacy programs, a great variety of other adult training programs were set up—some lasted only a few years while others survived over a longer period. Most of the training was designed to meet the needs of the urban worker. By attending spare-time schools, he could obtain the equivalent of a primary or secondary education, or he could participate in on-the-job and spare-time training courses operated by industries and other enterprises and institutions in order to improve his productive capabilities. At present the emphasis is on work improvement courses, and little is said about regular primary education for workers, which was emphasized in the 1950's.

More logically included under adult education rather than higher education are the spare-time and correspondence colleges. In 1965, there were over 1,000 of these institutions with a total enrollment of 430,000, of which 149,000 was in correspondence colleges.[11] Many of these schools catered to rural areas and provided courses in agronomy, animal husbandry, water conservancy as well as "mechanical, electrical, and civil engineering."

At the other end of the spectrum are the country's nurseries and kindergartens which, in 1958, enrolled some 30 million children. Although no later figures have been published, preschool facilities undoubtedly continue to play an important role in the society in order to permit women to participate fully in the nation's economy. In addition to the more formal type of nurseries and kindergartens that would be found in the larger cities, most of the factories maintain child-care

[11] NCNA, Dec. 10, 1965. The Peking Television University, established in 1960, seems to be a more serious undertaking. Among its students are production workers, teachers, and government cadres who enroll in its five departments: Chinese, mathematics, physics, chemistry, and foreign languages. (NCNA, Aug. 17, 1965.)

facilities for the working mothers while field nurseries are set up in the rural areas during the busy farming seasons.

PRIMARY SCHOOLS

Normally primary schools are started at the age of 7, continue for 6 years, and are divided into 4-year junior and 2-year senior primary schools. Actually, there are many schools, particularly in the rural areas, that do not go beyond the initial 3 or 4 years,[12] and there are many children who do not get into school until they are well beyond the theoretical starting age. Primary school enrollment grew rapidly during the 1950's and reached some 90 million by 1960. Although there have been no figures published since then, it is unlikely that, despite a significant increase in the school-age population, the enrollment in primary schools ever reached 100 million, and it may may have even declined since then. This conclusion is based on scattered data available for individual provinces. For example, in 1958 Kirin Province reportedly approached universal education, "but owing to the continued natural calamities * * * and all the shackles placed on us by capitalist educational thinking, this result has not been stabilized, so that universality of primary-school education has become an old and difficult problem in educational work." [13] The same source states that "The lowest school attendance rate is usually found in rural areas, where it is only 50 to 60 percent for communes and production brigades and where children not attending school are mostly from poor and lower middle peasant families." This low percentage may not be untypical for the country as a whole, especially because of the high rate of attrition between each grade. The Chinese themselves admit that "some children cannot enter school at the proper age or have to give up study in the middle of the school term and cannot finish their primary school education." [14]

One of the ways in which the regime is trying to counteract this problem is by establishing farm-study primary schools in the rural areas. During the earlier years, schools that combined education with productive labor were primarily limited to secondary and higher education, but now similar schools have been established for the young children on the communes. It was reported that 17 million children were attending the farm-study schools in September 1965.[15] It is interesting to note that, when possible, parents prefer to send their children to adjacent full-day schools, and the authorities have admitted considerable difficulties in "selling" farm-study primary schools even to the peasants. To transfer from a farm-study school into a state-operated full-day school, a student has to pass an entrance examination; few make the grade.

Another important reason for China's problems in achieving universal primary education is that not even these schools are entirely free of charge and, as a result, fewer children of poor families attend primary schools. Undoubtedly, this is also an important reason for

[12] Some rural primary schools include only three grades at the junior level, while some senior primary schools consist of only the fifth grade.
[13] *Chi-lin Chiao-yu* (Education in Kirin), No. 7, July 15, 1965; translated by JPRS, No. 33,793, Jan. 19, 1966.
[14] *KMJP*, Apr. 10, 1966; translated by JPRS, No. 37,161, Aug. 22, 1966.
[15] *JMJP*, Sept. 28, 1965.

the pressure to establish farm-study schools in China's villages; they make it possible for the children to compensate the local authorities for their education and thus avoid a monetary payment.

SECONDARY SCHOOLS

There are many different types of courses that may be pursued by a boy or girl who has completed a 6-year elementary school. Although statistics on this level of education are particularly confusing even for the period when data were reported, in 1959 somewhere between 8 and 9 million students were enrolled in China's secondary general schools. These schools are divided into two 3-year levels, roughly comparable to our junior and senior high schools. Only approximately one out of six junior middle school students, however, has an opportunity to enter the senior middle schools which, of course, supply the great majority of entrants into the institutions of higher education.

Students who continue their education but do not enter the secondary general schools may choose from numerous specialized schools that are operated by the State or, more likely, by an individual enterprise which both instructs the students and utilizes their services. In addition to industrial vocational schools, there are secondary schools in the fields of agriculture and forestry, public health, finance and economics, as well as normal schools which train teachers for primary schools or even for junior middle schools. Despite the proliferation of specialized schools and other less formal educational arrangements, it would not be surprising if the enrollment in the general schools had remained fairly constant since the late fifties.

All the general (full-time) middle schools and the overwhelming proportion of the specialized middle schools are located in the urban areas of China. Until 1958, for all practical purposes, there were no middle schools in the Chinese countryside. With the Great Leap Forward, the regime introduced the part-work, part-study agricultural middle schools in the communes. Enrollment in these schools grew quickly and reportedly reached 3 million by 1959–60. Disrupted during the agricultural crisis of the early sixties, Peking started a new push on these schools in 1964 and 1965 when they directed the local authorities again to establish this type of education. Without any assistance from the Central Government, and to compensate for the limited local resources, the brigades (villages) had to place maximum emphasis on the "great red flag of Mao Tse-tung's thinking." "When they are devoid of school premises, teachers and students construct them with their own hands. When they are devoid of desks and chairs, teachers and students make them with their own hands." [16]

These agricultural middle schools are ideally suited to meet the special problems and needs of rural China. They raise the general educational level of the rural population, without withdrawing any significant labor force from the rural economy since most of the study is done during the slack farming season. Like the primary level work-study schools, they are almost entirely locally subsidized and, therefore, do not present a financial burden to the government.[17]

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[16] *Chi-lin Chiao-yu* (Education in Kirin), No. 7, July 15, 1965; translated by JPRS, No. 33,793, Jan. 19, 1966.

[17] For example, one of the hsien (counties) in Hopeh Province reportedly has 3,100 students enrolled in agricultural middle schools. In 1964, these schools received State subsidies of 8,300 yuan, or less than 3 yuan per student per year. (*Kiangsu Chiao-yu* (Kiangsu Education), No. 1, Jan. 25, 1965; translated by JPRS, No. 30,982, July 8, 1965).

School fees are low, and the students can meet part or even all of the study and livelihood expenses through their own labor. On the other hand, agricultural middle schools in no sense can be equated with the general middle schools located in the cities. Most of these schools provide only four courses: "political subjects, language, arithmetic, and agricultural knowledge," and follow these principles: "Teach whatever the people's communes want; teach whatever is needed locally; teach whatever the masses lack knowledge of; teach whatever is necessary for the current farming operations; teach first what is urgently needed for use; and study in order to put the acquired knowledge into application." [18] These courses make it possible for the students to "pass hard tests politically and pass muster technically." Although the agricultural middle schools are academically deficient, the students learn to read and become conversant with numbers, while in some more specialized schools they do acquire skills that are in very short supply in the countryside, such as learning to drive a tractor, repairing of machinery, and basic knowledge of electricity.

HIGHER EDUCATION

Higher education, as education at the lower levels, is also "walking on many legs" in Communist China. It is, therefore, difficult to make meaningful evaluations of the number of institutions of higher education and of their enrollment.

At the apex of the higher education pyramid are about 20 comprehensive universities that have several academic departments and continue to offer courses to full-time students for a period of 4 or more years, as well as special universities such as the University of Science & Technology and the Tsinghua Polytechnic University, both in Peking. These universities provide China with her higher level personnel and leading scientists and engineers. In the middle of the pyramid are the hundreds of specialized colleges that have narrow fields of specialization, with courses lasting anywhere from 2 to 4 years. A rung below these colleges are the spare-time and part-time institutions of higher education that are usually run by individual enterprises, industrial ministries, or local governments. Most of the students in these institutions are workers, who are skilled in productive operations but do not have the formal education that would be required for entrance to the more legitimate institutions. At the bottom of the pyramid are the so-called worker and peasant colleges that first came into being during the 1958–59 Great Leap Forward and, in no stretch of the imagination, can be considered institutions of higher education.

Enrollment in the institutions of higher education grew rapidly during the 1950's, increasing by 50 percent between 1957 and 1958 and 1958 and 1959 and reaching a peak of 810,000 by the 1960–61 school year. Although no enrollment figures have been published since then, there are indications that enrollment dropped off and may be in the vicinity of 700,000 at present. Until the closing of the schools by the "cultural revolution," admittance to a university depended, first of

[18] *Kiangsu Chiao-yu* (Kirin Education), No. 2, Feb. 25, 1965; translated by JPRS, No. 30,982, July 8, 1965.

all, on the needs of the state. Quotas were set up for various specializations, whereupon selections were made on the basis of examination results, political conformity, and health of the individual student. The distribution of students by field of specialization reflected the regime's emphasis on those fields which had the most immediate practical application. Thus the greatest increase occurred in the fields of engineering and education, primarily at the expense of the social sciences, law, literature, and the arts. Although the growth in scientific education was impressive, it was not as rapid as the growth in engineering and technical education, because the contribution of a graduate in the physical sciences is not as immediate, in most cases, as that of an engineer. Furthermore, despite vigorous attacks on foreign science and technology, the Chinese Communists continue to rely heavily on borrowed scientific know-how.

It is estimated that a present (January 1967), there are slightly over 1.7 million persons on the Chinese Mainland who have completed some form of higher education.[19] Of this total, roughly one-third are engineering graduates, one-quarter are graduates in education, while only about 6 percent have majored in one of the natural sciences (see table). It is important to note that the two fields that account for over half of the personnel with completed higher education also have the largest number of graduates with less than a 4-year education.

Universities did not award advanced degrees in pre-Communist China, and students seeking them went abroad, primarily to Japan, the United States, or Europe. A plan to award such degrees was finally formulated and announced in 1956, with most of the responsibility falling on research institutes of the Chinese Academy of Sciences, and specifically on qualified research personnel, who were to tutor small groups of students. Although figures on the number of entrants into the advanced degree program were published for a few years, none have been released on the number completing such a program. One of the reasons for the lack of such data is that the system was never adequately formalized and was not really successful. In all probability, any student who remained at the university for an additional period of time to participate in further study or research was considered to be a graduate student. Despite the ambiguity of the whole program, however, there must be an elite group of students, particularly in the fields of science and engineering, who continue to attain graduate level competence within their area of specialization.

Until 1960, the Soviet Union played an important role in training specialists for China. During the years of economic cooperation, hundreds of Soviet experts participated in China's economic planning and construction, in scientific research, and, to a more limited extent, in the field of education. At the same time, thousands of Chinese scientists, professors, and students were sent to the Soviet Union either on short professional tours or to receive training. It is estimated that of the 7,500 students who went to the Soviet Union

[19] Through coincidence, this figure is very close to the total number of persons who have graduated from institutions of higher education between 1949 and 1966 (estimated at 1,716,000). The composition of the two figures is not exactly the same, however. The manpower estimate includes the above graduates, less deaths for a period of some 18 years, plus perhaps some 75,000 survivors of the pre-1949 graduates. It just so happens that the deaths among the younger but more numerous post-1949 graduates compensate, to some degree, for the addition of the pre-1949 survivors.

Graduates from institutions of higher learning in Communist China by field, 1948–49—1965–66

Year	Total		Engineering		Natural sciences		Agriculture and forestry		Medicine		Education		Finance and economics		Other	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	1,716,000	100	577,840	34	98,387	6	140,149	8	184,868	11	468,417	27	87,140	5	159,199	9
1948–49	21,000	100	4,752	23	1,584	8	1,718	8	1,314	6	1,890	9	3,137	15	6,605	32
1949–50	18,000	100	4,711	26	1,468	8	1,477	8	1,391	8	624	4	3,305	18	5,024	28
1950–51	19,000	100	4,416	23	1,488	8	1,538	8	2,366	12	1,206	6	3,638	19	4,348	23
1951–52	32,000	100	10,213	32	2,215	7	2,361	7	2,636	8	3,077	10	7,263	23	4,235	13
1952–53	48,000	100	14,565	30	1,753	4	2,633	6	2,948	6	9,650	20	10,530	22	5,921	12
1953–54	47,000	100	15,596	33	802	2	3,532	8	4,527	10	10,551	22	6,033	13	5,959	13
1954–55	55,000	100	18,614	34	2,015	4	2,614	5	6,840	12	12,133	22	4,699	8	8,085	15
1955–56	63,000	100	22,047	35	3,978	6	3,541	6	5,403	9	17,243	27	4,460	7	6,328	10
1956–57	56,000	100	17,162	31	3,524	6	3,104	6	6,200	11	15,948	28	3,651	6	6,411	11
1957–58	72,000	100	17,499	24	4,645	6	3,513	5	5,393	8	31,595	44	2,349	3	7,006	10
1958–59	70,000	100	(23,310)	(33)	(4,410)	(6)	6,318	9	9,000	13	(21,000)	(30)	(2,450)	(4)	(3,512)	(5)
1959–60	135,000	100	(44,955)	(33)	(8,505)	(6)	(10,800)	(8)	(14,850)	(11)	(40.500)	(30)	(4,725)	(4)	(10,665)	(8)
1960–61	162,000	100	54,000	33	10,000	6	12,000	7	19,000	12	49,000	30	(5,670)	(4)	(12,330)	(8)
1961–62	178,000	100	59,000	33	11,000	6	20,000	11	17,000	10	56,000	32	(6,230)	(4)	(8,770)	(5)
1962–63	200,000	100	77,000	38	10,000	5	17,000	8	25,000	12	46,000	23	3,000	2	22,000	11
1963–64	200,000	100	(70,000)	(35)	(11,000)	(6)	(18,000)	(9)	(23,000)	(11)	(56,000)	(28)	(6,000)	(3)	(16,000)	(8)
1964–65	170,000	100	(60,000)	(35)	(10,000)	(6)	(15,000)	(9)	(19,000)	(11)	(48,000)	(28)	(5,000)	(3)	(13,000)	(8)
1965–66	(170,000)	100	(60,000)	(35)	(10,000)	(6)	(15,000)	(9)	(19,000)	(11)	(48,000)	(28)	(5,000)	(3)	(13,000)	(8)

NOTE.—Numbers in parentheses are estimates. Percent detail may not add to totals because of rounding.

1948–49—1962–63: C. Y. Cheng, *Scientific and Engineering Manpower in Communist China, 1949–63*, National Science Foundation, Washington, 1965, p. 78.

1963–64: Total reported in *Chung-kuo Ching Nien Pao* (China Youth Daily), Aug. 13, 1964. Distribution based on the average for the previous 3 years (1960–61—1962–63).

1964–65: Total reported in *Jen-min Jih-pao* (People's Daily), Aug. 11, 1965. Distribution, same as for 1963–64.

1965–66: In a sense, these figures are completely fictitious. The Cultural Revolution interferred with the orderly completion of the 1965–66 school year, so that most probably the majority of the students received neither a certificate of completion nor a job assignment. Nevertheless, it would be inaccurate to exclude these individuals since they did pursue their studies during most of the school year. There is no reason to believe that there was a drastic change in the number and distribution of students scheduled for graduation and the 1964–65 figures are repeated.

between 1950 and 1960, 2,000 were graduate students.[20] Since 1960, the number of Chinese students in the Soviet Union has decreased yearly, until in October 1966 the remaining 65 students were expelled by the Soviet Government.

It is estimated that the number of persons in China who have completed graduate studies, both in China and abroad, is in the vicinity of 10,000 to 12,000. At least three-quarters of them are believed to be scientists and engineers.

Quality of Education

There are two possible approaches in evaluating Communist China's accomplishments in the field of education. One is to compare the training of an average Chinese youth with that of students in the West, a comparison which will be unfavorable to China since the majority of her schools cannot provide an education that will meet the standards of the world's advanced countries. It is much more realistic to consider China's accomplishments in the field of education in relation to her past and in the light of the problems she must face and the specific needs of her economy.

Determined to raise the overall educational level of the population but realizing the magnitude of the problem, the Communists decided to compromise by attempting to give the largest portion of the population a limited education (requiring minimum expenditure of capital and time away from production), and, at the same time, to train a smaller group more adequately, and to thoroughly educate a select handful of politically and scholastically qualified individuals.

The problems that the Chinese faced were similar to those of all developing countries striving for modernization, but China's obstacles were on a much larger scale. With rapid growth in enrollment, there was, and continues to be, a severe shortage of qualified teaching personnel. The problem is serious at all educational levels, but most serious in China's countryside, where 80 to 85 percent of the students are located. Typical is a complaint of one region with 161 agricultural middle schools that "85 percent of the teachers today, judging by their cultural standards, are inadequately trained in their special fields and are in need of improvement."[21] The standards referred to above are generally quite low. Thus, with the exception of some of the better urban schools, children in primary schools are, at best, taught by graduates of the junior middle schools; those in the junior middle schools are taught by graduates of the senior middle schools; the latter by graduates of the 2-year normal schools. Quite often even these minimal standards are not achieved in rural China.

To a somewhat lesser degree, the problems of teaching personnel, facilities, and equipment also exist in institutions of higher education, particularly in those of the post-Leap Forward variety. Major universities that are on the standard itinerary of the touring scientists apparently are well provided for, however.

Few textbooks seem to find their way out of China, and a detailed evaluation of their content is difficult to make. With so many different

[20] C. Y. Cheng, *Scientific and Engineering Manpower in Communist China, 1949–63*, National Science Foundation, Washington, 1965, p. 196.

[21] *Chi-lin Chiao-yu* (Education in Kirin), No. 7, July 15, 1965; translated by *JPRS*, No. 33,793, Jan. 19, 1966.

types of schools, levels of education, and periodic shifts in emphasis, the writing and publication of textbooks could be—in a different economy—a lucrative business. Given the conditions in China, and the size of the student body, publication and distribution of appropriate texts could very well be a major problem. One solution that has been widely utilized by the school authorities is to translate, primarily Russian, textbooks into Chinese. It seems safe to assume that Russian texts are on the decline, but undoubtedly numerous college texts used in Europe and the United States continue to be translated. Of some 200 scientific books published by Science Press in Peking in 1965, about 50 percent were translations of Soviet and Western publications.

A conclusion that need not be based on assumptions is that an inordinate amount of time is spent on political training, on the study of Marxism-Leninism, the history of the Communist movement, and the writings of Mao Tse-tung. The proportion of time spent on these subjects varies from one type of school to another and from one year to the next—depending on whether the "flowers are blooming," or the country is "contending and rectifying." In the legitimate institutions of higher education, the amount of time which the student must spend in political study usually averages between 10 and 20 percent of the entire curriculum, while in the part-time schools for workers and peasants, one-third to one-half of the time may be spent on political topics. This excessive emphasis may well go beyond the prescribed requirements. In the first place, how better for a teacher to assure his personal security; in the second place, for a poorly trained individual it is much easier to read Mao's works to the class than to teach a regular course.

But this must be only part of the story, or else how could China have consolidated its controls over the economy? How could she have overcome the serious and prolonged economic crisis of the early 1960's? How could she have become one of only five world nuclear powers? Obviously Communist China's educational system has not been as ineffective as could be implied from the preceding paragraphs. The answer is in the "other leg" of China's education.

Urban areas of China maintain adequate numbers of schools that offer the students the best education China is able to provide. Numbers are not available, but over the years these urban primary and secondary schools have been able to supply the better institutions of higher education with more than enough candidates to fill the limited number of available openings. At the select universities, the student is provided with all the necessary facilities, as well as instruction by some of China's most competent professors, many of whom are Western-trained and must double as teachers and researchers at the Chinese Academy of Sciences.

It is difficult to criticize China for emphasizing physical sciences and technology at the expense of the social sciences and the arts. She is a country in a hurry and must pick and choose those areas of specialization that are likely to contribute more immediately and more directly to her economic growth. Many of the Chinese engineers, for example, are overly specialized, extremely weak on basic theory, and, in effect, little more than middle level technicians. But China needs this type of specialist. It would be a waste of time and money for China to

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produce nothing but highly trained engineers who have spent 4, 5, or more years at a university. While a nucleus of these people is available, the Chinese economy, in its present stage of development, would probably have difficulty in absorbing large numbers of these individuals.

Another good example of China's practical approach to education is in the field of medicine. There are many developing countries around the world which are desperately in need of medical personnel. But what is their solution? They train highly competent doctors who meet all the standards required by Western medicine, but who refuse to live in the conutryside and to serve the needs of the peasant. The Chinese are much more realistic. They have neither the time nor the money to train only highly competent medical doctors; instead they are producing thousands of middle level medical personnel who return to serve in the village of their origin. They are not able to provide the professional care of the medical doctor, but they play a vital role in providing the masses with the basic medical needs, taking care of emergencies, and teaching the people the importance of sanitation and personal hygiene. Also, the thousands of medical practitioners (herb doctors) have been given equal status with the doctors trained in Western medicine and are fully utilized around the country. This does not mean that the Communists are blind to the differences between the native- and Western-trained doctors (although from their writings it is easy to come to that conclusion); it is again a case of "making do" with what is available until improvement can be brought about.

Education and the Economy

More than 40 years ago, the Soviet academician, Strumilin, estimated that primary education in the Soviet Union increased a worker's efficiency by over 40 percent, secondary education by over 100 percent, and completed higher education by over 300 percent. [22] The applicability of these specific figures either to China or to the present decade is not important; the message it conveys has not changed. The importance of investing capital in human resources through education has been expressed countless times and is universally accepted. In developing countries, the problem is how to integrate education with the economy rationally so that neither will suffer because of an inability of the other to provide for it.

Budgetary data on Communist China are scarce for the 1950's and almost nonexistent for the 1960's. Despite an admission that "the State is in no financial position at present to satisfy fully the needs of the people" in the field of education, Communist China spent an average of 7 percent of its national budget on education between 1951 and 1956 and almost 10 percent in 1957.[23] Since 1957 China experienced many changes in its educational system, but because such a large share of the financial burden for education was relegated to the local communities which had to support schools with existing resources, it is unlikely that the proportion of the national budget allocated to education ever exceeded 10 percent. As a matter of fact, it may have

[22] S. G. Strumilin, *Ekonomicheskoye Znacheniye Narodnogo Obrazovaniya* (The Economic Significance of People's Education), Leningrad, 1924.

[23] See, for example, L. Orleans, *Professional Manpower and Education in Communist China,* National Science Foundation, 1961, pp. 14–17.

declined significantly since 1960. It is, of course, impossible to measure the cost of education at the local level.

As difficult as it is for Peking to allocate the necessary resources for education, it is just as difficult to achieve a happy medium between the quantity and quality of manpower produced by the educational system and the growing needs of an economy that relies equally on the simple plow and on the electronic computer.

China's population is growing by some 14 to 16 million persons per year. Over 10 million youths enter the labor force ages annually and must be absorbed into the economy. Even during the period of rapid industrial growth, the regime admitted that the cities could not effectively absorb much more than 1 million persons into the urban economy annually. As a result, China had to limit the so-called "blind infiltration" of rural population into the urban areas and periodically had to round up these peasant migrants and return them to their villages. The agricultural failures in the early sixties and the ensuing crisis in China's urban economy resulted in a major change in China's economic policies. Beginning in 1962, production priorities were shifted from industry to agriculture, thus further limiting the cities' requirements for additional skilled labor and contributing to the very basic and acute problem of having to absorb the bulk of the growing manpower into the rural economy.

To assist the rural areas in counteracting the increasing population pressure on arable land, Communist China has instituted a number of policies designed to help the economy to absorb this manpower. In recent years, in addition to continuing the mass labor projects in water conservancy, afforestation, flood control, land reclamation, road construction, and other miscellaneous activities, the Government has been emphasizing the so-called subsidiary occupations. These activities are primarily household oriented and are to occupy all those who can be spared from basic agricultural production. Members of the communes are encouraged to engage in handicraft activities, to plant additional fruit trees or bamboo plants, to raise domestic animals and fowl, to gather wild plants, and so forth. Material incentives are provided in order to secure some enthusiasm for these activities.

This thumbnail description of China's problems in utilizing rural manpower is directly pertinent to educational policies. Under these circumstances what should the role of education be? What type of education should be provided children and youth who have little, if any, possibility of leaving the farms for either white-collar or blue-collar employment? How can just enough education be provided to raise the overall cultural level of the rural youth, yet not enough to affect their morale adversely or make them rebel at the thought of a future of building up a Socialist countryside?

From what is known about China's educational trends and policies, it may be concluded that the questions raised above were not considered too seriously during most of the first decade under the new regime. The leadership was much more optimistic and idealistic: As much education as possible for as many people as possible. The limiting factor was cost to the economy, with little thought given to the economic and social consequences of this kind of philosophy. It was probably not until after the Great Leap Forward, and particularly during the critical years of 1961 and 1962, that the leadership has had to recognize

some of the problems stemming from imbalances between education and the economy.

Although many of the urban students in the 1950's were required to participate in various forms of manual labor and, on occasion, to spend summers and holidays working in rural cooperatives and communes, it was not until 1961, when the deepening economic crisis decreed agriculture as the economic base and industry as the leading factor, that the regime implemented a policy of curtailing enrollment, closing substandard schools, and moving students to the countryside on a permanent basis. Hundreds of thousands of urban youths at various stages of completed schooling were prevented from pursuing their education. As of mid-1966 it was reported that "Well over a million educated young people from Chinese cities, determined to take the road of revolution and to become working people, have gone to live and work in the countryside since 1962." [24] Although most of them were from middle schools, expendable college students were also included, that is, those who were studying subjects that ranged from the agricultural sciences to art, education, and law. *People's Daily* bluntly expressed China's dilemma: ". . . the desire of the young men and women for education cannot be fully satisfied." [25]

The reaction of China's urban youth to these developments was predictably bitter, and the regime utilized all the facilities of China's vast propaganda machine to convince the students that whether they continue their studies or join in production they are part of the revolution. In 1965, an article in an educational journal, for example, discussed students who would complete their elementary and middle school studies during the summer: "Some of them will advance to higher levels and continue their studies, but the majority will enter into productive labor . . . However, there are still quite a few students who are unable to correctly see the relationship between the desires of the individual and the needs of the state." [26] In other words, you may want to go on with your education, but the state can't afford the luxury.

"Dear Abby" type columns have been extremely popular in China and are often more revealing than lengthy analyses in professional journals. A letter to "Comrade Editor" that appeared in *China Youth* states: "I am a third-year student in senior middle school . . . Every day, I come to school early and leave late, studying hard . . . But some fellow students say that I am wrong to think only of seeking admission into a university . . . They even think that only going to the agricultural front is glorious and brave . . ." The reply of the editor is typical: ". . . Provided we have a red heart and a wish to serve the people wholeheartedly and to labor, study, and struggle for the sake of the revolution, then we shall be able to make useful contributions to the motherland whether we continue our studies or take part in productive labor . . . . It is, of course, glorious for middle school students if they respond to the appeal of the motherland and go to the agricultural front, but it is equally glorious if, as required by the state, they go to schools of higher grade to continue their studies . . ." [27]

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[24] NCNA, Sept. 27, 1966.
[25] *JMJP*, Mar. 31, 1966.
[26] *Che-chiang Chiao-yu* (Chekiang Education), No. 4, April 1965; translated by JPRS, No. 33,142, Dec. 3, 1965.
[27] *Chung-kuo Ch'ing-nien* (China Youth), No. 8, Apr. 16, 1965.

Propaganda notwithstanding, it would undoubtedly be difficult to find a youth so full of ideological fervor and revolutionary zeal that he would prefer to leave even the drab Chinese city for the healthy climatic and political atmosphere of the countryside. To some extent, the disappointment of the students must have had adverse reactions on their parents, and more important for the leadership, on the morale of students still in school. Many of them felt that ". . . since most of the graduates from the elementary and middle schools will have to go to work, they need not prepare for advanced studies and consequently neglected their studies." [28]

Once among the peasants, the "young intellectuals" were to "temper themselves in hard manual work" and eventually to help raise the cultural level of the countryside by taking jobs as teachers and bookkeepers, for example. Unfortunately for the "urban intellectuals," most of the peasants were just as unhappy to see them arrive as the students were to come, thus creating difficult social problems of integration. An example of the difficulties is expressed in the following poem written by the "local masses":

Behold the graduate of the ordinary middle school,
He is capable of doing nothing correctly.
Ask him to handle human manure,
He complains it is not sanitary.
Request him to make use of the abacus,
He does not know how it is operated.
Tell him to grow sweet potatoes,
He raises a crop of onions instead.
If you want an important job attended to,
Better rely on one from an agricultural middle school.[29]

Conclusions

Without statistics, with only vague economic indexes, and during the height of the "great cultural revolution," projections or predictions of the future in Chinese education can be little more than a gesture of frivolity. Let us then be frivolous. If the cultural revolution will run its course and finally phase out into a condition of relative stability, what can be expected of the next decade in the field of education? It is difficult to foresee any drastic changes.

The situation in the urban areas should stabilize so that in the future it will not be necessary to send urban students to the countryside. Even assuming that China's industrial development will accelerate over the rate of the past half dozen years, the urban areas of China should be able to supply most of the skilled manpower necessary for a growing urban economy. This, of course, means that the nature of education in the rural areas will have to be molded in a way that will provide hundreds of millions of children and youths with the three R's and a much more select group of students with training that will meet the limited requirements for semiprofessional personnel to fill administrative and technical positions in rural China. Six-year universal

[28] *Che-chiang Chiao-yu* (Chekiang Education), No. 4, April 1965; translated by JPRS, No. 33,142, Dec. 3, 1965.
[29] *Kiangsu Chiao-yu* (Kiangsu Education), No. 1, January 1965; translated by JPRS, No. 30,982, July 8, 1965.

primary education will not be achieved in rural China within the next decade, but it is quite possible that a 4-year primary education will become available to almost all the children in the country. Relatively few offspring of peasants will be able to leave the village and to improve their social and economic status within the urban economy. Probably most schools in rural areas will continue to be of a farm-study variety. If the economic situation improves, a larger proportion of the urban training will be on a full-time basis.

Thus, China will continue to "walk on many legs" and to support and encourage many different types of schools to meet a variety of conditions and needs that evolve from continued use of both labor-intensive and capital-intensive projects.

Assuming no economic crisis of the 1961 variety, enrollments in institutions of higher education should increase again, but they should not experience another Leap Forward. Emphasis on science and technology will persist indefinitely at all educational levels and so will concentration on the practical and the immediate. With the continued emphasis on teacher training and special schools for teacher improvement and advancement, the general quality of education should improve gradually; nevertheless, only select urban schools will continue to train the Chinese elite.

Communist China's accomplishments in education cannot be slighted. It can be said that, except for periodic disruptions, Communist China has managed to create and operate an educational system that is ideally suited to her conditions and goals. Unable to provide the hundreds of millions of people with first-rate education, she has encouraged an atmosphere of learning, has made literacy among the masses one of the primary goals, has managed to elevate the overall educational level of rural youth, has trained adequate numbers of middle-level specialists and technicians, and, at the same time, has not neglected the economy's requirements for higher level professional personnel, particularly engineers and scientists. China has done this with a minimum of disruption to individual productivity, in most instances, by combining education with work and at a minimum cost to the state, by making the local authorities responsible for the education of the people within their jurisdiction.

China's achievements in education would have been even more impressive had it not been for the constant emphasis on political orthodoxy and political training. By encouraging educational achievements and, at the same time, distrusting those who do achieve a high level of competence, Communist China has had one foot on the accelerator and one on the brake throughout most of her 17 years of existence. In the final analysis, China's future thus depends on whether she persists in placing politics above all else or gradually deemphasizes political controls. Although education in Communist China is "on the right track" in many ways, only when "expertness" will take precedence over "redness" will China truly be in a position to move forward toward her ambitious economic goals.

SCIENTIFIC AND ENGINEERING MANPOWER IN COMMUNIST CHINA

BY

CHU-YUAN CHENG

CONTENTS

STATISTICAL TABLES

SCIENTIFIC AND ENGINEERING MANPOWER IN COMMUNIST CHINA*

I. Introduction

The significance of human resources in the economic growth of underdeveloped countries has come to be widely realized by economists during the past decade. Since manpower is the basic resource, it is the indispensable means for converting other resources to mankind's use and benefit. The dramatic events of our era bear adequate testimony to the fact that the rate of development of science and technology is one of the most decisive factors in determining the economic and military power of a nation.

Since the establishment of their regime in 1949, the Chinese Communists have shown a keen awareness of the need to build up an adequate body of scientific and technical manpower. When the Chinese People's Political Consultative Conference adopted its common program in September 1949, it stipulated: "Efforts should be made to develop the natural sciences in order to serve the construction of industry, agriculture, and national defense. Rewards should be given for scientific discoveries and inventions. Dissemination of scientific knowledge should be greatly strengthened." To attain this goal, the higher educational system in Mainland China has undergone substantial changes since 1951. State expenditures allocated to higher education and scientific research increased considerably between 1950 and 1960. As a result, during the 1949–63 period, nearly 1.2 million Chinese students graduated from college and universities. Of them 671,000 majored in the four categories of natural sciences, agriculture, medical sciences, and engineering.

The purpose of this paper is to investigate the training and employment of Chinese scientific and engineering manpower during the period from the inception of the Communist regime in 1949 to 1964, the last year when data were available. The term "scientific and engineering manpower" as used in this paper is defined broadly. Scientists and engineers in addition to specialists in biology, chemistry, physics, mathematics, geology and general science, and engineering specialists in chemical, civil and structural, electrical, mechanical, aeronautical, metallurgy and other engineering, also include agricultural scientists and engineers as well as medical doctors. This concept is adopted by the United Nations concerning scientific and technical manpower for

* This paper is based in part on materials from the author's new book, *Scientific and Engineering Manpower in Communist China 1949–1963*, published by the National Science Foundation in January 1966. The analysis has since been supplemented and updated.

underdeveloped countries,[1] and is also similar to that conceived by the Chinese Communist regime.[2]

Because of the poverty of source material, to arrive at reasonably concrete estimates of the scientific and technical manpower, a survey was made on the biographic data of 1,200 prominent Chinese scientists and engineers. These 1,200 persons in 1963 were college or university professors, research fellows in the Chinese Academy of Sciences, and other important research organizations, or chief engineers in the production enterprises. They were considered to be reasonably representative of their associates in terms of position and achievements. One-third of them held Ph. D. degrees. Their biographic data, gathered from widely diverse sources, provide a microanalysis of the hard core of Chinese scientists and engineers. Statistics presented in this paper were compiled from scattered sources which, though they are subject to certain degrees of error, still can provide a basis for estimates in this special field where official figures are particularly scarce.

II. Supply and Demand

The demand for specialized manpower is usually related to the stage of development of a nation's economy. In a centrally planned economy, anticipated demand for specialized personnel is usually stipulated in annual or long-term plans, as that of the Soviet Union. But in the First and Second Five-Year Plans of Communist China, detailed data for scientific and engineering manpower were not specified.

When Communist China mapped out its 12-year plan for the development of science and technology in 1956, it was estimated that demand for engineers and agrospecialists by the end of 1967, would reach at least 4 million. With the addition of scientific workers, teachers of science and engineering, and medical and pharmaceutical personnel, the demand for scientific and engineering manpower during the 1956–67 period would be estimated at 6 million, of which 2 million are high-level specialists with college diplomas and 4 million are medium-level technical personnel with secondary vocational education.

The demand for senior scientists was not mentioned in official statement. V. A. Kovda, former Soviet adviser to the president of the Chinese Academy of Sciences, indicated in 1955 that:

> In 1955, the Soviet Union has 30,000 scientific workers with advanced academic degrees of doctor or candidate or with high academic titles such as professor or lecturer. Since the Chinese population is treble that of the Soviet Union, China needs about 90,000 to 100,000 scientific workers with advanced academic degrees or titles.[3]

To meet the growing demand for specialized manpower, engineering, technical, and scientific research personnel have increased sharply during the 10-year period 1952–62. (Table 1.)

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[1] W. Brand, *Requirements and Resources of Scientific and Technical Personnel in the Asian Countries.* Paris: UNESCO, 1960, p. 27.

[2] State Statistical Bureau, *Ten Great Years,* Peking: Foreign Languages Press, 1960, p. 203.

[3] *K'o-hsüeh T'ung-pao* (Bulletin of the Chinese Academy of Sciences) No. 5, 1955, p. 38. Hereafter referred to as KHTP.

TABLE 1.—*Engineering and technical personnel in Communist China, by year and number, 1952–62*

Year	Number of persons (in thousands)	Index number (1952=100)
1952	164	100
1953	210	128
1954	262	160
1955	344	210
1956	449	274
1957	496	302
1958	618	377
1959	1,000	610
1960	1,100	671
1961	1,270	774
1962	1,400	854

Source:
1952–58: State Statistical Bureau, *Ten Great Years*, p. 184.
1959: Speech by Lu Ting-yi, director of Party Central Propaganda Department; in Chung-kuo Hsin-wen (China News Service), Canton, Oct. 31, 1959, p. 3.
1960: Chang Chi-ch'un, article in *Hung-ch'i* (Red Flag), No. 3, 1960, p. 11. Chang's figure of 1,000,000 was for early 1960; the yearend figure is here estimated to be 100,000 greater.
1961: According to *Jen-min Jih-pao* (People's Daily), Jan. 11, 1960, 170,000 persons were to be added in 1961.
1962: There were 59,000 graduates from engineering colleges and about 70,000 from the secondary vocational schools in 1962, or a total increase of about 130,000.

The total technical and engineering personnel in Communist China in 1962 was 8.5 times the number in 1952. These personnel include four major categories: (1) professional engineers with at least the equivalent of a college diploma (they accounted for only a small fraction of the total), (2) skilled workers who did not have a college education but who were promoted to engineers (this category increased rapidly since 1958), (3) technicians with college diplomas or a secondary vocational school education, and (4) skilled workers with the title of technician.

Scientific research personnel usually include five groups: (1) senior research staffs including research fellows and associate research fellows; (2) research assistants and technicians; (3) laboratory personnel; (4) library staffs; and (5) administrative staffs. In 1958, of the 118,600 scientific research personnel, only 32,800 were classified as research and technical personnel.[4]

While teachers in the secondary vocational schools are not scientific or technical personnel in the strict sense, they might be considered potential scientists. Teachers in institutions of higher learning, however, are the significant scientific research personnel in China. Among the department members of the Chinese Academy of Sciences, about one-third are professors in universities and colleges.

Medical personnel totaling about one-half million, including Western medical doctors, doctors' assistants, nurses, and midwives, have been counted as professional manpower, but practitioners of traditional Chinese medicine have not been included in the statistics.

By 1955 there were 11,438 scientific research personnel in China. The number rose to 52,000 in 1962. In 1955, there were 353,868 engineers and technicians. In 1962, the number was enhanced to 1.4 million, of which 150,000 were engineers and the rest were technicians. In 1955, there were 24,000 teachers in college science departments and

[4] *Ten Great Years*, p. 203.

engineering colleges. This number jumped to 90,000 in 1962. Agrotechnical personenl increased from 30,000 in 1955 to 200,000 in 1962. The number of medical doctors also rose from 25,000 in 1955 to 100,000 in 1962. Total scientific and engineering manpower (including technicians) in Mainland China was about 600,000 in 1955 and 2.4 million in 1962, representing a threefold increase during this 7-year period. (Table 2 and chart 1.)

Despite the impressive totals, these increases were apparently at the level of junior research personnel rather than at the level of senior scientists. In many research institutes of the Chinese Academy of Sciences, the proportion among senior scientists (including researchers and associate researchers), intermediate scientists (assistant researchers), and junior scientists (assistant and research trainees) in 1958 was 1:1:10. Of the 5,506 research personnel in the Chinese Academy of Sciences in 1957, only 746 were classified as senior scientists, 755 were intermediate, and 4,005 were research trainees.[5] In 1958, of the 10,800 agroscientific personnel in China, only 1,300, or 12 percent had reached the level of associate researcher or associate professor.[6] Therefore even with the tremendous increase of scientists

TABLE 2.—*Scientific and engineering manpower in Communist China, by field, 1955 and 1962*

Field	1955	1962
Total	594,306	2,405,000
Scientific research personnel [1]	[2] 11,438	[3] 52,000
Research fellows and associate research fellows	[2] (654)	[3] (3,000)
Engineering and technical personnel	[2] 353,868	[4] 1,400,000
Engineers	[2] 31,940	[5] 150,000
Technicians	[2] 321,928	[5] 1,250,000
Teachers in science and engineering colleges	[6] 24,000	[6] 90,000
Teachers in secondary vocational schools	[7] 50,000	[7] 150,000
Agrotechnical personnel	[8] 30,000	[8] 200,000
Medical workers [1]	[9] 125,000	[10] 500,000
Doctors	[9] (25,000)	[11] (100,000)

[1] The totals are not necessarily derived by addition of details as they are from different sources. Scientific research personnel include others not shown separately.

[2] From the 1955 census of the State Statistical Bureau, reported in *T'ung-chi Kung-tso T'ung-hsin* (Statistical Work Bulletin), No. 23, 1956, p. 29. The figures for engineers and technicians in this source are different from those reported by the State Statistical Bureau in *Ten Great Years*, p. 184, which gives 344,000 for 1955, or 9,868 less than the 1955 census.

[3] Scientific personnel in 1958 was 32,500 (*Ten Great Years*, p. 203). The number for 1962 was estimated by assuming a 60-percent increase between 1958 and 1962. (A 70-percent increase between 1957 and 1962 was reported in *JMJP*, Dec. 4, 1963.)

[4] From table 15.

[5] The number of engineers in 1962 was estimated at 150,000 on the following basis: (*a*) From 1949 to 1962, 310,000 students graduated from engineering colleges; on the assumption that ⅓ of them acquired the title of engineer, the number would be 100,000; (*b*) Engineers trained during 1928–47 and still surviving were estimated at 30,000; (*c*) Engineers promoted from skilled workers were estimated at 20,000.

[6] The numbers of teachers in all colleges were reported as 40,000 in 1955 and 140,000 in 1962. Based on the number of students graduated, teachers of science, engineering, medical science, and agricultural science were estimated to comprise 60 percent of the total in 1955 and 65 percent in 1962.

[7] No official data are available; estimates are by the author.

[8] Reportedly, 14,000 students were graduated from agricultural colleges from 1928 to 1947 and 15,800 from 1948 to 1955, bringing the total number of agrospecialists in 1955 to about 30,000. According to *JMJP*, Jan. 11, 1960, China had 170,000 agrotechnical personnel in 1960. This number, added to an estimated 30,000 trained in 1961–62, brings the total for 1962 to an estimated 200,000.

[9] The original number reported by the 1955 census included Chinese traditional medical doctors; this number does not include them.

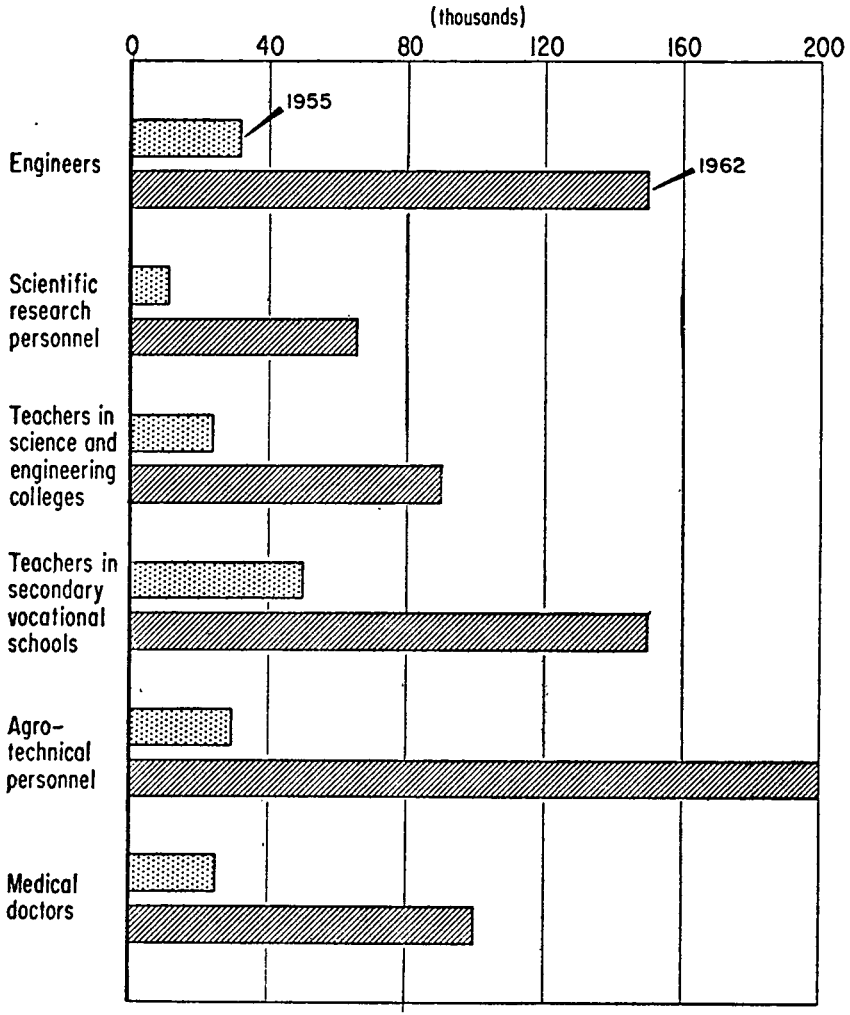
[10] Chung-kuo Hsin-wen (China News Service), Canton, Dec. 16, 1960, p. 13.

[11] By the end of 1960, there were 80,000 medical doctors in China (*ibid.*). In 1961–62, 20,000 new doctors were added.

[5] *KHTP*, No. 9, 1955, pp. 75–78.

[6] *Hua-tung Nung-yeh K'o-hsüeh T'ung-hsün* (East China Agricultural Science Bulletin), No. 2, 1959, p. 56.

CHART 1. GROWTH OF SCIENTIFIC AND ENGINEERING MANPOWER IN COMMUNIST CHINA, 1955 AND 1962



Source: Table 2

and engineers since the Communist takeover, the evidence indicates that China is still facing a significant lack of experienced and qualified professional personnel.

III. THE TRAINING PROGRAM

To accelerate the building up of scientific and engineering manpower, the higher educational system in Mainland China has undergone substantial changes since 1951. By 1952, the traditional educa-

tion system was abolished and a new system was set up. The whole training program consists of three aspects. The main effort of the program is to train a great number of engineers, agrotechnicians, medical doctors, and natural scientists through the engineering colleges, colleges of agriculture and forestry, colleges of medical science and the science departments of the comprehensive universities. The second function is to train senior scientists and engineers through the postgraduate program conducted in the Chinese Academy of Sciences, universities and in the Soviet Union and East European countries. The third path is through the spare-time training program to train skilled workers and promote them to the rank of technicians and engineers.

Prior to the establishment of the Communist regime, there were 207 universities and colleges in China. By 1953 with the reform and readjustment of higher educational institutions, the number decreased to only 182. The number of universities and colleges rose to 227 by the summer of 1957. With the Great Leap Forward in 1958, a tremendous number of new colleges and universities were set up. According to official reports, 612 such institutes were opened in that single year.[7] By the end of 1959, there were more than 840 colleges and universities. From 1961 on, many of the newly established schools were abolished or merged due to the lack of competent teachers, facilities, and qualified students. By the end of 1963, only 400 universities and colleges survived.[8] Of these, 23 were comprehensive universities; 20 were polytechnical universities; about 100 were engineering colleges; 90 were agricultural colleges; 120 were medical colleges; the rest were teachers' colleges, colleges for economics, political science, physical education, fine arts, and languages.

Advanced training programs for senior scientists and engineers were conducted by university graduate schools and research institutions of the Chinese Academy of Sciences. In August 1955, the state council authorized the Chinese Academy of Sciences to establish a new degree for graduate studies called *fu-po-shih* (associate doctor). By Western standards, this degree stands between the M.A. and the Ph. D., and its nearest counterpart is the candidate degree awarded in the Soviet Union. However, until the end of 1964, no one had ever received such a degree. By 1959, more than 70 universities and colleges were training graduate students in the fields of science, engineering, agriculture, and medicine. The term of study was 3 years for the university graduate schools and 4 years for the Chinese Academy of Sciences.

From 1949 to 1955, 5,000 students received training in the Soviet Union and East Europe. The First Five-Year Plan stipulated that 10,100 students were to be sent abroad to study during 1953–57. Of these, 9,400 were to be sent to the Soviet Union and 700 to other Communist countries.[9] However, by the end of 1960, only 7,500 students had been sent to the Soviet Union.[10] Until 1957, most of the students sent abroad were undergraduates, only about one-sixth of them were

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[7] *Chung-kuo Hsin-wen* (China News Service) (Canton), Feb. 11, 1960, p. 10. Hereafter referred to as CKHW.

[8] Chou P'ei-yuan, "Higher Education in China," *China Reconstructs*, No. 2, 1963, pp. 8–10.

[9] *First Five-Year Plan for Development of the National Economy*, Peking, Foreign Languages Press, 1955, p. 183.

[10] Sladkovskiy, M. I., "Soviet-Chinese Economic Cooperation," *Problemy Vostokovedeniia*, translated in *Reports on China*, Joint Publications Research Services (JPRS) No. 7155, Nov. 29, 1960.

graduate students. The Government changed its policy in 1957, and limited eligibility for students going to the Soviet Union to those who had had at least 2 years of practical experience. The changed relationship between Peking and Moscow since 1959 had a great impact on Communist China's program of dispatching students abroad. By the end of 1962, only 1,200 Chinese students were estimated to be in the Soviet Union.

Until 1957, the training for scientists and engineers in Communist China relied principally on the universities and colleges. With the 1958 Great Leap Forward movement and the adoption of the policy of "walking on two legs," specialized training programs were advocated to accelerate the training of a great number of technicians and skilled laborers within a short period. Hundreds of spare-time universities and vocational schools sprouted across the mainland. Thousands of skilled workers were promoted to the rank of engineers, and hundreds of "peasant scientists" were created. By the end of 1960, 470,000 workers were reported to have been enrolled in the spare-time colleges.

During the years from 1950 to 1960, state funds allocated to higher education and scientific research increased considerably, which permitted the training of more scientists and engineers.

State expenditures for education at all levels, which amounted to only 813 million yuan in 1951, rose to 2,906 million yuan in 1957, the last year of the First Five-Year Plan. This represents an increase of 3½ times the 1951 figures. In 1960, outlays for education leaped to 6,400 million yuan, or more than double those for 1957. Funds spent for higher education in the general education expenditures amounted to 114 million yuan in 1951 and 637 million yuan in 1957. However, they declined in 1958 to 599 million yuan because many institutions of higher learning drew upon earnings from their own factories and farms in that year. For example, the enrollment of the China People's University in Peking increased by 2,000 students in 1958, but its state-allocated portion was 2 million yuan less than that in the preceding year. In the Peking Engineering College, the average expenditure per student was 1,000 yuan in 1957 which dropped to 600 yuan in 1958.[11] Under the new system, the state funds for higher education were actually reduced, although enrollments showed great increases.

In contrast to the figures for higher education, the state expenditures for scientific research showed remarkable increase after 1958. In 1957, state funds allocated for scientific research totaled only 293 million yuan which jumped to 820 million yuan in 1959 and to 1,081 million yuan in 1960, or more than three times the 1957 figures. In 1957, expenditures for scientific research amounted to only one-tenth of the education expenditures, but by 1960, they were one-sixth. These expenditures clearly indicate that the regime after 1958 made more direct investment in scientific research than in education (table 3).

As a result of the expansion of investment in scientific research and education, enrollment in higher education showed a constant increase during 1950–60. When the regime was established in October 1949, there were only 117,000 students enrolled in full-time institutions of higher learning. By 1959–60, the number soared to 955,000, a seven-

[11] *Kuang-ming Jih-pao* (Enlightenment Daily), Peking, Aug. 17, 1959.

TABLE 3.—*Expenditures for education and scientific research in Communist China, 1950–60* [1]

Year	Total State expenditures [2]			Expenditures for education (all levels) [3]			Expenditures for higher learning [3]			Expenditures for scientific research [4]		
	In millions		Percent	In millions		Percent of total state expenditures	In millions		Percent of total state expenditures	In millions		Percent of total state expenditures
	Yuan	Dollars		Yuan	Dollars		Yuan	Dollars		Yuan	Dollars	
1950	6,810	2,892	100	(5)	(5)	(5)	(5)	(5)	(5)	4	2	(6)
1951	11,900	5,053	100	813	345	7	114	48	1	8	3	(6)
1952	16,790	7,130	100	1,123	477	7	205	87	1	11	5	(6)
1953	21,490	9,125	100	1,832	778	8	426	181	2	32	14	(6)
1954	24,630	10,459	100	1,883	800	8	468	199	2	34	14	(6)
1955	26,920	11,431	100	1,761	748	6	399	169	2	38	16	(6)
1956	30,580	12,985	100	2,075	881	7	559	237	2	235	100	1
1957	29,020	12,323	100	2,906	1,234	10	637	270	2	293	124	1
1958	40,960	17,393	100	(5)	(5)	(5)	599	254	2	384	163	1
1959	53,770	22,408	100	(5)	(5)	(5)	(5)	(5)	(5)	820	348	2
1960	70,020	29,732	100	6,400	2,718	9	(5)	(5)	(5)	1,081	459	2

[1] Latest information available.

[2] 1950–58: State Statistical Bureau, *Ten Great Years*, p. 23.

1959–60: Li Hsien-nien, "Budget Report," *Peking Review*, No. 14, 1960, p. 22. The 1960 figure is the budgeted amount; the actual amount of expenditures was not available.

[3] 1951–56: *T'ung-chi Kung-tso* (Statistical Work), No. 12, 1957, p. 32.

1957: Orleans, Leo A., *Professional Manpower and Education in Communist China*, p. 16.

1960: *Ta Kung Pao*, Hong Kong, Nov. 5, 1961.

[4] 1950—According to Kuo Mo-jo, budget for CAS in 1956 was 66,740,000 yuan which was 2,062 percent of that in 1950 (*KHTP*, No. 15, 1957, p. 449). The 1950 budget for CAS therefore is calculated as 3.2 million yuan which was about 80 percent of the total scientific expenditure in that year. From the above calculation, an estimated total of 4,000,000 yuan was derived for 1950.

1957–60: Lindbeck, John, "Organization and Development of Science," in Sidney H. Gould (ed.), *Sciences in Communist China*, pp. 12–13.

1951–56, *T'ung-chi Kung-tso*, No. 12, 1957, p. 31.

[5] Data not available.

[6] Less than 0.5 percent.

NOTE.—Detail may not add to totals because of rounding.

fold increase over 1949. The sharpest increase occurred during 1958–60, the years of the Great Leap Forward. During that 3-year period, enrollment registered a 100-percent gain from 441,000 in 1957–58 academic year to 660,000 in 1958–59 academic year which then rose to 955,000 in 1960–61 academic year. After the regime adopted the adjustment and consolidation policy in 1961, enrollment decreased. By September 1963, the total enrollment was 820,000. This figure, being seven times that of the 1949–50 enrollment, represents an average of 11 college students per every 10,000 persons in China. Enrollments in institutions of higher learning from 1949–50 to 1962–63 are shown in table 4 and chart 2.

TABLE 4.—*Enrollments of full-time students in institutions of higher learning in Communist China, 1949–50—1962–63*

Academic year	Enrollment (thousands)	Index number (1949–50=100)
Pre-1949 peak year (1947–48)	155	132
1949–50	117	100
1950–51	137	117
1951–52	153	131
1952–53	191	163
1953–54	212	181
1954–55	253	216
1955–56	288	246
1956–57	403	344
1957–58	441	377
1958–59	660	564
1959–60	810	692
1960–61	955	816
1961–62	819	700
1962–63	820	700

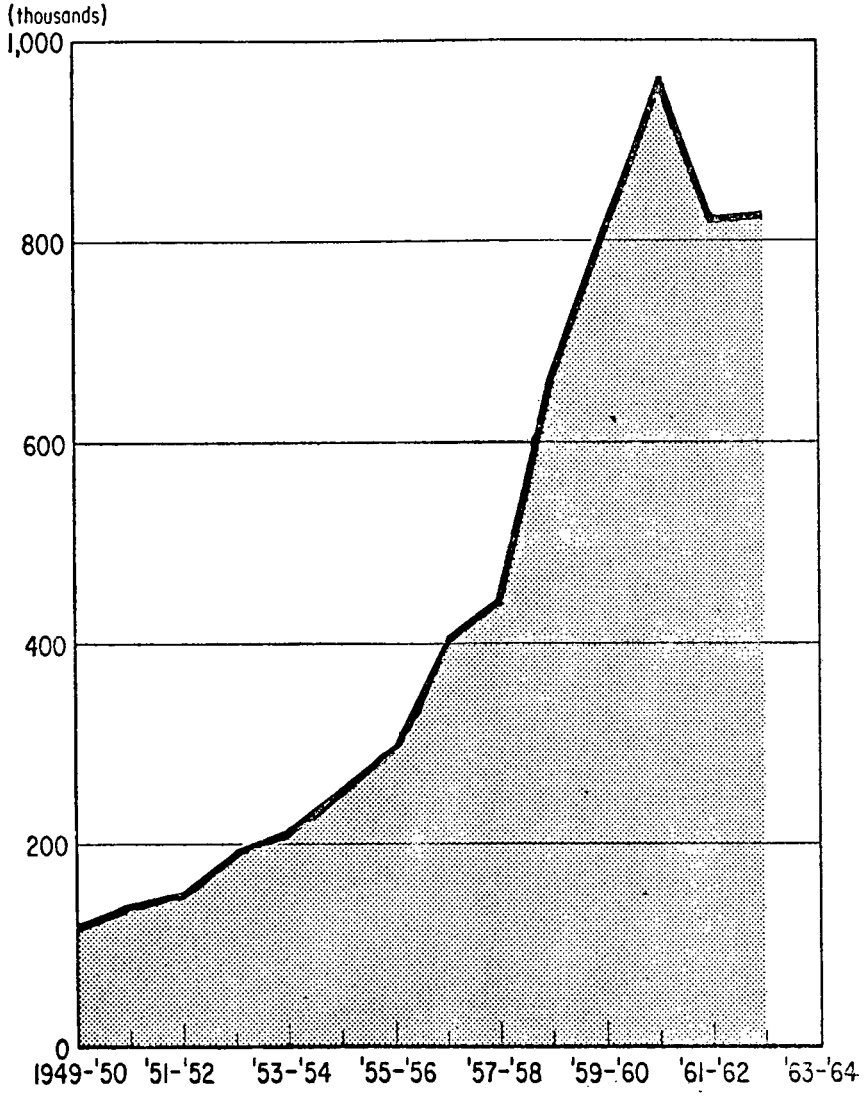
NOTE.—Numbers of enrollments reported for 1957–58 through 1960–61 are confused and inconsistent. Based on admissions and graduates for each year, the enrollment in 1958–59 would be 517,000 (441,000–72,000+148,000), which is 143,000 less than the 660,000 reported by the Chinese Communists. Totals for 1958–59 and for 1959–60 have been announced but have a "Big Leap" flavor. The 1960–61 enrollment of 955,000 is derived from the announced graduations and admissions based on the 1959–60 total enrollment of 810,000 (810,000—135,000+280,000). However, a Russian journal gives 900,000 for the 1960–61 enrollment (*JPRS*, No. 4493, p. 10). A Chinese official announcement even gave the number as "over a million" for the 1960–61 enrollment. Discrepancies ranging from 55,000 to 100,000 appear in these 3 different estimates.

Sources:

1949–59: State Statistical Bureau, *Ten Great Years*, p. 192.
1959–60: *Hung-ch'i*, No. 3, 1960.
1960–61: *New China Year Book, 1962*, p. 295.
1961–62: Chou P'ei-yuan, "Higher Education in China," *China Reconstructs*, No. 2, 1963, p. 9.
1962–63: According to NCNA (Peking), Aug. 17, 1963, the total medical college enrollment in 1963 was 9 times that of 1947 and occupied 13 percent of the total. Since the 1947 medical college enrollment was 11,855, the 1963 medical college enrollment would be 107,000 and the total enrollment would be 820,000.

During the period from 1949 to 1963, 1,176,000 students graduated from colleges and universities, of which 387,840, or 33 percent were majoring in engineering; 67,387, or 6 percent in natural science, 92,149, or 8 percent in agriculture and forestry; and 123,868, or 10 percent in medical science. These four faculties totaling 671,000 represent the number of new scientists and engineers trained in the first 14 years of Communist control. (Table 5, charts 3 and 4.) Based on the enrollments during 1958–59 to 1962–63, and the estimated graduates from 1962–63 to 1966–57, by 1967, the final year of Communist China's Twelve-Year Plan, the estimated total number of scientists and engineers with college diplomas would be around 1.3 million, which is far below the original target of 2 million as planned by the Communist authorities in 1956.

CHART 2. ENROLLMENTS OF FULL-TIME STUDENTS IN INSTITUTIONS OF HIGHER LEARNING IN COMMUNIST CHINA, 1949–50 TO 1962–63



Source: Table 4.

TABLE 5.—*Graduates from institutions of higher learning in Communist China, by field, 1948–49—1962–63*

Year	Total		Engineering		Natural sciences		Agriculture and forestry		Medicine		Education		Finance and economics		Other [1]	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	1,176,000	100	[2] 387,840	33	67,387	6	92,149	8	[3] 123,868	10	316,417	27	71,140	6	117,199	10
1948–49	21,000	100	4,752	23	1,584	8	1,718	8	1,314	6	1,890	9	3,137	15	6,605	32
1949–50	18,000	100	4,711	26	1,468	8	1,477	8	1,391	8	624	4	3,305	18	5,024	28
1950–51	19,000	100	4,416	23	1,488	8	1,538	8	2,366	12	1,206	6	3,638	19	4,348	23
1951–52	32,000	100	10,213	32	2,215	7	2,361	7	2,636	8	3,077	10	7,263	23	4,235	13
1952–53	48,000	100	14,565	30	1,753	4	2,633	6	2,948	6	9,650	20	10,530	22	5,921	12
1953–54	47,000	100	15,596	33	802	2	3,532	8	4,527	10	10,551	22	6,033	13	5,959	13
1954–55	55,000	100	18,614	34	2,015	4	2,614	5	6,840	12	12,133	22	4,699	8	8,085	15
1955–56	63,000	100	22,047	35	3,978	6	3,541	6	5,403	9	17,243	27	4,460	7	6,328	10
1956–57	56,000	100	17,162	31	3,524	6	3,104	6	6,200	11	15,948	28	3,651	6	6,411	11
1957–58	72,000	100	17,499	24	4,645	6	3,513	5	5,393	8	31,595	44	2,349	3	7,006	10
1958–59	70,000	100	(23,310)	(33)	(4,410)	(6)	6,318	9	9,000	13	(21,000)	(30)	(2,450)	(4)	(3,512)	(5)
1959–60	135,000	100	(44,955)	(33)	(8,505)	(6)	(10,800)	(8)	(14,850)	(11)	(40,500)	(30)	(4,725)	(4)	(10,665)	(8)
1960–61	162,000	100	54,000	33	10,000	6	12,000	7	19,000	12	49,000	30	(5,670)	(4)	(12,330)	(8)
1961–62	178,000	100	59,000	33	11,000	6	20,000	11	17,000	10	56,000	32	(6,230)	(4)	(8,770)	(5)
1962–63	200,000	100	77,000	38	10,000	5	17,000	8	25,000	12	46,000	23	3,000	2	22,000	11

[1] Includes arts, fine arts, law, political science, and physical culture.

[2] According to NCNA (Peking), Aug. 26, 1963, 370,000 engineers and technicians have been trained in China since 1949, including those graduated in the summer of 1963. This discrepancy of 17,840 is probably due to the round number reported each year. For instance, according to NCNA (Peking), Sept. 19, 1962, the number of graduates from engineering colleges during 1948–49—1961–62 was 290,000. If this figure is deducted from the 370,000, the 1963 graduates would be 80,000, or 3,000 more than the number reported by *JMJP*.

[3] According to NCNA (Peking), Aug. 17, 1963, "well over 110,000 physicians and pharmacists have been trained since 1949." This also shows a 13,000 discrepancy as compared with the cumulative figures listed in this table.

[4] The number of graduates in science and finance and economics is higher than the figures given in this table. Therefore, the residual listed as "other" is inflated.

NOTE.—Numbers in parentheses are estimates by the author. Percent detail may not add to totals because of rounding.

Sources:

1948–49 to 1957–58, State Statistical Bureau, *Ten Great Years*, p. 196.

1958–59, *New China Year Book*, 1962, p. 296, and Chung-kuo Hsin-wen (China News Service), Dec. 16, 1960, p. 13, hereafter referred to as CKHW.

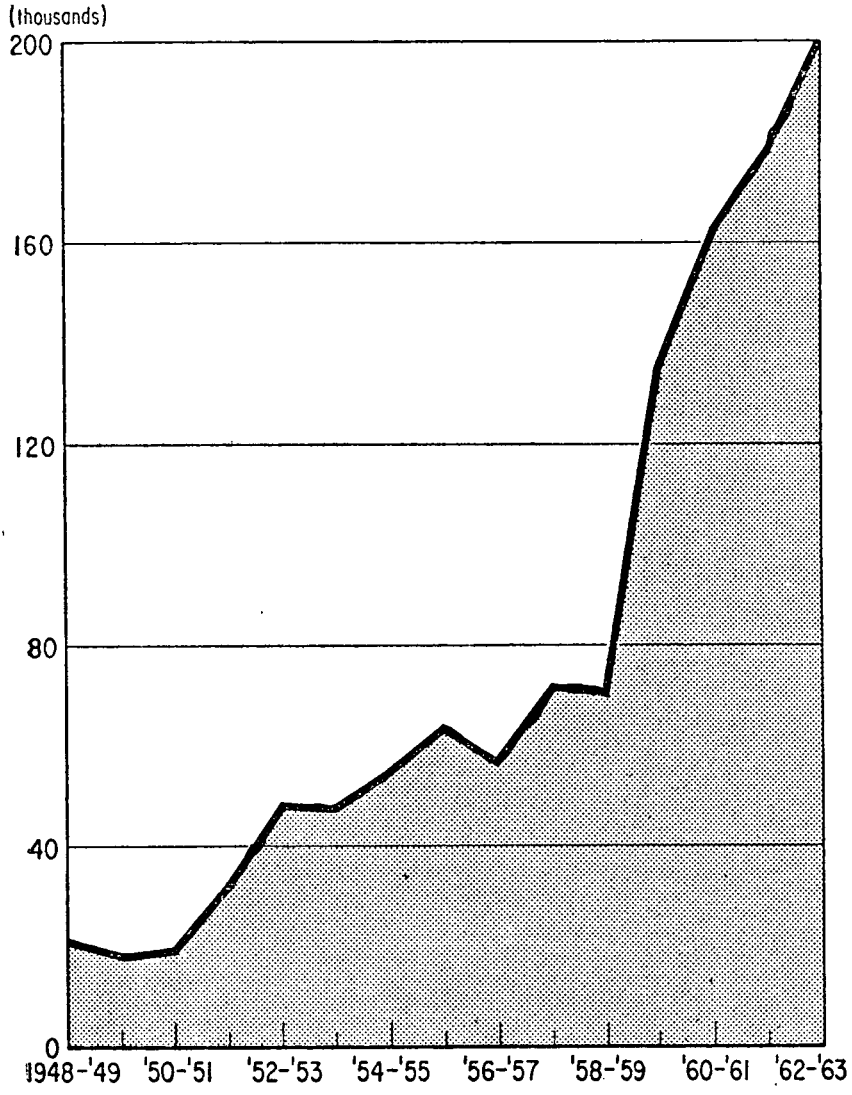
1959–60, New China News Agency (Peking), Sept. 3, 1960, hereafter referred to as NCNA.

1960–61, NCNA (Peking), Aug. 8, 1961, and CKHW, Aug. 3, 1961, p. 5.

1961–62, NCNA (Peking), Aug. 28, 1962, and *Jen-min Jih-pao* (People's Daily), Aug. 29, 1962, hereafter referred to as *JMJP*.

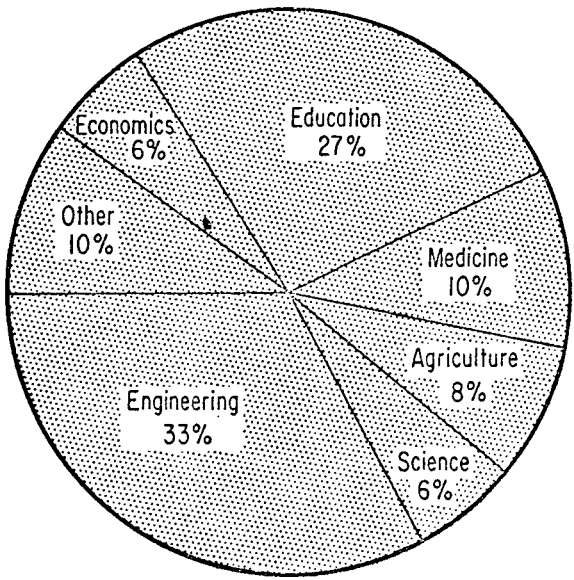
1962–63, *KMJP*, Aug. 12, 1963.

CHART 3. GRADUATES FROM INSTITUTIONS OF HIGHER LEARNING IN COMMUNIST CHINA, 1949–50 TO 1962–63



Source: Table 5

CHART 4. DISTRIBUTION OF GRADUATES FROM INSTITUTIONS OF HIGHER LEARNING IN COMMUNIST CHINA, BY FIELD, 1948–49 TO 1962–63 (CUMULATIVE TOTAL)



Source: Table 5

Despite the failure of Communist planners, the steady increase of graduates from college science departments as well as engineering colleges has helped to build up a sizable professional manpower force in every field. From 1949–58, the number of graduates in the field of physics was about five times greater than the number trained in the period from 1927 to 1948.[12] Scientists and engineers engaged in chemical research and production grew tenfold in the first 10 years of the Communist rule.[13] In the fields of meteorology, physiology, geology, mechanical engineering and aeronautical engineering, the number of scientists and engineers increased even faster.

Similarly striking progress was made in the numbers trained for agricultural science. In 1958, the scientific and technical personnel graduating in agroscience numbered an estimated 10,800, compared with only a few hundred in 1949.[14]

An increasing professional force was also trained in the medical and pharmaceutical field. During the 11 years from 1949 to 1960, medical and pharmacological colleges graduated 48,000, or five times the number of graduates reported for the 20 years before 1949. By the end of 1960, there were 80,000 medical doctors and high-level medical technicians working throughout the mainland.[15] The number of medi-

[12] *Wu-li Hsüeh-pao* (Acta Physica Sinica), No. 10, 1959, p. 507.
[13] Wu Hsüeh-chou, "Achievements of Chemistry in the Past 10 Years," *KHTP*, No. 18, 1959, p. 576.
[14] *Hua-tung Nung-yeh K'o-hsüeh T'ung-hsün*, No. 2, 1959, p. 56.
[15] *CKHW*, Dec. 16, 1960, p. 13.

cal-science research institutes increased from 20 in 1956 to over 100 in March 1963. The number of research fellows increased more than fourfold in the same period. The Chinese Medical Association, a professional organization of medical workers, had more than 19,000 members in September 1963, roughly six times the number in 1950.[16] In several special fields, specialists increased impressively. By the end of 1963, China had 20 times as many medical workers in otolaryngology as in pre-1949 years.[17]

IV. The Pattern of Employment

EMPLOYMENT OF SCIENTISTS

Scientists in Communit China are chiefly employed by the Chinese Academy of Sciences, institutions of higher learning, and the research institutes. According to official Chinese data, most of the approximately 32,800 research personnel in 1958 were employed in institutes related to industry and communications, which were under the various minsters of the Central People's Government. (Table 6 and chart 5.)

TABLE 6.—*Employment of scientific research personnel in Communist China, by field, 1958*

Field of research	Number of personnel	Percent distribution
Total	32,800	100
Basic science	5,900	18
Industry and communications	14,700	45
Agriculture, forestry, animal husbandry, and fisheries	1,200	4
Medical science and public health	2,200	7
Others	8,800	27

Source: State Statistical Bureau, *Ten Great Years*, p. 203.

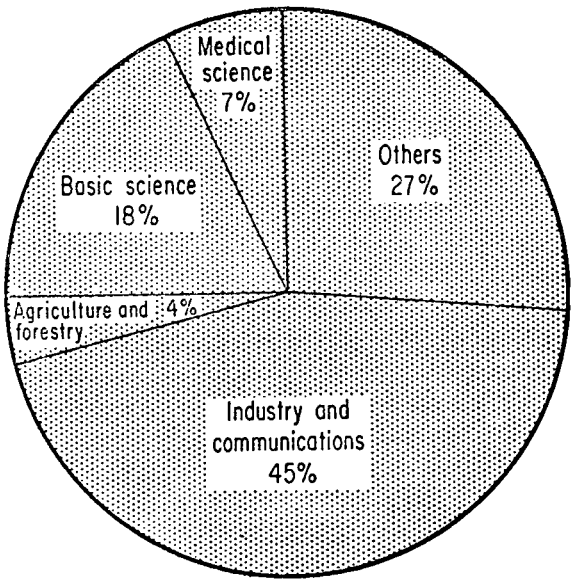
NOTE.—Percent detail may not add to 100 because of rounding.

Scientists conduct basic research within the Chinese Academy of Sciences. The Academy, comprising over 100 research institutes in Peking, Shanghai, Nanking, Ch'ang-ch'un, Wuhan, Canton, and other major cultural centers, is the headquarters for the country's major scientific talents. In 1959, it employed a research staff of 7,000. Among these, 800 were senior scientists. Each of the Academy's research institutes employes several outstanding senior scientists, most of them directors or deputy directors. They may also serve as department members in the Academy.

In institutions of higher learning, qualified scientists are generally full professors, and a number also serve as deans or chairmen of departments. Many of these university professors are invited by the Academy of Sciences, the Academy of Medical Sciences, and the Academy of Agricultural Sciences to participate as members of scientific committees of research institutes. They may also conduct scientific research projects, either independently in the university or in cooperation with the academies.

[16] New China News Agency (NCNA), Peking, Sept. 22, 1963.
[17] NCNA, T'ientsin, Nov. 19, 1963.

CHART 5. DISTRIBUTION OF EMPLOYMENT OF SCIENTIFIC RESEARCH PERSONNEL IN COMMUNIST CHINA, BY TYPE OF ACTIVITY, 1958



Source: Table 6

The other research institutes are principally under the supervision of governmental ministries. The Academy of Medical Sciences and the Academy of Agricultural Sciences have dozens of subsidiary institutes and are the largest employers of scientists in these two fields. There are also hundreds of other institutes which employ a great number of scientists, such as the Academy of Railroad Science, the Academy of Architectural Engineering, and the Academy of Petroleum Research.

The 1962 survey of 1,200 prominent scientists and engineers obtained data on the type of organization in which they were employed (table 7). Of these scientists, information by field of specialization for 1,185 is available.[18] Among them, 55 specific fields were identified. More than one-fifth of the scientists were engaged in the engineering sciences, nearly one-third in the physical sciences, another one-third in earth and biological sciences, and most of the remainder in medical and social sciences and humanities. In the latter two fields, history and economics claimed the largest numbers. In the physical sciences, nuclear physics and chemistry were the two most popular. Among earth and biological sciences, agriculture and forestry, botany, and geology were the most often chosen. Civil and mechanical engineering were the two fields most often selected of the engineering sciences.

[18] For details see Chu-yuan Cheng, *Scientific and Engineering Manpower in Communist China, 1949–63*, National Science Foundation, 1966, app. IV.

TABLE 7.—*Prominent scientists and engineers in Communist China, by type of employing organization, 1962* [1]

Type of organization	Number employed	Percent distribution
Total	1,200	100
Chinese Academy of Sciences	551	46
Institutions of higher learning	381	32
Research institutes [2]	120	10
Government administration	28	2
Public health	7	1
Production enterprises	87	7
Other	26	2

[1] Many scientists and engineers hold multiple jobs. To avoid double counting, each person is counted as holding a single job. For example, a scientist may be a research fellow or a director of a research institute and concurrently serve as a professor in a university. He is counted as employed in the Academy of Sciences. On the other hand, a professor who is also a member of a scientific committee of a research institute is counted as employed by an institution of higher learning.

[2] Research institutes include the Academy of Medical Sciences and the Academy of Agricultural Sciences as well as other research organizations.

EMPLOYMENT OF ENGINEERS AND TECHNICAL PERSONNEL

Information concerning the employment of engineering manpower in Communist China is scarce. A 1958 official survey for six major industries in China provides some data covering the years 1952–56. This information is relatively complete for only five of the industries; it provides data for the number of engineering and technical personnel employed in comparison with the number of untrained workers of the same industry (table 8).

TABLE 8.—*Engineering and technical personnel employed in 5 major industries in Communist China, by industry and year, 1952–56*

Type of personnel and year	Iron and steel	Electric	Coal	Textile	Paper
1952:					
Untrained workers	211,587	60,923	481,000	969,803	77,094
Engineers and technical personnel	(1)	4,237	12,000	16,068	1,616
Engineers and technicians as percent of untrained workers	(1)	*7*	*2*	*2*	*2*
1953:					
Untrained workers	254,109	(1)	506,000	1,085,639	90,549
Engineers and technical personnel	(1)	(1)	15,000	21,306	2,208
Engineers and technicains as percent of untrained workers	(1)	(1)	*3*	*2*	*2*
1954:					
Untrained workers	261,521	(1)	527,000	1,085,639	89,774
Engineers and technical personnel	(1)	(1)	15,000	25,710	2,858
Engineers and technicians as percent of untrained workers	(1)	(1)	*3*	*2*	*3*
1955:					
Untrained workers	276,902	(1)	549,000	1,105,668	84,309
Engineers and technical personnel	(1)	(1)	24,000	30,317	3,616
Engineers and technicians as percent of untrained workers	(1)	(1)	*4*	*3*	*4*
1956:					
Untrained workers	304,269	114,088	576,000	1,219,693	85,839
Engineers and technical personnel	(1)	10,793	30,000	37,592	4,069
Engineers and technicians as percent of untrained workers	(1)	*9*	*5*	*3*	*5*

[1] Data not available.

Source: State Statistical Bureau, Division of Industrial Statistics, *Wo-kuo Kang-t'ieh Tien-li Mei-t'an Chi-chieh Fang-chih Tsao-chih Kung-yeh ti Chin-shi* (The Present and Past of Steel and Iron, Electric, Caol, Machinery, Textile, and Paper Industries in Our Country), iron and steel, p. 27; coal, p. 29; paper, p. 211; electric, p. 67; and textile, p. 174.

The data show the steady increase of engineering and technical personnel to workers in the industries. In electrical industries technical personnel advanced from 7 percent in 1952 to 9 percent in 1956; in the coal industry, from 2 to 5 percent; in the textile industry, from 2 to 3 percent; and in the paper industry, from 2 to 5 percent. The distribution of engineers and technicians differed greatly from industry to industry. In heavy industry (such as the electrical industry, where production procedures are highly complicated), the ratio of technicians to workers was as high as 9 percent in 1956. On the other hand, in light industry (such as textiles, where production processes are relatively simple), the ratio was only 3 percent.

New engineering personnel, totaling 272,183, were graduated from colleges during 1953–62. The distribution by field of training is shown in table 9 and chart 5. Forty-four percent of these engineers were majoring in the two important fields of machine and tool making and building construction and city planning. These data might indicate the general trend of the employment of new engineers trained in 1953–62.

TABLE 9.—*Communist Chinese engineering graduates, by field, 1953–57 and 1958–62*

Field	Total graduates, 1953–62		Graduates, 1953–57		Graduates, 1958–62	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total	272,183	100	90,918	100	181,265	100
Geology and prospecting	24,228	9	9,546	10	14,682	8
Mining and mine management	20,687	8	7,273	8	13,414	7
Power	20,234	7	7,183	8	13,051	7
Metallurgy	11,610	4	3,091	3	8,519	5
Machine and tool making	64,226	24	18,547	20	45,679	25
Manufacture of electric motors and supplies	9,613	4	1,637	2	7,976	4
Chemical technology	13,973	5	4,910	5	9,063	5
Papermaking	1,090	(1)	546	1	544	(1)
Light industry	6,716	2	3,091	3	3,625	2
Surveying, drafting, meteorology, and hydrology	6,079	2	2,091	2	3,988	2
Building construction and city planning	55,542	20	24,002	26	31,540	17
Transport, post, and telecommunications	12,703	5	4,546	5	8,157	5
Other	25,482	9	4,455	5	21,027	12

[1] Less than 0.5 percent.

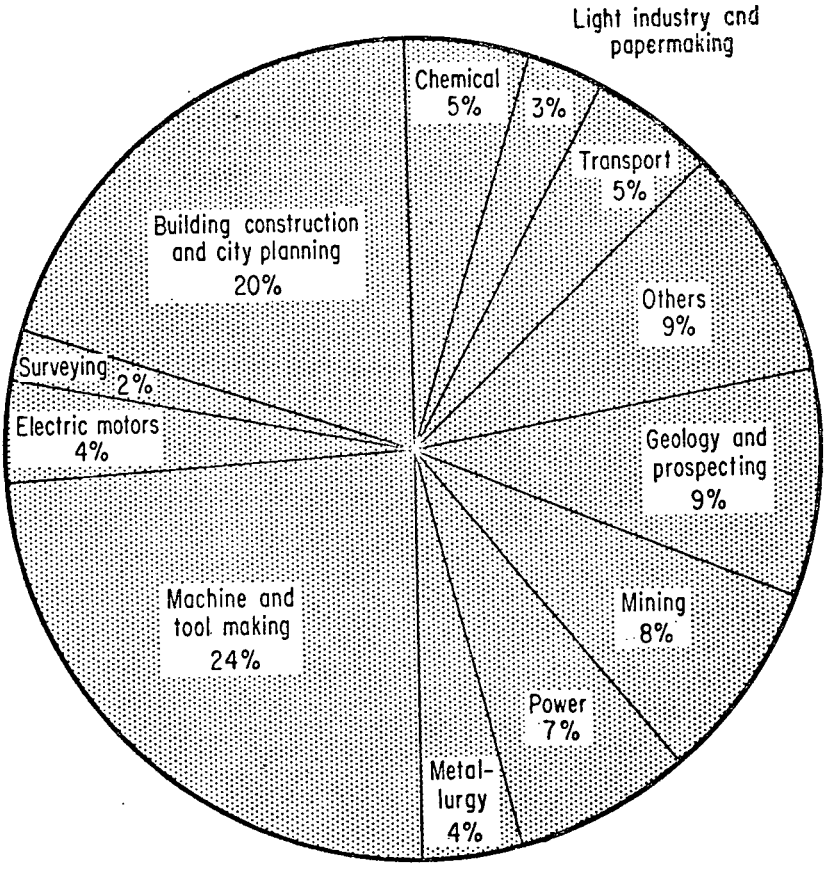
NOTE.—Percent detail may not add to total because of rounding.

Sources: 1953–57 and 1958–62: Total graduates from table 5; percent distribution from *First Five-Year Plan, op. cit.*, pp. 179–80.

EMPLOYMENT OF WOMEN SCIENTISTS AND ENGINEERS

One significant aspect of the employment of scientific and technical manpower in China today is the growing number of women scientists and engineers. In the period 1951–59, the number of women students enrolled in universities and colleges increased from 35,000 to 180,000, representing a fivefold expansion, and resulting in the training of thousands of women as scientists and engineers. Similarly, during the period 1949–60, the number of women workers registered a twelvefold increase, from 600,000 to 8 million. Many outstanding women workers have been promoted to the rank of engineers. By 1962, women

CHART 5 . DISTRIBUTION OF ENGINEERS GRADUATED, BY FIELD, 1953–62



Source: Table 9

scientists accounted for over one-fifth of the research workers in the Chinese Academy of Sciences, a 42-percent growth in number since 1957. A later official report in March 1963, indicates that in the eight research institutes of the Chinese Academy of Sciences, the number of women research workers reached more than 28 percent of the total number of research personnel, an increase to over 10 times the proportion in the early post-1949 period.[19] In several research institutes affiliated with the Chinese Academy of Sciences and the Chinese Academy of Medical Sciences, women scientists have become equally as prominent as men.

A more striking feature of Chinese scientific and technological development has been the emergence of women as engineers and technicians. In Shanghai, the major textile center in China, this industry in 1962 employed nearly 1,000 women engineers and technicians. More than 500 women were reported working as managers or holding other top

[19] NCNA (Peking), Mar. 8, 1963.

executive posts in these factories.[20] Before 1949, no women technicians worked in heavy industry. In 1962, in Anshan, China's leading steel center, more than 600 women engineers, designers, and technicians—all post-1949 graduates—were working in metallurgical, steel-rolling, power-generating, machine-building, and mining departments. Substantial numbers of women engineers and technicians also worked in the railroad system. Women civil and mechanical engineers serve in railroad construction departments as well as rolling stock plants.

TABLE 10.—*Female workers and employees*[1] *in Communist China, by year, 1949–60*

Year	Total workers and employees (thousands)	Female workers and employees (thousands)	Females as percent of total workers and employees
1949	8,004	600	7.5
1950	10,239	(2)	(2)
1951	12,815	(2)	(2)
1952	15,804	1,848	11.7
1953	18,256	2,132	11.7
1954	18,809	2,435	12.9
1955	19,076	2,473	13.0
1956	24,230	3,266	13.5
1957	24,506	3,286	13.4
1958	45,323	7,000	15.4
1959	(2)	7,500	(2)
1960	(2)	8,000	(2)

[1] Workers include personnel working in factories, shops, etc.; employees include those working in government, administration, etc.; these 2 terms are roughly equivalent to the terms, "blue-collar" and "white-collar" workers, respectively.
[2] Data not available.

Sources:
1949–58: State Statistical Bureau, *Ten Great Years*, pp. 180 and 182.
1959–60: Chung-kuo Hsin-wen (China News Service), Feb. 22, 1960, p. 11.

TABLE 11.—*Female workers and employees in Communist China, by selected specialty, various years*

Specialty	Women, as percent of total in each field
Industry:	
Light industry (1960)	30
Textile industry (1960)	75
Iron and steel industry [1] (1958)	15
Machine-building industry [1] (1958)	15
Railway system (passenger service) [2] (1962)	50
Education:	
College teacher [3] (1956)	20
Secondary school teacher [3] (1956)	18
Primary school teacher [4] (1960)	51
Public health:	
Doctor of Western medicine [3] (1961)	20
Professional health worker [3] (1961)	35
Art [5] (1960)	35
Urban communes: Industrial worker [3] (1961)	65

[1] Chung-kuo Hsin-wen (China News Service), Mar. 7, 1961, p. 1, hereafter referred to as CKHW.
[2] NCNA (Peking), Mar. 7, 1962.
[3] *China Reconstructs*, No. 3, 1961, p. 11.
[4] CKHW, Feb. 24, 1960, p. 10.
[5] CKHW, Mar. 3, 1960, pp. 12–13.

[20] *CKHW*, Mar. 9, 1962.

V. Western Influences Versus Soviet Influences

The building up of scientific and technical manpower in Communist China could not have been achieved without the assistance and cooperation of the Soviet Union during the 1950–59 period. Soviet assistance includes two major aspects: The dispatching of Soviet specialists to work in China and the acceptance of Chinese students, scientists, and technicians to be trained in the Soviet Union.

According to Soviet data, during 1950–59, some 11,000 Soviet specialists were sent to China.[21] The majority of them worked in industrial factories, mining projects, and communication. At least 30 were assigned to each of the 130 major industrial projects constructed with Soviet assistance from 1950 to 1960. In several of the more important projects, the number of Soviet specialists often reached several hundered. Soviet specialists also participated in the field of education. A Soviet source in 1959 reported that more than 700 Soviet specialists had lectured in Chinese universities and colleges since 1951. To assist Communist China develop science and technology, in 1954 and 1955, the Soviet Academy of Sciences sent 20 prominent scientists to serve as advisers from 1 to 2½ years. In 1956, when the Chinese Communists were considering plans for developing science and technology for the 12-year period from 1956 through 1967, the Soviet Union sent 18 of its most important scientists as consultants.

In the economic field, Soviet specialists supervised major capital construction and mass-production processes and assumed the tasks of training Chinese workers and managerial personnel. For projects initiated by China, Soviet experts undertook specifications, selected construction sites and offered consultative services relating to the installation and utilization of equipment. Upon completion of these projects, Soviet experts checked and approved them before they were transferred to Chinese management.

In the educational field, Soviet specialists were employed as presidential or departmental consultants in many universities and colleges. They were credited with helping to establish 337 departments and about 500 laboratories and to train many new instructors and more than 4,000 Chinese graduate students.

In scientific research, Soviet specialists participated in almost every major field. Almost every important branch of the technical and natural sciences in China was created or expanded with substantial Soviet assistance during 1950–60. For example, in the field of nuclear physics, the U.S.S.R. aided in the erection of a number of modern experimental stations. Both the high-capacity reactor and the high-voltage cyclotron in China were obtained with Soviet aid. As a result, Communist China can conduct intensive research work in nuclear physics, radiative chemistry, radiobiology and the production of radioactive isotopes. This culminated in the successful explosion of the first nuclear bomb of Communist China in October 1964.

Another phase of Sino-Soviet scientific and technical cooperation during 1950–60 period was the training of Chinese scientists, students and technicians in the Soviet Union. According to 1960 Chinese re-

[21] Chu-yuan Cheng, *Economic Relations Between Peking and Moscow: 1949–63*, New York, Praeger, 1964, p. 35.

ports, the U.S.S.R. accepted, at different times, more than 38,000 Chinese students, scientists and workers for study and practical training in Soviet centers and factories, including 1,300 scientists, 1,000 instructors, 7,500 students, 8,000 technicians, and 20,000 workers. In the Joint Institute of Nuclear Research in Dubna, near Moscow, until June 1965, 30 top-level Chinese nuclear physicists were active in the advanced research.[22]

TABLE 12.—*Chinese scientists, students, and others who were trained in the Soviet Union, 1950–60*

Category	Number	Percent distribution
Total [1]	38,000	100
Scientists [2]	1,300	3
Instructors [3]	1,200	3
Students [4]	7,500	19
Undergraduate	5,500	14
Graduate	2,000	5
Technicians [5]	8,000	21
Workers [6]	20,000	53

[1] *Sinkiang Jih-pao* (Sinkiang Daily), Feb. 14, 1960.
[2] *Jen-min Jih-pao* (People's Daily), Feb. 14, 1959, reported that 1,000 Chinese scientists went to the Soviet Union between 1950 and 1958; another 300 are estimated to have gone to the Soviet Union in 1959 and 1960.
[3] Between 1950 and 1958, there were 850 Chinese instructors in the U.S.S.R. (*Kitai* (China), No. 4, 1960 pp. 7–8; and Tikhvinskiy, S. L., "Soviet-Chinese Culture Ties," *Ten Years of the People's Republic of China*, translation in *Reports on China* series, JPRS No. 2825.) In 1959, 250 Chinese instructors went to the Soviet Union (*Iz Istorii Nauki i Tekhniki v Stranakh Vostoka*, pp. 8–33). For 1960, an estimate of only 100 was made because of the deterioration in relations between China and the Soviet Union.
[4] There were almost 7,500 Chinese students in the Soviet Union between 1950 and 1960 (Sladkovskiy, M. I., "Soviet-Chinese Economic Cooperation," *Problemy Vostokovedeniia*, translation in *Reports on China* series, Joint Publications Research Service, JPRS No. 7155, Nov. 29, 1960). Graduate students constituted about 25 percent of the total.
[5] Sladkovskiy, *op. cit.*
[6] According to CKHW, Oct. 5, 1959, p. 57, the total number of technicians and workers was 28,000. The number of workers was estimated by subtracting the number of technicians from this total.

NOTE.—Percents may not add to total because of rounding.

Although Soviet influence was substantial during 1950–60, Western influence in Chinese science and technology still prevailed. China's cooperation with Western countries and Japan in the development of science and technology can be traced to two centuries ago. As early as the 17th century, a group of prominent Catholic missionaries, including Matteo Ricci and Johannes Adam Schall, introduced European science to China. Two centuries of cooperation in culture and science between China and the West laid a foundation too solid to be undermined overnight. When the Soviet influence began to decline in 1960, Western influence showed a renewed upward trend. Two important factors serve as evidence. The first is the important role played by Western-trained scientists and engineers in Communist China's scientific and technological front. The other is the far-reaching impact of the Western model on the Chinese-trained scientists.

During the years 1850–1962, the number of Western-trained higher intellectuals in China was estimated to be about 24,300 plus about 12,000 who received training in Japan (table 13). Collectively this force of 36,300 represented about one-fourth of the higher intellec-

[22] According to Nikolai N. Bogolyubov, director of the Joint Institute of Nuclear Research, all Chinese scientists had withdrawn from the institute since June 1965. *New York Times*, July 6, 1966.

tuals in China. About 15,500 of them were scientists and engineers, 5,500 of them were believed to be working on the Chinese mainland in 1962. Of these 5,500 Western- and Japanese-trained scientists and engineers, 1,100 hold Ph. D. degrees. Taking account of the attrition due to death or retirements, the Western-trained scientists and engineers now working on the Chinese mainland still will be around 4,500 with 900–1,000 holding Ph. D. degrees. These 4,500 Western- and Japanese-trained scientists and engineers constitute the backbone of China's professional, scientific, and technical manpower. They not only form much of the core of scientific personnel in the Chinese Academy of Sciences and other research organizations, but also they have become a leading force in institutions of higher learning. In the Chinese Academy of Sciences, 188 of 251 leading scientists were selected as board members of the four departments of natural and technical science. Among these 188 board members, 143 or 76 percent were trained in the United States, Japan, or Western Europe. In the institutions of higher learning, Western trained scientists also occupied a leading role. For example, of the 47 presidents and vice presidents of universities and colleges considered in our sample survey, 31 were trained in the United States, Western Europe, or Japan; only two were known to have been trained in the Soviet Union. In 1957, when the Chinese Academy of Sciences awarded prizes for outstanding contributions in science and technology, Chinese scientists trained in the West and Japan received all the three first prizes, all the five second prizes, and 24 of the 41 third prizes.

TABLE 13.—*Estimated number of degree-holding Chinese scientists, medical doctors, and engineers trained in the West and Japan by place of training, varying years, 1850–1962*

Place	Year	Number awarded degrees, all fields [1]	Number awarded doctoral degrees, all fields [1]	Number awarded degrees in sciences, engineering, or medicine [1]	Holders of degrees in sciences, engineering, or medicine and staying in Communist China [2]	Scientists, engineers, and medical doctors holding Ph. D. degrees and staying in Communist China [2]
Total		36,300	4,117	15,500	5,500	1,100
United States and Canada	1850–1953	13,800	2,100	6,000	2,000	450
Japan	1901–39	12,000	100	4,500	1,500	50
Great Britain	1911–49	2,500	346	1,000	500	120
France	1907–62	3,000	582	1,200	500	150
Germany	1907–62	3,500	731	2,000	800	250
Other West European countries	1907–62	1,500	258	800	200	80

[1] Includes those on the Chinese Mainland and those staying abroad.
[2] Does not take into account losses during the period as the result of death or retirement. The number of those actually working in Communist China in 1962 may have been 15 to 20 percent less than shown.

Scientists in charge of the recent Chinese development of nuclear weapons were all trained in the United States and Western Europe. The most eminent nuclear physicist in China, Ch'ien San-ch'iang, director of the Institute of Atomic Energy, received his Ph. D. in physics in 1943 from the University of Paris. Next to Ch'ien are two other prominent nuclear physicists, Wang Kan-ch'ang and Chao Chung-yao,

both deputy directors of the institute. Wang received his Ph. D. from the University of Berlin in 1943, and Chao received the Ph. D. degree from the California Institute of Technology. The top scientists now supervising the rockets project are Ch'ien Hsüeh-shen and Kuo Yung-huai. Ch'ien received his M.S. degree in aeronautical engineering from MIT and a Ph. D. degree from CIT. Kuo also holds a Ph. D. from the CIT. All these indicate that Western-trained scientists still play the leading role in Communist China today.

Since 1960, partly because of the withdrawal of Russian specialists and partly because of a new awareness of the importance of Western science and technology, the Peking Government has begun to revise its policies toward international cooperation. Western books are translated and published in increasing number. Scientific workers, students, and cadres are encouraged to study English and other Western languages. Since 1961, scientists from Northern European countries have been invited to lecture in Communist China. In September 1963, Chinese scientists were sent to study atomic energy in Denmark. In November 1964, a first contingent of Chinese students totaling 102 was dispatched to study in France. In March 1966, 25 Chinese were studying a wide range of scientific subjects at British institutions.[23] These activities signify a resumption of Chinese cultural relationship with the West.

VI. Effect on Economic Growth and Military Strength

The increase of scientific and engineering manpower in Communist China has contributed to the development of modern industry and the buildup of military strength.

The rapid growth of several key branches of heavy industry is closely related to the graduation of more than 400,000 engineering college students. Although their quality has not appeared to be as high as the quality of those trained in the advanced countries, the graduates have filled many gaps in engineering and technical fields. For instance, in chemical industry, one of the fastest growing industries during the past decade, the correlation between the growth of the industry and the growth of technical manpower in this particular field has been conspicuously evident.

Before 1949, China's chemical industry was insignificant. The chemical industry developed rapidly after 1953. By 1957, more than 2,000 kinds of chemical products were being produced, and in 1960, the variety increased to more than 8,000. The output of chemical fertilizer grew from 181,000 tons in 1952 to 4.5 million tons in 1965, an increase of 24-fold. The advance in the chemical industry was attributable to increased capital investment and the steady building up of technical manpower in this field. In 1949, there were only a few chemical industrial research organizations. Since 1958, they have been greatly expanded. The chemical research force by 1960 had increased more than a hundredfold since 1949. According to Hou Te-pang, Vice Minister of the Chemical Industry, Communist China in 1963 had 40 times as many chemical engineers and technicians as it had 14 years before.[24] A nationwide chemical research network had come into

[23] *New York Times*, Mar. 2, 1966.
[24] NCNA (Peking), Dec. 31, 1963.

being. In the Chinese Academy of Sciences, more than 10 research institutes have been assigned to do chemical research including research in new branches of chemistry such as high polymers and biochemistry.

The correlation between the growth of technical manpower and the growth of industry can also be seen in many other industries. Moreover, the buildup of the technical force enabled Communist China to escape wholesale collapse when in July 1960, the Soviet Government suddenly withdrew its experts from China. If Communist China had not trained such a technical force, her economic plight since 1960 would have been even worse.

Along with the development of civilian industries, a substantial number of technical manpower has been allocated for the defense industries. By the end of 1965, of the eight ministries of machine-building industries, at least five were for defense purposes. In 1959, there were 3 million workers, technicians and engineers in the machine-building industries. It is estimated that one-half of them belonged to defense industries. Total engineering and technical personnel employed in defense industries was estimated at 150,000, or about 11 percent of the total.

Chinese Communist scientific activities also have been largely directed toward military objectives. Many top scientists were assigned to do research in nuclear physics, space projects, and other undertakings with apparent military goals. In addition to having dispatched more than 30 prominent nuclear physicists to participate in advanced research at the Joint Nuclear Research Institute in Dubna, near Moscow, over an estimated 400 senior scientists in 1964 were doing research in nuclear physics in the Institute of Atomic Energy in the Chinese Academy of Sciences and in several Chinese universities.

Corresponding to the development of nuclear bombs, a considerable number of scientists and engineers also engage in the rocket program. Under the 12-year plan for development of science and technology, jet propulsion was one of the 12 major tasks, ranking next to the peaceful use of atomic energy. In 1959, several new research institutes were set up to intensify the rocket program, including an Institute of Upper Atmosphere Physics in Wuhan, an Institute of Automation and Remote Control in Peking, and an Institute of Mechanics and Electronics in Peking. During the 10-year period between 1953 and 1963, more than 5,000 college students graduated in aeronautical engineering. In 1963, the China Aeronautical Engineering Society was formally established indicating the rapid growth of technical manpower in this field.

By all these efforts, the Chinese Communists have attempted to realize two basic objectives: the industrialization of the national economy and the modernization of national defense with hydrogen bombs and long- or intermediate-range missiles. Although these goals have not been achieved, the steady growth of Chinese scientific and engineering manpower has definitely advanced the industrialization and military strength of Communist China.

VII. Appraisal and Prospect

To make an evaluation of the training program of scientific and technical manpower in Communist China during the first 15 years, four items could be recognized as her achievements: (1) the increase

in the number of young scientists and engineers; (2) the mobilization of women; (3) the dissemination of science and technology throughout the population; and (4) the development of new branches of natural science and technology.

During the 1949–63 period, nearly 1.2 million Chinese students graduated from colleges and universities. Of them, 33 percent graduated in engineering, 6 percent in the natural science, 8 percent in agriculture and forestry, and 10 percent in the medical science. Together, these four categories totaled 671,000. Compared with the 1928–48 period, when only 70,000 students graduated in these four fields, the Communists' gain has been striking. Besides, during 1949–63, about 8,000 students were sent to the Soviet Union and Eastern Europe, 3,000 of them for graduate training. By the end of 1963, there were 12,000 graduate students in Communist China. These two categories, totaling 15,000, have constituted most of the potential resources for developing senior scientists and engineers.

One salient achievement in the scientific manpower training and utilization has been the wide mobilization of women. During 1954–59, the relative share of women scientists in the total scientific manpower rose from 19 to 23 percent. Since women have constituted about one-half of the total population, their increasing participation in scientific and engineering activities can be expected to have a considerable effect on scientific activities.

In the pre-Communist era, knowledge of science and technology was pursued only by a small group of higher intellectuals. Most of the country's capable manpower was engaged in literary, artistic, or political activities. Since the Communist regime regards science and technology as the indispensable means to raise productivity, the campaign to promote science and technology has become nationwide. In the long run, this movement will gradually draw the country's talents away from literature, philosophy, and political activities.

With the maturing of new scientists, progress has been made in several important fields of modern science and technology. With the successful nuclear explosion first in October 1964 and subsequently in May 1965, October, May, and December 1966, Communist China ranks among the five countries holding nuclear capacity, marking a new era in China's science and technology. Considerable advances have also been made in technology. All these have not only stimulated the country's economic growth but also enhanced her military strength to a great extent.

However, the Communists' system of training and employing her scientific and technical manpower also embodies many basic weaknesses. In the training system, emphasis on political standing and class origin has hampered the training of gifted students. The emphasis on "redness" over "expertness" has led to a realization among the younger generation that to be politically acceptable is more advantageous than to be educationally qualified. These factors, added to the fact of narrow specialization and neglect of basic subjects, have resulted in inferior quality of the training of young scientists and engineers. The rapid increase of enrollment during the Great Leap Forward period was also at the expense of quality. Advanced training of Chinese students in the Soviet Union and Eastern Europe has also been proved unsatisfactory. The policy of sending more than

5,000 high school graduates to study in the Soviet Union during 1950–56 was admitted as a mistake because the students were not mature enough to absorb advanced scientific knowledge and technology. Moreover, such training could have been provided by the universities and colleges in China. Even the graduate students sent to Russia usually received only narrow specialized training.

Shortcomings with respect to the employment and utilization of scientists and engineers have offset a great part of the Communist regime's efforts to promote science and technology: (1) many leading scientists performed administrative and political functions; (2) scientists and engineers were assigned to alien disciplines; (3) engineers were subordinated to nontechnical cadres; and (4) the older intellectuals were attacked during the vacillating political campaigns.

Apart from deficiencies in the training and utilization of scientific and engineering manpower, the Chinese Communist regime also faces three problems that have retarded the further advance of her science and technology.

The first problem arises from the wide gap between senior and junior scientists. Despite the gain of 671,000 scientists and engineers in the first 14 years since 1949, the driving force of the country's scientific enterprise in 1966 was still the senior scientists. Many of them were in their sixties and seventies. Their retirement or death intensifies the replacement problems. More than 10,000 middle-aged senior scientists trained in Western countries, particularly in the United States, preferred to live outside mainland China, making the gap even wider. This was clearly reflected in the critical shortage of high-level research fellows in the Chinese Academy of Sciences and the shortage of teachers with rank of professor or associate professor in the universities and colleges.

The second problem pertains to the source of China's outside technical assistance. From the beginning of the Communist regime, China's one-sided foreign policy has committed her squarely to the Soviet Union as the only source of foreign assistance. Western cooperation was actually terminated. After 1960, as a result of the Sino-Soviet split, this assistance was drastically curtailed. Unless Communist China can make new contact with the Western countries, future training of senior scientists and engineers can only rely on her own efforts. Since China still lacks the necessary facilities and faculty for advanced training, the growth of senior scientists will become more difficult than ever before. This will widen the gap between the senior scientists and the junior scientists.

The third problem stems from the regime's attitude toward science and scientists. Although the regime realizes the importance of modern science and technology, there is still a strong antiscientific mentality among the top leaders who are more familiar with guerrilla war rather than with scientific enterprises. Their blueprint for the future of Chinese society bears heavily the imprint of the days when they directed a guerrilla army from the caves of Yenan. During the past 17 years, there was a constant struggle between the Party and the intellectuals. The scientists pursue objective truth while the Party leadership makes truth subservient to political dogmas. In the Great Leap Forward period, scientists were condemned as being "bookish," and having divorced themselves from practical production and politi-

cal activities. Since 1961, the regime has adopted some measures to normalize relations with the scientific and technical personnel. However, beginning from 1966, under the so-called Great Cultural Revolution, scientists and professional personnel were again required to participate in productive labor and political struggle. A thorough reform of the higher educational system has been decided upon. On June 18, 1966, the Party Central Committee and the State Council jointly announced that the old system of entrance examination for the enrollment of college students was abolished. Enrollment was to be based on recommendation rather than on examinations. Only those students who have shown loyalty to the Party can be admitted to institutions of higher learning. Since September, 1966, all the colleges and high schools in Communist China have been closed, and most of the younger students have been organized into the Red Guards. Graduate students studying abroad were also called back. Recent reports also indicate that college studies may be shortened to only 2 or 3 years and students will then spend the rest of their time in practical training. All these reforms will turn students into professional political instruments and will greatly hamper the advance of modern science in China.

One decisive factor affecting the growth of scientific and engineering manpower in Communist China is her economic and political conditions. Since the deterioration of the national economy in 1960, the tempo of development in scientific and engineering manpower has been slowed down. College enrollment during 1961–65 showed a tendency to decline. The regime has placed emphasis on the half-work and half-study program. By the end of 1965, economic conditions in the Chinese mainland can only recover its losses caused by the Great Leap. The regime is confronting a critical shortage of capital and is unlikely to allocate substantial funds for developing scientific and engineering manpower. The country's continuing political instability caused by the current "Culture Revolution" has also become a retarding force of the scientific progress.

Unless Communist China can overcome her current political upheaval and economic difficulties, arrive at some agreement with foreign countries to accept her graduate students for advanced training and furthermore, change her attitude toward the scientific and professional personnel, the growth of her scientific manpower in the coming years will be curtailed rather than advanced.

RESEARCH AND DEVELOPMENT IN COMMUNIST CHINA: MOOD, MANAGEMENT, AND MEASUREMENT

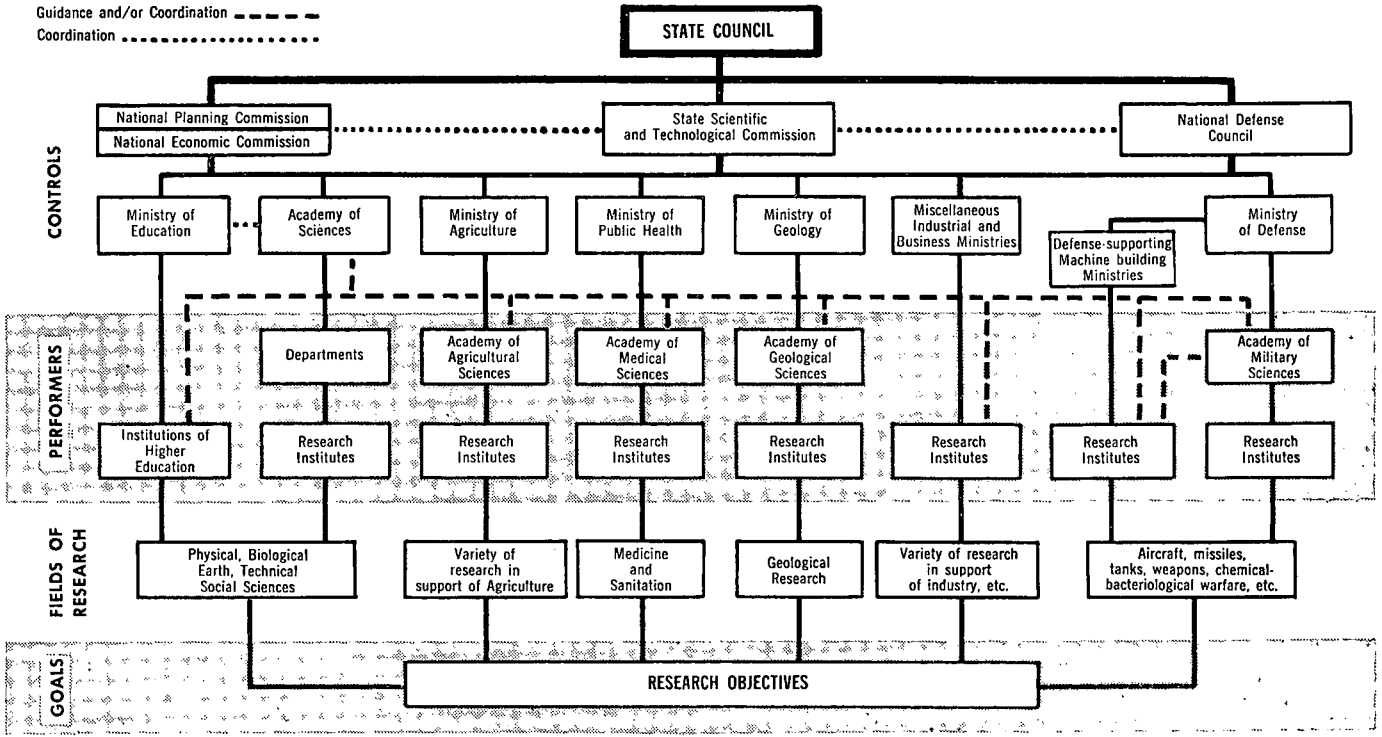
BY

LEO A. ORLEANS

CONTENTS

TABLES

ORGANIZATION PATTERN FOR R&D IN COMMUNIST CHINA*



*This chart reflects more the presumed mechanics of operation, than the formal organizational structure. It was adapted from a chart prepared by Mr. Wang-chi (Science and Technology Division, Library of Congress).

RESEARCH AND DEVELOPMENT IN COMMUNIST CHINA: MOOD, MANAGEMENT, AND MEASUREMENT

I. Description of Research and Development

There is no term in the Chinese language and no concept that is equivalent to our phrase "research and development." Although native sources do discuss "science" and "research" even these words define a scope of activties in China that makes them difficult to relate to R. & D. as we understand it. When this fact is considered in conjunction with the overall paucity of analytical and textual material and the virtual nonexistence of statistical data, the immediate question is: "Why bother?" The effort is dictated by exigency, since even a superficial evaluation of the scope and content of R. & D. activities in Communist China is vital in any assessment of that country's economic and military potential. Thus, it is my intent to draw together some of the relevant information that would at least provide a panoramic sweep of the R. & D. picture, identify major gaps in information, and provide one possible methodogical approach for measuring Communist China's R. & D. effort.

R. & D. represents a powerful force for change, and in the economically advanced countries a substantial share of scientific and technological growth derives from it. Realizing the extent to which such development insures economic growth and greater profits, government and industry in these nations combine to invest substantial resources in R. & D.

In the developing countries the situation is quite different. Most of these nations fall into the category of "preresearch cultures," and their rate of investment in science and research is, at best, negligible. How much of the limited capital should be spent by a country emerging into the modern world for science and technology in some form of R. & D. is debatable. While a majority of the experts feel that even at an early stage of development, it is improtant to engage in R. & D. activities in order to insure economic growth, others feel that there are areas of investment of much higher priority and that it is more practical for an emerging country to borrow the scientific and technical know-how of the more advanced countries of the world. All would probably agree, however, that if a developing nation is to invest in some form of research, this research should be closely related to the country's basic needs (e.g., agriculture, building materials, and construction) and should take full advantage of the country's local skills and natural resources—be they minerals or coconuts. Furthermore, in order to efficiently borrow and adapt foreign technology, a country still has to conduct R. & D.

It is difficult to place Communist China on a world scale of scientific and technological development. Some think of it as a backward nation, while others list it among the major industrial powers. The paradox is real. Whereas political and social changes have permeated

throughout the population, large segments of the rural population are still untouched by technological change. At the same time China is a significant producer of the world's coal, steel, and electric power and has several other highly developed industries. It continues to be a land of the man-pulled cart, while the rapidly expanding railroad system crisscrosses most of the densely populated regions of the country. China is a country of the simple plow and The Bomb.

A. THE POLITICAL AND SOCIAL SETTING FOR RESEARCH AND DEVELOPMENT

Politics in Communist China so completely permeates life in all of its facets that it is impossible to study any topic without discussing the role of ideology and the effects of the ever-shifting political climate. Although it may well be taken for granted that science, technology and consequently R. & D. would fall ouside political interference, under the Chinese Communist regime the conclusion could be drawn that it is precisely these subjects that constitute the focal point for the ideology of Marx and Mao. One can smile when he reads that "Mao Tse-tung's thinking is not only the best weapon for reforming society and remolding people's ideas, but also the best guidance for revealing the secrets of science and technology,"[1] but it would be a mistake to ignore this as simply Communist gibberish directed at the uneducated masses of China. Statements like the one above are directed at the scientist and the engineer as well; they are not casual in nature and the specialist is expected to accept them and to abide by them. Within the intensely political climate it does have an effect on the individual researcher's thinking and, most important, on his attitude and capacity for work. An appreciation of the setting within which R. & D. activities are undertaken, therefore, is vital to the evaluation of the total R. & D. picture.

The slogan "walking on two legs" is evident in many of China's internal policies. It means that the country must rely on both the old and the new; on the traditional and the modern; on the slow and the fast. It implies the use of all possible approaches to achieve national goals and contains much that is practical within the Chinese setting. It is particularly applicable to science and technology, for the leaders realize the importance of instilling an awareness and an appreciation of science among hundreds of millions of peasants and workers with no scientific and technological tradition.[2]

"Science" and "technology" have become common words in the daily press and are frequently seen in a variety of popular slogans. For example, the "love of science" is one of the "five loves" being taught along with the love of fatherland, people, labor, and public property. Even more directly related to research and development are the three great revolutionary movements: (1) class struggle, (2) struggle for production, and (3) scientific experimentation. Responding to these demands for scientific experimentation, the press and radio uncover endless numbers of peasants who devise new methods in agri-

[1] *Jen-min Jih-pao* (People's Daily), Jan. 24, 1966, hereafter referred to as *JMJP*.

[2] It must be remembered that as a nation China has a long and notable history of scientific research and achievement. See, for example, Needham's *Science and Civilisation in China* (7 vols.), in the course of publication since 1953 by the Cambridge University Press.

culture and workers who improvise and improve procedures and equipment.

An editorial in the *People's Daily* asks: "Is it an accident when an ordinary worker with only 3 years of primary school education becomes a specialist in the scientific and technical fields of upper space and the origin of light?" The answer, of course, is: "No. In the great era of Mao Tse-tung in our country this is an inevitable phenomena. . . . Many of our inventions and creations come directly from the hands of the workers; there are even more inventions and creations in which workers play at least some part." [3]

This glorification of the "nonintellectual expert" is almost always accompanied by a slap at the professionals, at the foreign-trained experts, and at foreign science and technology in general. The following example is one of hundreds that appear in Communist literature:

> Inspired by Chairman Mao's statement that the downtrodden are often the wisest while the intellectuals are often the most stupid, Shanghai's workers have dared to challenge established authorities and sweep away the foreign dogmas and stereotypes that have shackled the development of production. They have rapidly caught up with and overtaken advanced standards in science and technology and turned out many high-grade precision products of their own design. . . . "We must sweep away the prestige of so-called specialists and authorities who try to overwhelm us with foreign books and stereotypes," said the workers. "We must tear down the bourgeois flag and hoist the great red banner of Mao Tse-tung's thought in the field of science and technology." [4]

The deprecation of everything foreign has been particularly evident during the past year as part of the big push for self-reliance. Typical is the following quotation from an economic journal:

> The policy of self-reliance requires that in the cause of building socialism a country must independently develop its economy, national defense, science and technology, culture and education, and other undertakings according to its own concrete situation and its own manpower, material resources and fund supply. . . . A country must not depend upon any other country and become a satellite of another country.

And in the last paragraph:

> It is especially necessary to point out that the successful explosion of the first and second atomic bombs—which China manufactured herself—was an enormous achievement made possible by the implementation of the guideline of self-reliance in China.[5]

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[3] *JMJP*, Jan. 20, 1966.

[4] New China News Agency, June 9, 1966, hereafter referred to as NCNA.

[5] *Ching-chi Yen-chiu* (Economic Research), No. 7, July 20, 1965, hereafter referred to as *CCYC;* translated by U.S. Joint Publications Research Service, No. 34,015, Feb. 4, 1966, hereafter referred to as *JPRS*.

The demand for self-reliance is only partly directed at international independence. Most of the propaganda was aimed at individual plants and enterprises. Self-reliance has evidently become such a fetish that "some enterprises, though located only a few streets apart and only a wall to separate them, stubbornly refuse to contact one another. Each minds its own business and shuns cooperation." (*JMJP*, Feb. 20, 1965). The situation got so bad that, starting in the spring of 1965, a big push was initiated for cooperation between enterprises.

The regime and its media of public communications seldom differentiate between true science and "people's science," or between efforts of professional engineers and semiliterate technicians. In their efforts to blur class differences and to make every worker a scientist and every scientist a worker, the Communists have undoubtedly created serious morale and performance problems with respect to the professional personnel. (And, in the process, greatly complicated any analysis of China's professional and semiprofessional manpower.)

The plight of the Chinese intellectual has been covered by many authors.[6] The continuing vacillations of the Government's position toward the small professional segment of the population clearly indicate the dilemma that persists after almost 18 years of Communist control. The intellectuals are indispensable for the country's future, but are still suspect and are presumably the most politically unreliable segment of the society. While making every effort to increase the number of highly qualified specialists in the country, the Communists have apparently been unable to produce a professional robot, who can be creative as a specialist and at the same time unquestioningly receptive to the concentrated unsophisticated political rubbish. Unfortunately for the Communists a thinking scientist is likely to be a thinking man and the intense efforts to "wipe out individualistic thoughts" are diametrically opposed to the type of thinking customarily associated with R. & D. activities.

Despite these efforts by the regime, it is clear that some of the scientific and technical personnel continue to be skeptical about the usefulness of Mao Tse-tung's thought as a guide in scientific experimentation and they are taken to task by the *People's Daily:*

> They say: "Going through every page of Chairman Mao's works cannot find an engineering principle or a mathematical formula." It is true that such a principle or formula cannot be found in Comrade Mao's works. But it is in such works that one can find the "formula" that creates the mathematical formula, and the "principle" which points out the engineering principle.[7]

Mao also has said that "where the broom does not reach, the dust will not vanish of itself." Mao's broom has been sweeping for over 15 years but the intellectuals apparently go on asking the questions.

The constant propaganda that emphasizes self-reliance and runs down foreign technology and book-learning is designed to infuse pride and self-confidence in the Chinese, and to combat the inferiority complex which, presumably, was instilled by more than half a century of foreign domination: ". . . the imperialists and reactionary ruling classes spread the cult of foreign technology and tried to destroy the Chinese people's national pride and make them feel inferior."[8] Although the "China first" line is the one most frequently heard, some of the more serious articles directed at the professional segment of

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[6] For example, Theodore Hsi-en Chen, *Thought Reform of the Chinese Intellectuals*, London, 1960; Roderick MacFarquhar, *The Hundred Flowers Campaign and Chinese Intellectuals*, New York, 1960. The most recent policies are described in Donald J. Munro, "Dissent in Communist China: The current Anti-Intellectual Campaign in Perspective," *Current Scene*, vol. IV, No. 11, June 1, 1966.

[7] *JMJP*, Feb. 26, 1966.

[8] *JMJP*, Nov. 13, 1965.

the population, occasionally do come out with more realistic statements on science, technology, and R. & D.:

> There is a large amount of the world's advanced technology which can be emulated by us. If we are adept in studying and rich in creative spirit, we can shorten the devious road and catch up or even surpass the advanced countries.[9]

In some instances both viewpoints are expressed in the same article; for example: "China must thoroughly renounce superstitious belief in foreign countries and superstitious belief in books," and a few pages later: "The absorption and utilization of foreign good experiences and good techniques is necessary at any time for any country."[10]

Also relevant to the discussion is the manner in which scientists are used by the Goverment in international scientific meetings, which are little more than pretentious political shows. The latest example was the 1966 Summer Physics Colloquim, which was held in Peking and attended by scientists from 32 countries of Asia, Africa, Latin America, and Oceania. If there was any exchange of scientific ideas and information during the colloquium, it certainly was not reported either by the press or by the radio. All the emphasis was on the political theme, implying the wholehearted support of the world scientists in the "Big struggle that is going on between the forces of revolution and the forces of counterrevolution." Science was introduced only to stress further this same proposition: "At present U.S. imperialism is using its science and technology to carry out aggression and massacre in Vietnam and many other areas of the world."[11]

B. SOVIET VERSUS WESTERN INFLUENCES

What little science and technology activity there was in China prior to 1949 was mainly Western oriented. Since the turn of the 20th century thousands of Chinese students received their education in the United States, Western Europe, and Japan, and the reorganization and reforms of the educational system after 1911 also were largely influenced by Western thought. When the Communists assumed control over the mainland, they immediately repudiated all cooperation with the West and turned to the Soviet Union for "tea and sympathy."[12] The long cooperation between China and the West, however, was too solid to be easily and quickly reversed. Western- and Japanese-trained scientists and engineers constituted the backbone of China's professional manpower, many of them occupying key positions in the Academy of Sciences, in the institutions of higher learning, in industry and in government. The difficulty of redirecting this Western orientation among China's scientists and engineers was ignored by the Communists, except as it touched on political issues. Actually, the conversion from English, German, and French to the

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[9] *CCYC*, No. 11, Nov. 20, 1965; translated in *JPRS*, No. 33,768, Jan. 18, 1966.
[10] *CCYC*, No. 10, Oct. 20, 1965; translated in *JPRS*, No. 33,403, Dec. 20, 1965.
[11] *Peking Review*, No. 31, July 29, 1966. One paper read at the physics colloquium was entitled "Making Lamps for the Revolution." It was delivered by "an ordinary worker" who explained how studying Mao Tse-tung's thought has helped him to "Trial-produce more than 10 types of new electric light sources." (*Peking Review*, Sept. 2, 1966). No mention, however, of how it was received by the visiting scientists.
[12] Cheng, Chu-yuan, *Scientific and Engineering Manpower in Communist China, 1949–63*, National Science Foundation, Washington, 1965. See his ch. VII, "Role of the Soviet Union in Developing Scientific and Technical Manpower in Communist China," and ch. VIII, "Role of Western-Trained Scientists and Engineers."

Russian language posed great problems both for established professionals and aspiring students. Thousands of Russian texts and reference works were translated into Chinese; thousands of scientists, engineers, and students spent years studying the Russian language—a tongue that does not come easily to the Chinese—and many of the institutions of higher learning adopted Russian materials in their courses.[13]

This laborious effort of reorientation toward the U.S.S.R. came to a sudden halt in 1960 with the major political schism between the two countries. China was left with Russian-made factories and Russian blueprints for industrial construction projects, but without the necessary spare parts and without scientific and technical advisers. After some 10 years of intensive Russian influence in science, industry, and education, China once again found herself in the throes of a painful and expensive readjustment; initially in a detachment from the Soviet Union, and then gradually and grudgingly back to a limited form of Western influence in science and technology.

Considering the diatribes against Western science and technology, the drift toward the West may seem like a contradiction. In a sense, however, it is just another twist of the "walking on two legs" policy. While the propaganda machine accelerates its denunciations of capitalist science, schools at all levels are introducing more and more courses of English and other Western languages (rather than Russian) and more and more Western scientific and technical materials are being translated into Chinese.[14] This forced trend is also quite apparent in the recent foreign trade policies pursued by Communist China. Since 1963 she has purchased at least 25 complete plant installations from Western countries.[15] Among those nations having no diplomatic relations with China, West Germany has become her most important trading partner. Trade between these two countries increased from 265 million marks in 1964 to 1.1 billion marks in 1965, and continues to increase.[16]

The loss of Soviet support, particularly at a time when China's economy was already experiencing a sharp downward trend, had conspicuous economic consequences. Likewise, the current shift from Russian to Western influence and the reorientation in China's educational and scientific systems must be having a braking influence on the country's R. & D. activities.

C. RESEARCH AND DEVELOPMENT GOALS

Given the above conditions and moods, what can be said about Communist China's R. & D. goals? As expressed in lead articles and editorials and as trumpeted in the national and international propaganda media, the aim is clear and direct: The country's science and tech-

[13] For example, in 1954, 54 of the 61 courses offered in the science departments of Shantung University used Russian materials exclusively.

[14] Another example of China's interest in Western science and technology is evident from the following incident, as reported in the *Wall Street Journal* (Feb. 5, 1965): "Not long ago the Massachusetts Institute of Technology library in Cambridge, which exchanges scientific publications with Red China, was briefly baffled by a Communist request for certain papers on atmospheric physics. It turned out that these were to be delivered at an MIT conference months away. . . ."

[15] *Neue Zuericher Zeitung*, Zurich, Apr. 6, 1966.

[16] *Le Monde*, Paris, Mar. 22, 1966.

nology must catch up to and overtake the leading nations of the world. The method is even simpler: Under the guidance of the Communist Party's Central Committee and Chairman Mao, the most advanced scientific and technological achievements will naturally follow China's ideological revolution.

The real objectives and their details are much more difficult to ascertain, but for the most part they operate within the following precept: "All scientific research is for the purpose of developing production and must be integrated with production practice. Subjects for research must come from production and the results of research, without any exception, must return to production." [17] This theme is stressed again and again. It not only determines the nature and content of R. & D., but also has the effect of gravely limiting all activities relating to true basic research.

Although the degree to which economic goals determined R. & D. activities has varied over the years, the emphasis has always been there. It is not surprising, therefore, that some of the specific R. & D. goals can often be gleaned from the overall economic production goals.

China's First Five-Year Plan (1953–57) for the development of the national economy contained few details dealing with scientific and technical development and only generally discussed the need to improve scientific research and experimental work and to raise the scientific and technical level in China. It did, however, spell out 11 fields which should constitute the principal work of the Academy of Sciences: (1) peaceful use of atomic energy, (2) construction of new iron and steel bases, (3) petroleum production, (4) seismology, (5) multipurpose exploitation of river valleys, (6) tropical plants in South China, (7) natural and economic divisions of China, (8) antibiotics, (9) polymers, (10) theoretical problems relating to national construction during the transition to socialism, and (11) contemporary Chinese philosophy and history. [18] It may be seen that only about half of the tasks assigned the Academy can be identified as including at least marginal R. & D. activity.

Professor Eckstein aptly described the Second Five-Year Plan (1958–1962) as "Stillborn and swallowed up by the Great Leap Forward." As a matter of fact, the full text of the Plan was never published. The draft of the Plan did, however, contain several paragraphs that pertained to science. Once again the emphasis was on the practical needs of national construction and on the building of socialism. It stressed the need to learn from the latest scientific and technical achievements of the Soviet Union and other countries, reasserting the need to concentrate on the science of atomic energy, on electronics, and on the techniques of automation and remote control.

A more important guide to the trends in R. & D. was the first long-term plan for scientific development, known as the Twelve-Year Plan (1956–67). It was formulated by the State Planning Commission with the cooperation of the Academy of Sciences and the various industrial ministries, and with the assistance of numerous Soviet advisers. During the planning period 582 problems relating to science

[17] *JMJP*, Jan. 20, 1966.
[18] *First 5-Year Plan for Development of the National Economy of the People's Republic of China, 1953–57*, Peking (Foreign Language Press), 1956, p. 54.

and technology were identified. These problems were finally grouped into the following 12 categories—in many instances identical with the principal areas of concentration mentioned in the economic plans: peaceful uses of atomic energy; new electronic techniques; jet propulsion; automation in production and precision equipment; surveying and prospecting for petroleum and other scarce materials; exploration of mineral resources; metallurgical studies; development of fuels and heavy machines; technical problems associated with exploitation of the Yellow and Yangtze Rivers; agriculture, with emphasis on mechanization, electrification, and use of chemicals; prevalent diseases; and basic natural sciences.

Although presumably it was quite flexible, the Twelve-Year Plan for scientific development was also swallowed up by the Great Leap Forward. Despite the absence of qualified personnel and rational plans, 1958 saw a tremendous proliferation of local branches of the Academy of Sciences and miscellaneous research institutes at the provincial, municipal and even lower levels. Under the pressures and zeal of the Great Leap, research activities predictably deteriorated, while research organizations proceeded to report completion of the tasks outlined in the Twelve-Year Plan in one-third or one-half of the original time schedule.

The adjustments that were necessitated following the Great Leap cut across all phases of Chinese life, including policies that related to science and technology. Once again there developed a more liberal attitude toward professionals and specialists, political control was placed into some perspective, and the emphasis was on quality. Many of the "fly-by-night" institutes were abolished or merged and the limited scientific manpower was concentrated in research centers which had more adequate facilities. Within the economy, the Communists decreed a major shift of emphasis from industry to agriculture and it must be assumed that on the scientific and technological front there was similar shifts in policy and a reallocation of scarce capital.

More recently, some of the goals that may be related to industrial R. & D. have been listed as objectives of the campaign for "technical innovation and technical revolution." These objectives are:

> (1) to speed up the technical reform of all sectors of the economy; (2) to raise labor productivity; (3) to give an impetus to the enterprises so that they will take actions on their own, save investments, and raise output; (4) to improve the quality of industrial products and increase their varieties; (5) to improve labor conditions; (6) to lower cost of products; (7) to enrich and develop scientific and technical theories; (8) to gradually diminish the differences between physical labor and mental labor.[19]

These objectives have been incorporated into the tasks of the Third Five-Year Plan—the details of which have not been published.

Admittedly all such statements regarding goals and objectives are little more than generalities, but they do provide some idea as to priorities and areas of research concentration.

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[19] *CCYC*, No. 10. Oct. 20, 1965; translated in *JPRS*, No. 35,070, Apr. 18, 1966.

D. THE NATURE OF RESEARCH AND DEVELOPMENT

The practical orientation of R. & D. in Communist China has already been discussed under policies and goals, but it may be well to consider it in terms of concepts familiar in the West; i.e., basic research, applied research, and development. Is it possible to fit Chinese research concepts into these commonly used but comparatively loose categories?

Basic research is a relative term and the lines between it and applied research are often vague and very subjective. The official definition as adopted by the National Science Foundation is as follows:

> Basic research is research in which . . . the primary aim of the investigator is a fuller knowledge or understanding of the subject under study, rather than a practical application thereof.[20]

Using this particular definition, there is at present virtually no basic research in China. However, the American definition makes a special provision for the profitmaking organizations by including under basic research ". . . original investigations(s) for the advancement of scientific knowledge . . . which do not have specific commercial objectives, although they may be in fields of present or potential interest to the . . . company." Ironically, to describe adequately the limted basic research that takes place in China, all one needs to do is to eliminate the word "commercial" and substitute "state" for "company" in the above definition.

In the case of applied research—research directed toward practical application of knowledge—the specific definition relating to profitmaking organizations is again more applicable, once the word "commercial" is deleted; i.e., "Research projects which represent investigation directed to discovery of new scientific knowledge and which have specific (commercial) objectives with respect to either product or process." Presumably most of the research that is not related to "development" falls within this category.

"Development is the systematic use of scientific knowledge directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes." All the discussions and descriptions of R. & D. activities in Chinese sources indicate that most of the time and effort is expended in functions that would normally fall into the category of development.

Nevertheless, when positing that the volume of basic research in Communist China is insignificant, a frequent response is "How can that be possible? They produced The Bomb!" The explanation is, simply, that the scientists directed to produce The Bomb had much of the necessary information already available to them. Many of the physicists were Western-trained, they had access to Western literature, and they had considerable Soviet assistance in the middle fifties. In that sense, a large part of R. & D. work involved in the production of The Bomb could almost be considered developmental in nature. Other achievements periodically reported in the Chinese press as major scientific breakthroughs are seldom the result of true theoretical research, because in almost every instance the effort is mission-oriented.

[20] National Science Foundation, *Reviews of Data on Research and Development*, No. 33, April 1962, p. 8. See also for applied research and for development.

This is in no sense a disparagement of Chinese science, rather an indication of the practical (from the Communist standpoint) philosophy that governs R. & D. activities.

Admittedly the discussion here presents a rather narrow definition of basic research—perhaps more accurately defined as "pure basic," as opposed to "synthetic basic." But there is no need to split hairs. The main point is that the majority of Chinese scientists are required to have a definite and practical goal. If in the process they manage to stray and come up with new findings that extend knowledge but have no immediate practical application, the result may be considered to be a bonus.[21] The philosophy that "The basic researcher must . . . be able to dream and have faith in his dreams. . . ." [22] is an impossible prerequisite for the Chinese Communist Party.

Over the years, the proportion of basic research to total research seems to have fluctuated in direct proportion to the state's policies toward scientists. Apparently, there is a natural pull toward basic research that exists among the majority of scientists. Whenever the regime relaxes its controls, the scientist drifts toward theory. This happened during the early years of the Communist regime; again in 1957 during the period of "booming and contending," and following the Great Leap when the mass line was repudiated and at least a portion of the control over science and technology was returned to the professionals. The more liberal policies never seem to last and are always followed by a harsh reaction in the form of a fierce ideological campaign against intellectualism and individualism—two derogatory terms which have become almost syononymous to the Communists.

The current campaign against scientists, which is part of the larger "cultural revolution" that is rending China is a case in point. One of the complaints declaims thoughts of some of the research personnel, "filled with the desire for personal fame and material rewards." The party, however, is making progress in educating these villains: "After persisting in the direction of making scientific research work serve Socialist construction, the propensity of certain scientific researchers to divorce themselves from production, realities, and the masses, has been overcome to a certain extent." After the scientists saw the light, many of them agreed that "If you have no politics in your head, you cannot free yourself from the trammels of academic studies and personal fame and rewards, and you achieve nothing." [23]

E. STRUCTURE, PERFORMERS, AND CONTENT

It is impossible to present a neat picture of the management and direction of the various institutions engaged in R. & D. activities. It is known, for example, that the Academy of Sciences with its research

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[21] There is almost a universal conflict between the people who provide the money for basic research and those who are involved in performing the research. It is human nature to expect concrete results and visible benefits in return for expended funds. Consider the following excerpt from an editorial in the *New York Times* (July 11, 1966): "The long honeymoon enjoyed by basic researchers in the Nation's university and other laboratories appears to be coming to an end. In both the White House and Congress more and more impatience is being exhibited toward research inspired by scientific curiosity rather than by the desire to solve specific well-defined immediate problems." The attitude of the impatient Chinese Communists should not be surprising.

[22] Hans Selye, "What Makes Basic Research Basic?" *Saturday Evening Post*, Jan. 24, 1959.

[23] *Yang-ch'eng Wan pao* (Canton Evening News), Oct. 3, 1965; translated in *JPRS*, No. 36,342

institutes is a major R. & D. performer. Institutions of higher education, not only maintain their own research facilities, but also control some research facilities that are administratively attached to them. Some universities (and their research facilities) are directly under the Ministry of Education in Peking, while some are under Provincial and local administration. Research institutes are also maintained by industrial ministries and even by individual plants. To further complicate the situation, industrial ministries and some factories run specialized colleges. The multiple formal and informal controls within this elaborate system appear to be almost unlimited. Consider a reference to an electrical equipment research institute. Unless the source further identifies the institute, the reader cannot know whether it is under the direction of the Academy, a branch academy, one of the industrial ministries, a specific factory, the Ministry of Education or one of its local counterparts, an institution of higher education, or perhaps under the combined control of several of these or other organizations. The confusion is accentuated by the numerous reorganizations and politically dictated management shifts that have occurred over the last 15 years. This does pose some analytical problems.

Presumably the Scientific and Technological Commission, which was set up under the State Council, sits at the apex of this tangled superstructure and is in some measure responsible for all R. & D. activities in the academies, in the institutions of higher learning, and in industry. At any rate, this Commission, created in 1958 through the amalgamation of the Science Planning and State Technological Commissions, represents the highest scientific and technological body on the mainland.[24]

Under the Commission is the Chinese Academy of Sciences, which remains the most important single center for scientific research and development. Through its five academic departments it controls over 100 research institutes. Still other research institutes are found under the regional branches of the Academy, which are located in every Province and in most of the major cities. The branch research institutes are under the direct supervision of the Provincial, scientific and technological committees and with few exceptions are inferior in terms of both personnel and equipment.

In addition to the Chinese Academy of Sciences, there are the Chinese Academy of Medical Sciences, under the Ministry of Public Health, and the Chinese Academy of Agricultural Sciences, under the Ministry of Agriculture. Both of these Academies receive some academic guidance from the Academy of Sciences, share some of the top scientists with the Academy, maintain independent institutes and operate some research institutes through the parent ministries.

Universities and other institutions of higher education maintain laboratories and other facilities and direct the work of specialized research institutes attached to them. On the whole, however, the amount of R. & D. performed at the institutions of higher education is relatively insignificant when compared to the activities of the Academy and the industrial ministries and enterprises. Most probably this is a reflection of the shortage of highly qualified personnel and

[24] The highly placed chairman of this Commission, Marshall Nieh Jung-chen, was recently purged by Mao.

modern equipment—the more competent personnel and the better equipment being concentrated in institutions which conduct full-time research. The most important exception is the University of Science and Technology which was founded in Peking in 1958 by the Chinese Academy of Sciences and the Ministry of Higher Education. Its faculty includes many eminent scientists and the advanced students participate in research within the relevant units of the Academy.[25] Other exceptions are the agricultural colleges, many of which are important research centers.

Another important organization that should be mentioned is the Federation of Natural Science Societies, which is a mass organization and includes societies in natural science, technology, medicine, and agriculture. Originally limited to individuals who have graduated from a college or university and have successfully engaged in scientific work, since 1958 membership requirements have been revised to accommodate highly qualified and experienced workers who may not have any formal higher education. Professional societies have a number of important responsibilities, such as control and organization of workers in science and technology and communication and dissemination of scientific and technological information, but since they do not engage in research their relevance here is limited.

"In new China, the basic policy for scientific research is service to production." [26] It is therefore not surprising that industry, which is charged with the building of China into a modern power through the "mass movement for technical innovation and technological revolution," plays a paramount role in Communist China's R. & D. In addition to the State Scientific and Technological Commission, many of the planning and control functions over industrial R. & D. are shared by the National Planning Commission and the National Economic Commission.

As already mentioned, there are a variety of organizational units at the national, Provincial, autonomous chou and municipal levels that conduct R. & D. in support of industrial needs. There are the research institutes under the direct control of the industrial ministries; there are laboratories and research facilities that are an integral part of the factory; there are specialized colleges that are run by the industries and which contain research facilities; there are also arrangements between plants and Academy research institutes, whereby the two cooperate in specific research projects. As a matter of fact, more and more research institutes of the Academy of Sciences seem to be tying their R. & D. activities to the requirements of specific plants and industries. The evolving picture suggests that within the system of close cooperation existing between the research institutes under the Academy, the institutions of higher education and the industries, it is the latter that has the most direct control over much of the content and nature of research. This has been particularly true during the last few years.

At the lowest level of industrial R. & D. are the research facilities established at the factories. "Many factories are now engaged in scientific research, and have their own research units. Even small

[25] See Cheng, p. 48.
[26] *China Reconstructs*, No. 6, June 1965.

factories are engaged in scientific research." The nature of much of the research conducted in these units would hardly fit under the R. & D. rubric, but it is significant that over a two-and-a-half year period 40 percent of the successful "scientific research projects" undertaken in light industry, for example, were accomplished by the factory research personnel. The listed advantages for factory R. & D. are as follows: ". . . scientific research can improve the technical standard of production, the results of research can be quickly applied to production, more specialists can be trained through research and more workers can participate in research." All ministries, departments (bureaus), and enterprises are therefore urged to "strengthen leadership over, and give assistance to research work in factories." [27]

The campaign to disseminate the spirit of "technical innovation and revolution" among all the industrial workers and employees has resulted in the publication of some interesting statistics—if not results—as illustrated by the following examples: "New products successfully trial-manufactured by the industrial departments of Shanghai municipality in the first 6 months of this year exceeded 600 items . . ."; "in the first half of this year, various iron and steel enterprises in the whole country successfully trial-produced more than 280 new varieties of rolled steel"; "since the beginning of this year, over 200 factories in Harbin have brought about more than 14,000 innovation items"; and so on and so forth.[28] Many of the innovations came about because "the workers and technicians relied on their own revolutionary spirit to carry out repeated tests and improvements."

Although the overall national R. & D. goals—like the economic goals—are established at the highest levels through the scientific and technological, national planning and national economic commissions, many of the decisions regarding the content of research to be pursued at the plant and institute level are left to the local authorities. This relative freedom of decision at the lowest production levels runs contrary to the usual image of monolithic China, but it is evident in the commune, in the factory, and in the local executive committees. Again and again the leaders exhort that research projects must originate from production and that researchers must formulate programs that are compatible with the actual production needs. The authority is unquestionably implied, and sometimes clearly stated: "Although there are special personnel in local governments responsible for the organization of research, the chief responsibility, however, still lies with the research units themselves and the persons who take charge of the projects." [29]

In Communist China the functions and responsibilities subsumed under the design sector extend considerably beyond what is generally included under design in the West. In some instances the word

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[27] *Chung-kuo Ch'ing Kung-yeh* (Chinese Light Industry), Peking, October 1965. Another source states that ". . . to organize factories to conduct scientific research work is one of the important ways of developing light industry's scientific research with faster, greater, better and more economical results. . . ." (*Ta-kung Pao*, Sept. 23, 1965; translated by *JPRS*, No. 35,015, Feb. 4, 1966.) Admittedly both sources refer to the less sophisticated research that would be done in light industry, but it is clear that factory R. & D. is also organized in other types of enterprises.

[28] *Kuang-ming Jih-pao* (Kuang-ming Daily), Sept. 21, 1964; translated by *JPRS*, No. 34,015, Feb. 4, 1966.

[29] *Chung-kuo Ch'ing Kung-yeh*, Peking, October 1965.

"design" is used synonymously with R. & D.[30] In discussing new technology within the industrial sector, the Chinese speak of "seven barriers," which are research, experimentation, design, manufacturing, testing, installation, and usage. Operating approximately in the center of this sequence of functions, "the designing sector understands more about current production needs and realistic conditions than the scientific sector; it is also more familiar with foreign technological conditions than the productive enterprises." The efforts to assign broader responsibilities to design personnel is expressed in the following complaint: "In factory designing, some designing personnel have deemed that the study of new technology belongs to the scientific research sector and that the making of advanced equipment belongs to the manufacturing sector. They also feel that whether the structure of products is rational is a matter for the production sector. . . . This ideology has seriously shackled their own hands . . ." [31] The design personnel are therefore encouraged to participate in research and experimentation, as well as in manufacturing and testing. They are also encouraged to "assign specific tasks" to scientific research units, institutions of higher education and production units.[32] Only when they "grasp all these responsibilities" will China's "technological revolution move ahead rapidly."

Between March 16, and April 4, 1965, there was a national design conference held in Peking, attended by individuals responsible for design units in industry, communications, commerce, and finance, and the agriculture and forestry departments of the central provincial and municipal governments.[33] It was called to stimulate the whole field of design and was followed by numerous articles discussing the problems and goals of design (and indirectly R. & D.) in Communist China.

An editorial in the *People's Daily* [34] called for a revolution in the work of industrial design and summarized the current thinking with regard to research and development in industry. It stressed the need for large-scale development of the machinebuilding industry and the production of large numbers of technically advanced machines and industrial products for all branches of the national economy in order to make China a powerful Socialist nation, modern in agriculture, industry, national defense, science, and technology. To achieve this there must be independent design work combining creativity with learning from others. The editorial warned that China will always lag behind other countries if it is content to copy their experiences and move along at a snail's pace. Independent designing is the only way a big country like China—with a large population and vast territory and with resources and natural and technical conditions quite different from elsewhere—can meet its diversified needs in Socialist construction.

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[30] Frequently, however, the category of "design personnel" includes workers not only in industrial design but also in architecture, pottery, commercial art, etc. It is this broad definition of design that makes it possible for the Chinese to refer to "several hundred thousand design personnel." (*CCYC*, No. 11, Nov. 20, 1965; translated by *JPRS*, No. 33,768, Jan. 18, 1966.)

[31] *CCYC*, No. 11, Nov. 20, 1965; translated by *JPRS*, No. 33,768, Jan. 18, 1966.

[32] *CCYC*, No. 9, Sept. 20, 1965; translated by *JPRS*, No. 32,793, Nov. 10, 1965.

[33] *K'o-hsueh T'ung-pao* (Science Bulletin), No. 5, May 1965; translated by *JPRS*, No. 33, 330, Dec. 15, 1965.

[34] *JMJP*, Nov. 13, 1965.

Referring to China's two atomic bomb tests and other important scientific achievements, the editorial declared that the designing of new and sophisticated products is by no means a mystery—China can accomplish what the other countries have been able to do, or have not yet done. It calls on the designers to use the experience of their predecessors to learn all that is good from both the Socialist and the capitalist countries, and to turn all this to China's account if it serves China's Socialist construction. In learning from others, designers should absorb only those things which are adaptable and useful under Chinese conditions because not all foreign designs are scientific and advanced. In capitalist countries there is too much formalism, unnecessary complexity and waste of materials. Even scientifically advanced designs may prove to be "backward" under the specific conditions existing in China. Thus, they too must be rejected. However, by relying on their own labor and wisdom and combining learning from others with their own creativeness, the Chinese people will be able to produce "Chinese-type" advanced products. Of course, the most important guarantee for success is still Mao Tse-tung's thinking, which helps designers to achieve their goals and assures close cooperation between administrators, technicians, and workers, and between factories, research institutes, and engineering colleges.

The various themes expressed in this editorial are repeated again and again in a variety of publications. This emphasis on design at the plant level may be construed as an indication of the lack of industrial sophistication, for as long as scientific and technical changes are initiated from the bottom, they are most likely to be in the nature of improvements and minor innovations rather than major technological breakthroughs. Although they exist, relatively little is said about the central design bureaus under the various ministries, which surely employ the more qualified personnel and which are more likely to be involved in more refined R. & D. It is possible their role is diminishing and that perhaps some of personnel in the central design institutions have been transferred to the plant level. In the past "design institutes did their work in isolation from reality . . . because design personnel had not seen production . . ." [35] To correct this situation, at least the designers of the large institutes "left the design institutes and went to the field and worked in cooperation with the workers and the factory comrades."

Cooperation in research between industries, the universities, and academy research institutes has been part of the R. & D. system for years. The standard operating procedure, however, has been one of contractual obligation whereby a production enterprise transferred funds to a research institute or a university to concentrate on a specific research problem. Undoubtedly, contractual relations between the factory and the institute continue, but recently there has been emphasis on more and more informal integration of research.

One form that this cooperation and coordination takes is the exchange of personnel. For example, during the research and testing stage, personnel from a particular factory are sent to work at the research institute; when the product or device is ready for design,

[35] *K'o-hsueh T'ung-pao* (Science Bulletin), No. 4, April 1965; translated by *JPRS*, 33,330, Dec. 15, 1965.

production, or installation, the research personnel from the institute are assigned to work at the factory. This is referred to as the "mutual dispatch of personnel" system. Also, "a large number of factories are now closely linked with colleges and scientific institutes and undertake pilot projects at the same time they expand production." The extent of this forced cooperation intended to eliminate the "yours" and "mine" concepts may be deduced from the statement that the "instiute of metallurgy of the Chinese Academy of Sciences has cooperated with factories on 52 research topics, representing four-fifths of its research work during 1965 . . . while the institute of chemical physics of the academy has worked in a similar way on 33 research projects over the past 2 years." [36]

At a recent national conference jointly sponsored by the State Economic Commission, the State Scientific and Technological Commission, the Ministry of the Chemical Industry, the Ministry of Higher Education, and the Chinese Academy of Science, Vice Premier Po I-po commended the workers, scientists, and university people for "splendid demonstrations of effective cooperation between productive unit, research institute, and college." [37] Examples of this cooperation abound in the Chinese press. A new ammonia converter was designed by a chemical plant and Tsinghua University; many new pneumatic devices were successfully researched and manufactured through cooperation between the Thermodynamic Instruments Research Institute and a thermodynamic instruments plant; important breakthroughs were achieved as a result of cooperation between a research institute of agricultural pesticides and a nearby chemical engineering plant; and so forth.

This discussion would not be complete without at least a mention of military R. & D. That the Chinese Communists have been engaging in the research, testing, and manufacture of modern military weapons and equipment is well known, but there is little to be learned from the mainland press with regard to military R. & D.

Presumably prior to 1958 military research was mainly conducted in a few of the suitable facilities of the Chinese Academy of Sciences. In 1958, through the establishment of the Military Science Academy, the Ministry of National Defense took direct control over military R. & D. The Military Science Academy, in addition to its own research activities, probably directs research in a number of specialized research institutes subordinated to it, some of them perhaps having been transferred from the Academy of Sciences when the Military Science Academy was created.

The ministries of machine building, which are responsible for the manufacture of military hardware, including aircraft and tanks, as well as the more modern weapons which may be currently in production, must be among the most reorganized institutions in Communist China. As is the case with other industrial ministries, the machine building ministries maintain some of the research institutes and educational facilities, which also must be involved in some R. & D. activities, many of them in cooperation with the Military Science Academy.

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[36] *NCNA*, Jan. 10, 1966.
[37] *NCNA*, Jan. 23, 1966.

In addition, much of the civil research performed in the country has military uses and implications.

It has recently been reported that within the Chinese Communist Party structure there are two committees directly concerned with military R. & D. One is a committee for defense science, and the other is a committee for defense industry. A military engineering college and a college for military chemicals are under the jurisdiction of these two committees.

II. Measurement of Research and Development

Whatever the economic level of a nation may be, there is usually an effort to measure the growth of science and scientific research. Among the developing countries, an index of this growth is used to show not only the rate and potential development, but also to suggest the progressive and far-sighted nature of the leadership. In the highly developed countries this information is also required by government and industry to evaluate past performance and to plan future courses. The science of measuring R. & D., however, is new and still undergoing numerous changes in terms of both concepts and interpretation of available data. Furthermore, much work is needed to establish more reliabile correlations between investment in R. & D. and the resulting change in the country's economy: that is, the relation between the input and the output. Only during the last few years have there been unified efforts (primarily by OECD) in promoting a more systematic collection of R. & D. information and establishing some international standards which would make it possible to reconcile data from different countries. The United States and other Western nations still find it difficult to obtain meaningful and accurate national data; international comparisons on the basis of existing data can be extremely deceiving. In the final analysis all measurements of R. & D. are, in essence, expressed in terms of people and money.

Considering the complexities of measuring the level of R. & D. in the advanced countries, it should not surprise anyone that at present it is impossible to measure Communist China's R. & D. effort with any degree of accuracy. There are no figures on the number of persons engaged in R. & D. activities, no data on capital invested in R. & D., no recent statistics on wages that can be used to determine the R. & D. wage bill. What follows then are some highly qualified and occasionally impressionistic estimates that may help clarify the problems, indicate information gaps, and, hopefully at least, result in order of magnitude figures as to the human and capital resources invested by the Chinese Communists in some of the activities which may in general fit the U.S. concepts of R. & D.

A. HUMAN RESOURCES

The volume and level of R. & D. is of course directly related to the number and competence of a country's scientists, engineers and their supporting technical personnel. The shortage of professional and semi-professional manpower in Communist China has been of constant concern to the regime and a perpetual stumbling block to its economic aspirations. Nevertheless, the progress that was made in expanding the educational system is impressive and as of January 1965 it is esti-

mated that there were 1.4 million persons with completed higher education on the Chinese Mainland.[38]

The present analysis will focus only on the engineers and the physical scientists, or that body of specialized manpower which constitutes the true accelerating force of a country's scientific and technological development, overall economic growth, and power potential. Because of this conceptual approach, research personnel in the life sciences, medicine, and agriculture have been excluded.

It is estimated that as of January 1965 there were a total of 450,000 engineers in Communist China who have completed some form of higher education. That the proportion of engineers increased from one-sixth of those with higher degrees to one-third of the total in just 15 years clearly indicates the regime's emphasis in higher education. It must be pointed out, however, that included among the 450,000 are a large number of graduates who are little more than technicians. As part of the "walking on two legs" philosophy, Communist China runs a variety of higher technical schools—from a 2-year Provincial engineering college to the Science and Technology University in Peking, which graduates highly competent engineers after 4, 5, or 6 years of training. Since more than 60 percent of the engineering schools are of the "quickie" variety that train highly specialized personnel, their graduates should be eliminated from the hypothetical pool from which research engineers would be drawn. Because the full-course engineering schools are somewhat larger in size, it is estimated that there are 200,000 engineers (44 rather than 40 percent of the total) with sufficient competence to participate in R. & D. work.[39]

Whereas there has been a tremendous increase in the proportion of engineers among the population with higher degrees, the proportion of scientists has actually decreased—another facet of the practicality and immediacy of planning in Communist China. As of January 1965 there were an estimated 85,000 scientists in China, excluding scientists in the fields of medicine and agriculture. Data published by the Communists have never included a breakdown of the science graduates by specific field; for that matter this information apparently was never published prior to 1949. It is known, however, that biological sciences were always among the most popular in the country and according to C. Y. Cheng's analysis of 1,200 prominent scientists and engineers in China,[40] life scientists constituted about 38 percent of the total scientists. Reducing the total number of scientists by approximately one-third, the figure of 55,000 is derived as an estimate of physical scientists in Communist China.

How many of these engineers and scientists are actually engaged in R. & D.? As already mentioned it is difficult to establish this figure

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[38] Following the 1963 graduating class, it was reported that China had graduated "well over 1.1 million" persons from colleges and universities since 1949. "Postliberation college graduates include 370,000 engineers, 325,000 teachers, over 110,000 physicians and pharmacologists, over 100,000 agronomists and foresters, and more than 70,000 natural scientists." (*NCNA*, Aug. 14, 1963.) To arrive at the 1965 estimate an attrition rate was applied to the 1963 data, and adjustments were made to include persons who graduated prior to 1949 and in 1964. Unless otherwise stated the figures in this section are the author's estimates. Much of the basic information for these estimates is contained in the study by Cheng and by L. A. Orleans, *Professional Manpower and Education in Communist China*, National Science Foundation, Washington, 1961.

[39] There are thousands of experienced workers in China who have worked their way up through the ranks and attained the title of engineer without any formal education. Although excluded from consideration here, some of them may be engaged in R. & D.

[40] Cheng, p. 130.

even in the West. Many scientists and engineers devote only part of their time to R. & D. activities and even the individuals themselves would find it hard to say exactly when they are engaged in R. & D. and when in other pursuits. Because of the additional professional and political demands on such people in China, their time is probably even more fragmented. Furthermore, the already tenuous line between engineer and technician would be particularly elusive under a system which produces engineers that are little more than technicians and technicians who may achieve the title of engineer. Under conditions where so much of the R. & D. is production oriented, it would also be particularly difficult to define when R. & D. stops and production begins.

One possible way to approach an estimate of the manpower actually involved in R. & D. is to consider each of the three major R. & D. sectors: (1) research in the institutions of higher education, (2) research at the Chinese Academy of Sciences and all of its branches, and (3) industrial research (ministerial research institutes and factories) and miscellaneous research institutions.

Based on enrollment figures and assuming that in the institutions of higher education there is a ratio of 30 students to every qualified professor (excluding instructors and other lower ranked teaching personnel), there were in 1965 some 10,000 engineers and 1,000 scientists teaching in the various colleges and universities on the mainland of China. Many of them would have full-time teaching loads, others would be located in educational institutions that don't have adequate research facilities; those directly involved in research would be doing it on a part-time basis. On the other hand, under the conditions prevailing in China, some of the advanced engineering and science students doing research would have to be considered with the scientists and engineers rather than with the supporting technical personnel. Considering these factors, it is estimated that in terms of full-time equivalents a maximum of 4,000 engineers and 500 scientists would be involved in R. & D.-type activities at the university research facilities.

Based on the rates of growth observed in the 1950's, the senior research staff at the Academy of Sciences should have approximately 5,000 by 1965.[41] Although the majority of the researchers in the life sciences are probably located at the Academy of Agricultural Sciences, nevertheless 1,500 is deducted from the total to account for the personnel in the life and social sciences, for a residual of 3,500 engineers and scientists that still have to be split up. To do this, it is assumed that the ratio of engineers to scientists is approximately the same as the ratio of engineering research institutes to research institutes in the physical sciences. Certainly not all of the 1,500 engineers and 2,000 scientists thus derived are doing full-time research at the Academy of Sciences, but for the purposes of this methodological exercise it is assumed that all of them are in R. & D.

It has already been established that in the total personnel pool available to the regime for R. & D. work, there are 200,000 engineers and 55,000 scientists. Substracting those accounted for in the universities and at the academy, there is a residual of 188,500 engineers and 52,000

[41] Includes both the senior and assistant research workers, since it is reasonable that the latter would also be drawn from qualified university graduates.

scientists to fill all the remaining positions in industry, construction, transportation, etc. that require their skills. It is anybody's guess as to how many of these specialists are in R. & D., but considering the shortages that exist in scientific and technical personnel and the extensive needs of China's economy, their number would be relatively small. Let us assume that approximately one-tenth of the engineers and one-half of the scientists are involved in R. & D.-type activities either in the research institutes of the various industrial ministries, in design institutes and offices, or in the shops and laboratories associated with individual production enterprises. In round numbers this would correspond to 20,000 engineer and 25,000 scientists.[42]

Combining the three sectors for which estimates have been made we come up with 25,500 engineers and 27,500 scientists, for a total of 53,000 qualified specialists in Communist China's R. & D. activities. At this point it is important to emphasize once again the factor of the multiple job holdings among these scarce specialists. Many members of the Academy teach at the universities; professors do research in some of the institutes of the Academy; engineers and scientists in both the university and Academy institutes are likely to be involved in research activities in the research institutes of the ministries, etc. Nevertheless, the distribution of the personnel between the three major research sectors should, to some extent, reflect the actual situation.

In addition to the main body of scientists and engineers, there are two other major categories of R. & D. manpower that have to be considered. There are the technicians and laboratory workers (usually with at least a secondary education) and an auxiliary body of workers and employees who range from the administrators to the custodial personnel. Indispensable in their support of the total R. & D. effort, their numbers are also important in arriving at the total R. & D. wage bill.

In 1957, in the Academy of Sciences, there were approximately 2.5 assistants, trainees, and other supporting technical personnel for every senior and assistant research worker. This ratio might be somewhat higher in the industrial sector of R. & D., but because of the serious shortage of personnel with the necessary qualifications, it is assumed that the ratio between supporting technical personnel and scientists and engineers is 3 : 1, or 160,000 to 53,000. As for the supporting workers and employees, I have assumed, on the basis of disparate data on available ratios, that in the total R. & D. effort there is a nontechnical supporting person for every scientist, engineer, and technician, or 213,000 workers and employees. In this manner we arrive at the total R. & D. manpower of 425,000 persons. Admittedly the 8 : 1 ratio between all types of supporting personnel and the engineers and scientists working in R. & D. is high, but usually the less advanced the technology the larger is the body of auxiliary manpower. Since it is estimated that this ratio is 1.7 : 1 in the United States and 2.5 : 1 in Western Europe,[43] the 8 : 1 ratio for Communist China does not seem out of line.

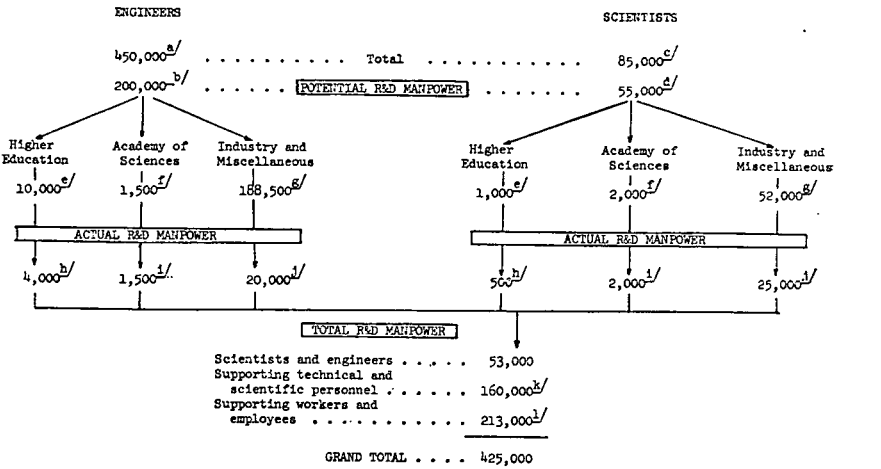
Considering the many crude assumptions that had to be made in the process of deriving the R. & D. manpower figure, it would be foolhardy

[42] Because these figures are derived from residuals, they include research personnel in the Academy of Military Science and other miscellaneous institutions, as well as engineers and physical scientists who may be employed by the Academies of Medicine and Agriculture.

[43] C. Freeman and A. Young, *The Research and Development Effort in Western Europe, North America, and the Soviet Union*, Organization for Economic Cooperation and Development (OECD), Paris, 1965, p. 40.

TABLE I

ESTIMATED MANPOWER IN RESEARCH AND DEVELOPMENT: 1965



NOTE.—For a more detailed discussion of the rationale, see text. All figures are liberally rounded.

a. Includes 370,000 engineering graduates reported between 1949 and 1963 (NCNA, Aug. 14, 1963), plus an estimated 70,000 graduates in 1964, plus survivors of pre-1949 engineers, less attrition. The engineers and scientists trained abroad approximately cancel those who left the country.

b. The figure of 450,000 engineers includes 2- and 3-year engineering college graduates, who should be eliminated from the total since they are usually not adequately trained for R. & D. Full-term engineering universities constitute approximately 38 percent of the total (based on data supplied by Mr. Wang-chi, Science and Technology Division, Library of Congress). Assuming a proportional distribution there would be 170,000 graduates of these universities. The 200,000 estimate is an upward adjustment to take into account the larger student body at the full-term universities. This figure represents the pool of potential R. & D. workers.

c. Between 1949 and 1963 Chinese universities graduated "more than 70,000 natural scientists" (NCNA, Aug. 14, 1963). Adjusting for the 1964 graduates (about 10,000), survivors of scientists graduated prior to 1949, and for attrition, a figure of 85,000 is estimated.

d. This figure excludes the life scientists. Chinese sources do not break down the scientists as to specific fields. In C. Y. Cheng's analysis of 1,200 prominent scientists and engineers in China (*Scientific and Engineering Manpower in Communist China, 1949–63, Washington, 1965*), biological scientists constituted about 38 percent of the total scientists (physical, earth, and biological). This percentage appears to be a little high for a general pattern. In the present calculation a ratio of 2:1 is assumed between the physical and earth sciences and the biological sciences.

e. Derived by assuming approximately a 30-to-1 ratio between students and qualified professors.

f. Of the total research personnel in the Academy of Sciences in 1957 there were 746 senior research workers, 755 assistant research workers, and 4,005 assistants, trainees, and technical personnel. (*Peking Review*, No. 5, Apr. 1, 1958.) It seems reasonable to assume that both the senior and the assistant research workers would be drawn from the qualified science and engineering graduates. Combining these two groups (1,501) and projecting forward on the basis of past growth trends a figure of 5,000 higher level research workers is estimated for 1965. Deducted from the research personnel are an estimated 1,500 life and social scientists. The residual of 3,500 is distributed between engineers and physical sciences approximately in proportion to the number of research institutes under the Academy in these particular fields.

g. A residual between total engineers and scientists and those in institutions of higher education and the Academy of Sciences. As a residual, this figure includes not only researchers in industry, but also in such specialized research institutions as the Academy of Military Sciences, as well as engineers and physical scientists who may be working under the Agricultural and Medical Academies and under some of the nonindustrial ministries.

h. These estimates assume that some of the professors will teach full time, some will be located in institutions without adequate research facilities, and that for the most part research is a part-time activity at the universities. This is in part compensated by students (particularly graduate students), who spend a certain proportion of their time on research. A slightly higher proportion of scientists than engineers will be doing research in universities. (In the West, university staff and postgraduate students usually devote 30–50 percent of their time to research.)

i. A somewhat exaggerated supposition that all scientists and engineers at the Academy of Sciences will be engaged in full-time research.

j. It is assumed that approximately one-tenth of the engineers and one-half of the scientists will be involved in R. & D.-type activities in all types of industrial research institutions. The figure for engineers includes those in design departments.

k. Assuming a 3:1 ratio between supporting technical and scientific personnel and the scientists and engineers. In 1957 in the Academy of Sciences this ratio was 2.7:1.

l. Assuming a 1:1 ratio between total scientific and technical workers and the supporting workers and employees. This is a minimal estimate for China, but approximately corresponds to the situation in the Soviet Union.

to place too much stock in the final estimate so shakily constructed. And yet, hopefully, there is sufficient rationale behind all the assumptions and certain built-in limitations that preclude unrestrained impulsiveness. In other words, it would probably be reasonable to expect the total manpower engaged in R. & D. in the engineering and the physical sciences to fall somewhere between 375,000 and 475,000.

B. CAPITAL RESOURCES

Measuring the cost of R. & D. is a tenuous undertaking under any circumstances. The cost of research does not appear as an entry in national budgets and the decisions regarding emphasis to be placed on R. & D. and money to be spent are the prerogatives of the department, ministry, or office most intimately familiar with the research requirements, costs, and problems. The difficulty is even greater in determining the research budgets of individual industrial enterprises. Only through extensive and intensive surveys, like those conducted in the United States, is it possible to arrive at some approximate figures of the total cost of R. & D. in a particular country.

The only directly relevant figures published by the Chinese Communists are those for the science budget which are available through the late 1950's. Although originally most of the science budget went to the Chinese Academy of Sciences, larger and larger proportions of the growing science appropriations have been allocated for other uses. Thus, in 1957 the Academy received only 31 percent of the national science budget,[44] while the rest of the funds were designated to support research and to expand physical plants in a variety of other institutions.

In addition to the science budget there are numerous other sources of finance for Communist China's R. & D. effort. For example, part of the scientific research at the universities comes from appropriations for higher education; industrial ministries finance research in their institutes from operating budgets; most of the defense R. & D. is financed through the defense budget and through the Ministry of Defense; the Ministry of Public Health sets aside its own funds for research; limited funds for scientific research are also probably expended by the local provincial and municipal governments. In many cases funds for specific projects would come from several sources through contractual obligations and direct grants. It is apparently possible, for example for the Academy of Sciences to provide funds for research done at one of the institutes of the Ministry of Defense, at the same time that the Ministry of Defense is financing certain activities of the Academy.

Given the necessary information, the direct approach would call for the analysis of all budgetary data in order to derive the cost of China's R. & D. Since the necessary facts and figures are absent, the present report undertakes a venturesome shortcut. An effort is made to come up with some rough indication of the cost of the total R. & D. effort from the manpower estimates in the preceding section.

Over the years, the Communists have made a number of attempts to standardize the country's wage system, but they have all been unsuccessful and there is little more wage uniformity in China's planned

[44] Cheng, p. 83.

economy than there is in the capitalist countries of the West. Although the Chinese have not published any comprehensive wage scales for many years, fortunately there were some statistics released following the June 1956 wage reform. The figures utilized in constructing table II are based on these scales—which are presumably still in effect—as well as on other scattered data as assembled by Cheng.[45] For the most part, constructed on the basis of averages, the wages are usually adjusted upward theorizing that personnel in R. & D. would more frequently be on the high side of the average.

From table II it may be seen that the total estimated wage bill for R. & D. personnel comes to 468,960,000 yuan annually. But in addition to wages there are a variety of incentives operating in China. Although the Party line will never admit to it, as a result of several unsuccessful experiments, the Communists have learned that the most effective insurance for harder work and higher production is not idealism (which does exist to a significant degree among the young) but financial incentives. There are bonuses for inventions and improvements, bonuses for hard work, rent allowances (or free housing), and other forms of incentives which require funds over and above the basic wages. For example, according to one plant manager, the bonus for superior workers amounts to 8 to 10 percent of the salaries and usually covers 8 or 9 percent of the workers.[46]

Other expenditures that should be included with wages are specific funds set aside by individual enterprises. The nature of the fund and

TABLE II.—*Estimated expenditures on research and development, 1965*

Location and rank of personnel in R. & D.	Number	Average wages [1] (in yuan)		Total annual wage bill (in yuan)
		Monthly	Annual	
Higher education:				
Professors (chiao-shou)	[2] 2,250	320	3,840	8,640,000
Associate professors (fu-chiao-shou)	[2] 2,250	210	2,520	5,670,000
Academy of Sciences:				
Researcher (yen-chiu-uyan)	[2] 1,750	320	3,840	6,720,000
Associate researcher (fu-yen-chiu-yuan)	[2] 1,750	210	2,520	4,410,000
Industry and miscellaneous: Engineers and scientists	[3] 45,000	170	2,040	91,800,000
Supporting S. & T. manpower (lecturers, assistants, industrial technicians, etc.)	[3] 160,000	90	1,080	172,800,000
Supporting workers and employees	[3] 213,000	70	840	178,920,000
Total wage bill				468,960,000
Adjusted for miscellaneous benefits [4]				540,000,000
Total annual R. & D. cost [5]				1,350,000,000

[1] Based on averages derived from Cheng (*Scientific and Engineering Manpower in Communist China, 1949–63*. Washington, 1965, pp. 150–154), as adjusted by the author.

[2] There is a total of 4,500 scientists and engineers in the institutions of higher education and 3,500 at the Academy of Sciences. (See table I.) It was reported that in 1957 there were almost an equal number of researchers and associate researchers at the academy. This 50:50 ratio is maintained for the academy and is also applied to the R. & D. personnel in the universities.

[3] See table I for source of figures. Ideally, these figures should be refined to take into account the wide divergence of wage scales within the individual categories, particularly among the workers and employees.

[4] The total wage bill is raised by 15 percent (see text) and rounded.

[5] See text for explanation.

NOTE.—All figures are liberally rounded.

[45] Ibid., pp. 150–154.

[46] Based on a conversation of Charles Taylor of *The Toronto Globe and Mail* with an official of a Tsinan factory, as reported in *The New York Times*, Aug. 8, 1965.

the percentage of the total wage bill (as reported for 1957) follows: (*a*) labor insurance fund, 3 percent; (*b*) medical and health allowance, 5 percent; (*c*) welfare allowance (canteens, nursing rooms, creches, dormitories, baths, barber shops, and laundries), 2.5 percent; (*d*) trade union working fund, 2 percent; and (*e*) labor insurance premium, 3 percent. The author of the article indicates that although these wage allowances account for 15.5 percent of the total wage bill, the actual expenditures during the First Five-Year Plan were close to 20 percent. He also feels that both the theoretical and actual figures are too high and suggests ways to reduce them.[47]

Bonuses, special wage allowances, and other incentive costs must be considered part of the total wage bill, which is consequently increased by 15 percent to 539,304,000.

The next question then is what proportion of the total R. & D. cost—which includes land, buildings, equipment, and office supplies, as well as materials and processed goods needed to conduct experiments and develop prototypes—do wages and salaries represent? In the United States they comprise approximately half of the total costs.[48] According to surveys in various sectors of the economy in four European countries and in the U.S.S.R., labor costs amount to 40 percent or more of the total R. & D. costs.[49] In British industry in 1962 wages constituted about 46 percent of the total R. & D. cost; in French industry about 56 percent; in West German industry, almost exactly 50 percent.

Is it pertinent that wages and salary costs in the West generally fall within the 40-to-60-percent range? Yes—if only to provide a base from which to speculate. This proportion would not change much with the scientific and technological level of an individual country. The less developed a nation, the smaller the scientific and engineering manpower resources, the lower the wages, but also the less sophisticated the equipment, the simpler the plant and the less ambitious the goals. In China the situation is somewhat different. Short of capital, the regime attempts to extract the maximum contribution from its manpower resources at a minimum cost. Although there are some built-in nonideological incentives, there is every effort to hold down the salaries of professional personnel in order to prevent a wide gap between their income and that of the ordinary workers and even the peasants. On the other hand, China's R. & D. goals are considerably more ambitious than might be expected normally in a country of comparable economic development. The R. & D. effort in the area of consumer goods, for example, is small, while scarce resources are poured into research in heavy industry and advanced military technology. Thus, the wage and salary cost in China's R. & D. is presumed to be at the bottom of the range, or 40 percent of the total R. & D. cost. Applying the 40

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[47] *Chi-hua Ching-chi* (Planned Economy), No. 5, May 9, 1958. Although the title of the article is "Supplementary Wage Funds," the implication that an enterprise is required to supplement the total wage bill by an additional 15 to 20 percent is difficult to accept. It also seems unlikely that such a large proportion of wages would be withheld from the workers. Probably both the workers and the enterprise contribute a certain share toward the listed funds and allowances.

[48] Estimates even in this country are imprecise and difficult to come by. According to the latest survey of U.S. industrial R. & D., for example, wages and salaries of R. & D. scientists, engineers and supporting personnel accounted for 47 percent of the total R. & D. costs. (National Science Foundation, *Basic Research, Applied Research, and Development in Industry, 1962*, NSF 65–18, Washington). A study on the research effort sponsored by the U.S. Air Force Office of Aerospace Research estimates that wages and salaries comprise from 55 to 60 percent of the total costs. (E. D. Brunner, *The Cost of Basic Research Effort: Air Force Experience, 1954–64*, memorandum RM–4250–PR, the Rand Corp., February 1965). Most other U.S. estimates fall within this general range.

[49] C. Freeman and A. Young, p. 32.

percent figure to the wage bill, the total R. & D. cost in Communist China in 1965 comes to 1,350 million yuan.

Is there any way to evaluate this figure, to determine whether it is "in the ballpark"? Can it be placed within the international context? Given the best available R. & D. statistics international comparisons are risky and imprecise due to differences in concepts, definitions, and data collection procedures. Conversion of R. & D. costs to dollar values is even more hazardous in view of the differences in salaries, costs of materials and other factors which may radically affect the value of the research dollar. (For the record, however, the estimate of 1,350 million yuan is approximately equal to $573 million.)[50]

One common method of measuring R. & D. is to express it as a percentage of the Gross National Product. Since the content of GNP is difficult to standardize, this introduces an additional variable, but it avoids a conversion into dollars and the cost of R. & D. is measured within a uniform fiscal and conceptual system. Estimating Communist China's GNP at 120 billion yuan in 1965,[51] the cost of R. & D. comes to about 1.1 percent of this total. It would be unjustified to formulate far-reaching conclusions on the basis of any comparisons between this figure and similar percentages for other countries, since all of them are both elusive and delusive. Furthermore, it must be remembered that the 1.1 percent for China is minimal, because it excludes the cost of research in the life sciences, medicine, agriculture and the social sciences (which are also excluded in many of the other countries). Expenditures in these fields could perhaps add another 0.3 percent to the estimated figure. With the caveats out of the way, some approximate percentages of expenditures on R. & D. as percent of GNP are presented for a few selected countries: 3.2 percent in the United States; 2.2 percent in the United Kingdom; 1.5 percent in France; 1.3 percent in West Germany; 0.4 percent in Italy; 1.6 percent in Japan; and 3 percent in the Soviet Union.[52] It is estimated that in most underdeveloped countries this ratio is less than 0.2 percent of GNP.[53]

Thus in very general terms there seems to be some relationship between the wealth of a country and the ratio of R. & D. expenditures to GNP. If there is such a correlation, is it reasonable that the ratio of R. & D. expenditures to GNP of Communist China is higher than in some of the countries of Western Europe? Given the somewhat strained methodology by means of which the figures were derived, it is possible simply to reject the results as invalid. This alternative is available to the critical readers, but not to the author. If the total R. & D. expenditures are not 1,350 million yuan, then they may be within the range of 1,200 to 1,500 million yuan; and if this does not constitute 1.1 percent of the GNP, would you believe 1 percent or 1.2 percent?

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[50] $1 equals 2.355 yuan at the official exchange rate. On the black market, a dollar is worth several times this amount.

[51] There a number of series of estimates of Communist China's GNP. This estimate is based on data shown in Y. L. Wu, et al., *Economic Potential of Communist China,* vol. III, Stanford Research Institute, Menlo Park, Calif., May 1964.

[52] All data refer to the years 1962, 1963, or 1964. Percentages for all countries except the Soviet Union were calculated from official statistics available in the files of Mrs. Martha Cuatrecasas, Foreign Studies Group, Office of Economic and Manpower Studies, National Science Foundation. The estimate for the Soviet Union is by OECD (Freeman and Young, p. 124).

[53] OECD, *Science, Economic Growth, and Government Policy,* Paris, 1963.

Perhaps the most obvious explanation as to why a relatively poor country such as Communist China would allocate so much of its scarce capital to R. & D. is that this is where the Chinese Communist Party wishes to concentrate the country's resources. The Party is determined that China will achieve great power status as quickly as possible. Since to her leaders "great power" is synonymous with "military power," much of the effort must be directed toward military R. & D.[54] There is no one to question the decisions and no one to suggest that the funds would be better spent in improving the living conditions of the population.

Although it is customary to conclude by considering the future, it would be the height of folly to prognosticate about China at the height of the "Great Proletarian Cultural Revolution." The one point that can safely be made, however, is that the current developments on the mainland are not likely to improve China's status in the world of science and technology. The fanatical efforts to purge "bourgeois" thinking, the postponement of the new school term, the determination to increase in the universities the proportion of students from peasant and worker families, and the insistence that peasant and intellectual alike cram into their heads the writings of Mao Tse-tung, must reflect adversely on all scholarly endeavors. The accentuation of the drive to fortify and extend this political control undoubtedly has exacerbated the already latent hostility between the political cadres and the scientists and engineers. These developments may not reduce the expenditures on R. & D., but they are likely to affect the performance of the personnel engaged in R. & D.

And so, we have come the full circle. I opened by stating that the Chinese have neither a term nor a concept for R. & D. and that there are no data available on which to base any estimates of either the size of the manpower or the cost of R. & D. I then proceeded to estimate both. It is quite conceivable that because questions were raised which the Chinese themeselves probably never asked,[55] the discussion would be completely foreign and meaningless to a Communist-trained Chinese scholar. It is hoped, however, that a reader from the West will find a basis on which to agree or disagree with the suggested methodology and estimates. I offer them in the hope that they might stimulate further discussion which, in turn, might evolve into more refined measurements of Communist China's R. & D. effort.

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[54] China's military budget is a puzzle in and of itself and certainly outside the bounds of this inquiry. What proportion of the expenditures are in the area of R. & D. is a question that is difficult to approach either from the military or the R. & D. side. The cost of China's nuclear program, for example, is variously estimated to fall between 1 and 2 billion yuan—a reasonably broad range, considering the nature of the available information. The R. & D. share of this program should not constitute more than a fraction of the total.

[55] This idea was expressed in an extremely perceptive review of C. Y. Cheng's book by Stevan Dedijer, which appeared in the Aug. 19, 1966, issue of *Science*. The review is written as if by a Chinese scientist, who at one point states that "American specialists are asking themselves questions about our research resources which we haven't asked ourselves."

Part IV. EXTERNAL ECONOMIC RELATIONS

INTERNATIONAL TRADE OF COMMUNIST CHINA, 1950–65

BY

ROBERT L. PRICE

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APPENDIX

TABLES

CHARTS

INTERNATIONAL TRADE OF COMMUNIST CHINA, 1950–65

I. Foreign Trade and the Economy of Communist China

A. AN OVERVIEW

Foreign trade in Communist China is a state monopoly that is used by the Party leaders as an important instrument of national policy for the pursuit of political objectives, both at home and abroad. The Chinese Communist regime seeks to create a strong, unified, and thoroughly communized China capable of achieving an independent great-power status and a position of leadership in Asia. This objective requires the transformation of China from a backward agrarian country into an industrialized state, with a powerful military establishment and broad international recognition. Specifically, foreign trade is directed toward assisting in obtaining these policy objectives by: (1) providing capital-goods imports embodying modern technology for the development of industry, (2) compensating for serious shortfalls and relieving bottlenecks in domestic production, and (3) developing trade as a wedge to promote Chinese influence abroad, both in other Communist countries and in less-developed Free World countries.

Up to 1960, Communist China's pattern of trade was dominated by the exchange of Chinese agricultural and mineral products and increasingly textiles, for machinery and raw materials contributing to the growth of the industrial base. Although the physical makeup of imports and exports reflected economic goals, the geographical direction of China's trade was strongly influenced by ideology. Mao established the "lean-to-one-side" policy for China at the beginning of the Communist regime. This policy resulted in China's economic orientation toward other Communist countries, particularly the U.S.S.R. This policy was reinforced by the Western trade embargo against China imposed in 1950 following China's intervention in the Korean war. Imports were obtained from the Free World chiefly when they were not available or were in short supply in the Communist world.

Since 1960, both the commodity and geographical patterns of Communist China's foreign trade has shifted dramatically. The collapse of the Great Leap Forward and the withdrawal of Soviet technicians from China in 1960, the persistent need for imports of Western grain, and the continuing deterioration of Sino-Soviet relations have combined to lower the volume of trade and to alter sharply its direction and composition. China's total trade rose from $1.2 billion in 1950 to a peak of $4.3 billion in 1959, and then declined to a level of $2.7 billion in 1962. This downturn was reversed in 1963, and by 1965 trade had increased to an estimated $3.7 billion. Since 1960 a major realinement in China's trading partners has taken place. Communist countries used to account for two-thirds of China's trade before 1960, but today the share are reversed, the Free World now accounting for 70 percent of China's total trade. (Table 1.)

TABLE 1.—*Direction of Chinese Communist international trade, 1950–65* [1]

Year	Total international trade			Trade with Communist countries [2]			Trade with Free World [3]		
	Total	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports
1950	1,210	620	590	350	210	140	860	410	450
1951	1,895	780	1,115	975	465	510	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	3,025	1,595	1,430	1,935	1,065	870	1,090	530	560
1958	3,735	1,910	1,825	2,350	1,250	1,100	1,385	660	725
1959	4,265	2,205	2,060	2,960	1,595	1,365	1,310	615	695
1960	3,975	1,945	2,030	2,605	1,320	1,285	1,370	625	745
1961	3,015	1,525	1,495	1,680	965	715	1,335	560	775
1962	2,675	1,525	1,150	1,410	920	490	1,265	605	660
1963	2,755	1,560	1,200	1,245	820	425	1,510	740	770
1964	3,245	1,770	1,475	1,125	730	395	2,120	1,040	1,080
1965 [4]	3,695	1,955	1,740	1,125	645	480	2,570	1,310	1,260

[1] Because of rounding to the nearest $5,000,000, components may not add to the total shown.

[2] Including trade with Yugoslavia.

[3] Trade reported by Free World countries has been adjusted for time leads and lags in shipping, shipping costs, double-counting, and unrecorded transactions. See app. A.

[4] Preliminary estimates based on incomplete data.

The Chinese acted with some deliberation in their liquidation of Mao's "lean-to-one-side" policy. After such Soviet actions as the cancellation of a "defense technology" agreement in 1959 and the abrupt withdrawal of Soviet specialists in 1960, the Chinese set about to lessen their dependence on the Soviet Bloc, and, if necessary, to be in a position to adjust to a break in relations. One of their earliest acts was to maintain the priority for the development of China's petroleum industry, even during the time when the overall investment program was being slashed. The earlier concentration on development of petroleum exploration and extraction was followed by a few orders for refining equipment and petrochemical plants for delivery by the Free World in 1964–65. Thus China was unable to reduce sharply its imports of petroleum from the U.S.S.R. Another of China's priority objectives was the rapid elimination of debt to the U.S.S.R. Simultaneously, the Chinese moved toward a phasing out of Soviet deliveries of equipment for complete plants and toward a careful cultivation of Free World contacts and detailed knowledge of Free World market conditions. The decision to purchase Free World equipment for high priority plants was apparently reached at the 10th Plenum of the Eighth Congress of the Chinese Communist Party in September 1962, but orders were not placed until August 1963.

The commodity composition of Communist China's foreign trade has continued to follow the trend set in 1961, despite the substantial recovery in both imports and exports since 1963. (Table 2.) Imports of agricultural products (largely wheat, raw cotton, sugar, and jute) and chemical fertilizers continued to dominate China's imports, and accounted for 47 percent of China's total imports in 1965. In contrast, in 1959 imports of agricultural products and chemical fertilizer amounted to only 4 percent of China's total imports. Imports of machinery and equipment, although showing a substantial rise in 1965, amounted to only $330 million, still far short of the nearly $1 billion in 1959. Part of this increase in imports of machinery and equipment in 1965 was accounted for by complete plants from the West contracted for in 1963, and just beginning to enter the country.

The major trend in Communist China's exports since 1963 has been the recovery in the export of agricultural products. For the first time in recent years food exports in 1965 drew roughly even with food imports in value. China exchanged high-value food products (rice, vegetables, processed foods, and meat products) for the cheaper wheat. After foodstuffs, textiles remained the single largest export earner, but exports declined slightly in 1965 as increased shipments to the West failed to offset the decline in exports to the Soviet Union. Exports of minerals and metals, once a prime earner of foreign exchange, continued to lag.

B. CREDIT AND FOREIGN EXCHANGE LIMITATIONS [1]

Communist China's exports have been by far the dominant source of foreign exchange, accounting for four-fifths of total receipts. The receipts of foreign credits, overseas remittances, and other earnings

[1] This section draws heavily on the summary and conclusion of CIA/RR ER 66–17, "Communist China's Balance of Payments, 1950–65," Washington, D.C., August 1966.

TABLE 2.—*Communist China—Commodity composition of trade, 1959, 1962, 1964, and 1965* [1]

[In millions of U.S. dollars]

	Total	1959 Free World	Communist countries	Total	1962 Free World	Communist countries	Total	1964 Free World	Communist countries	1965 [2] total
Exports	2,205	615	1,595	1,525	605	920	1,770	1,040	730	1,955
Agricultural products	1,100	390	720	425	285	140	650	515	135	775
Foods	(820)	(300)	(520)	(250)	(175)	(80)	(375)	(275)	(100)	(520)
Industrial materials	360	70	290	300	125	175	320	150	170	400
Textiles	620	120	500	535	155	375	440	200	240	425
Other manufactured goods	115	35	85	265	40	225	350	175	175	355
Imports	2,060	695	1,365	1,150	660	490	1,475	1,080	395	1,740
Agricultural products	10	10		575	455	120	820	735	85	700
Foods				(460)	(345)	(110)	(600)	(525)	(75)	(530)
Fertilizers (chemical)	70	70		40	40	[3]	60	60	[3]	140
Industrial materials	740	500	240	305	125	180	325	195	130	485
Machinery and equipment	980	70	910	120	20	105	200	70	130	300
Other	260	45	215	110	25	85	70	20	50	115

[1] Data have been rounded to the nearest $5,000,000. Because of rounding, components may not add to the total shown.

[2] Preliminary estimates based on incomplete data.

[3] Not available.

have played a less important role in financing China's imports. (See fig. 1.) During 1950–57 the rapid growth of the economy provided an upsurge in exports, which, supplemented by more than a billion dollars in long-term foreign aid from the U.S.S.R. and almost another billion in remittances from overseas Chinese, helped China meet its expanded requirements for foreign machinery and raw materials. In contrast, the excesses of the Great Leap Forward (1958–60) caused imports quickly to outspace exports, resulting in a sharp rise in short-term foreign indebtedness and a decline in China's international reserves. The deterioration of China's international payments position was slowed in 1961–62 by deep cuts in imports from Communist countries and by new infusions of foreign credit.

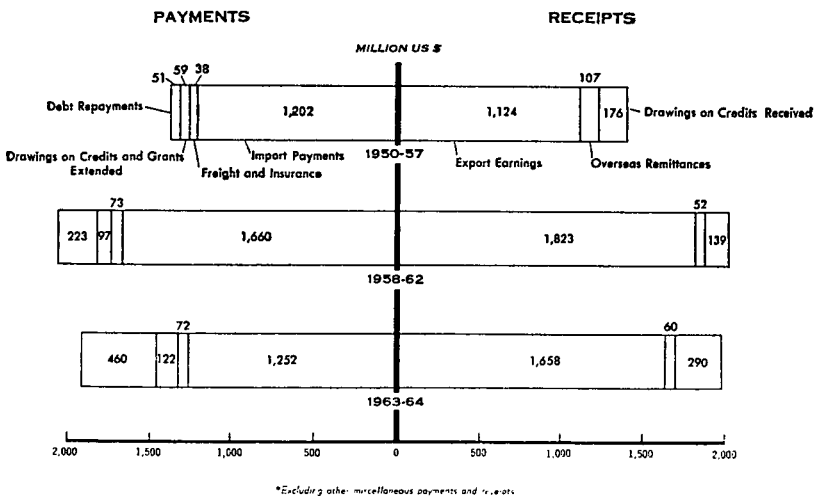
By 1963, China's international financial position began to improve because of a revival of exports and continued restrictions on purchases of machinery and raw materials from both the U.S.S.R. and the West. By the end of 1964, China's clearing indebtedness with Communist countries (especially the U.S.S.R.) amounting to about $360 million had been almost eliminated. Moreover, by generating a large export surplus with the U.S.S.R. each year, the Chinese were able by 1965 to finish repaying their long-term debt to the U.S.S.R.

Communist China for the first time turned to the West in 1961 for credits and by the end of 1964 had received credits of almost $1.2 billion. Unlike the credits from Communist countries, however, those from the West have provided only short- and medium-term financing, most of which have been 18-month credits to cover China's huge annual grain purchases. Other short-term credit from the West has covered China's large fertilizer purchases. Western credits have given little respite to China in meeting its hard currency obligations, however, because repayments each year now almost offset new drawings. If the Chinese leaders continue to rely on medium-term credits, repayments

Figure 1

COMMUNIST CHINA: International Payments and Receipts*

Annual Averages for Selected Periods, 1950-64



*Excluding other miscellaneous payments and receipts

may even surpass new drawings in the next few years. China, therefore, may seek long-term credits from the West to finance imports of additional plant and equipment needed to accelerate their industrial development. China's failure to seek long-term credits from the West probably reflects the uncertainty of the leadership over future requirements for Western grain and the high cost of credit.

Communist China's foreign exchange holdings do not allow for any sustained trade expansion. China, when the Communists took it over in 1949, had almost no international financial resources. But China was able to build up its international reserves by imposing a strict and highly effective system of trade and foreign exchange controls, by borrowing from the U.S.S.R., and by obtaining foreign currencies from overseas remittances and from the "surrender" by private individuals of foreign exchange and gold. Chinese holdings of Western currency and gold reached a peak of about $650 million at the end of 1957. These holdings were heavily drawn on during and following the Great Leap Forward from 1958 to 1962. By 1964 they were probably only about $400 million, well below the peak level of 1957. Thus holdings of Western currency and gold now are much less than in 1957, but trade with the free world now is more than double the 1957 level. (See table 3.)

TABLE 3.—*Communist China: International financial resources, year-end balances, 1957 and 1959–64* [1]

[In millions of U.S. dollars]

	1957 [2]	1959	1960	1961	1962	1963	1964
Foreign exchange reserves	645	530	415	355	320	335	400
Foreign currency balances [3]	610	450	300	215	155	145	185
Monetary gold holdings [4]	35	80	115	140	165	190	215
Clearing account balances (with Communist countries) [5]	−360	−435	−625	[6] −260	−205	−120	−55
Net international financial resources	285	95	−210	[6] 95	115	215	345

[1] Table 3 is from CIA/RR ER 66-17, "Communist China's Balance of Payments, 1950–65," Washington, D.C., August 1966, p. 7. Data are rounded to the nearest $5,000,000.

[2] Because foreign exchange reserves were negligible at the beginning of 1950, reserves at the end of 1957 represent the net changes during 1950–57.

[3] Net balance of errors and omissions (from China's balance of payments with the Free World), which are almost entirely changes in foreign currency balances arising from transactions with the Free World.

[4] Net balance of changes in holdings of monetary gold.

[5] Net balance of errors and omissions (from China's balance of payments with the Communist countries), which are almost entirely clearing account balances arising from transactions with Communist countries.

[6] The reduction in the clearing debt in 1961 and the consequent improvement in China's clearing and foreign exchange position are due almost entirely to the U.S.S.R.'s funding of China's clearing debt of $320,000,000.

During 1965 Communist China's holdings of gold and convertible currencies probably rose by $100 to $150 million as China increased the use of its export earnings to build up reserves. In 1965, China made its first purchases of gold on the world market, which amounted to $135 million and were paid for in sterling. This exchange of sterling for gold reflected not only the leadership's decision to diversify its international reserves, as a hedge against the possible devaluation of sterling, but also its more immediate concern over the deepening political and military crisis in southeast Asia. The Chinese nevertheless must have continued to hold some sterling balances overseas.

C. FOREIGN AID

Communist China has used its foreign aid program in an attempt to extend its political influence in both Communist and free world countries. (See tables 4 and 5.) Although the Chinese have directed their trade toward the West in recent years, China continues to channel its foreign economic assistance largely to Communist countries, especially those of Asia, as shown in the following tabulation:

The bulk of the actual drawings on these credits—at least $1 billion—has gone to Communist contries, chiefly North Vietnam and North Korea. Drawings by the less-developed free world countries have lagged considerably behind credit extensions and through December 1965 were estimated at some $200 million, only about 25 percent of total foreign-aid expenditures. China made record aid

Communist China: Extension of credits and grants to Communist and free world Countries, 1953–65

	U.S. dollars in millions
Communist countries	1,223.5
North Vietnam	457.0
North Korea	330.0
Outer Mongolia	115.0
Albania	164.0
Cuba	100.0
Hungary	57.5
Free world countries	815.0
Asia	410.0
Africa	264.0
Middle East	141.0
Total	2,038.5

TABLE 4.—*Communist China—Economic credits and grants to Communist countries, 1953–65* [1]

[In millions of U.S. dollars]

	Total	Albania	Cuba [2]	Hungary	North Korea	North Vietnam	Outer Mongolia
1953	200.0				200		
1954							
1955	204.0	4				200	
1956	49.5	2		7.5			40
1957	54.0	4		50.0			
1958	55.0	5			25		25
1959	119.0	19				100	
1960	220.0	5	60		105		50
1961	282.0	125				157	
1962	[3]	[3 4]					
1963	40		40				
1964							
1965	[3]	[3]				[3]	[5]
Total	1,223.5	164	100	57.5	330	457	115

[1] With the exceptions noted, source of table is Alexander Eckstein, *Communist China's Economic Growth and Foreign Trade*, (New York: McGraw Hill, 1966), app. E, p. 306.
[2] Figures revealed by Prime Minister Fidel Castro in speech on Jan. 2, 1966.
[3] Not available.
[4] Albanian press reported additional aid extended by Communist China, but amount not known.
[5] Negligible.

TABLE 5.—*Communist China—Economic credits and grants to Free World countries, 1956–65 and years 1964 and 1965*

[In millions of U.S. dollars]

	1956–65 [1]	1964 [2]	1965 [1]
Total	815	337.8	59
Africa	264	115.1	15
Algeria	50	0	0
Central African Republic	4	4.0	0
Congo (Brazzaville)	25	25.2	0
Ethiopia	0	0	0
Ghana	40	22.4	0
Guinea	25	0	0
Kenya	18	18.0	0
Mali	20	0	0
Somalia	22	0	0
Tanzania	45	45.5	0
Uganda	15	0	15
Asia	410	114.2	44
Afghanistan	28	0	28
Burma	85	0	0
Cambodia	50	0	0
Ceylon	42	4.2	0
Indonesia	105	50.0	16
Nepal	40	0	0
Pakistan	60	60.0	0
Middle East	141	108.5	0
Syrian Arab Republic	16	0	0
United Arab Republic	85	80.0	0
Yemen	40	28.5	0

[1] U.S. Department of State, "Communist Governments and Developing Nations: Aid and Trade in 1965," research memorandum, RSB–50, June 17, 1966.
[2] Alexander Eckstein, *Communist China's Economic Growth and Foreign Trade* (New York: McGraw Hill, 1966), app. E, p. 307.

extensions in 1964 to the less-developed free world countries of $338 million but, as in the past, drawings against these recent credits to the free world probably will be extremely slow.

The predominant role of the Communist countries in China's foreign-aid program is likely to continue, inasmuch as these nations are the main areas in which China and the U.S.S.R. are competing for influence. The increasing political isolation of China in the international Communist movement, however, may narrow the scope of China's aid program. North Vietnam and Albania have been the only Communist nations recently receiving Chinese aid. The principal focus of Sino-Soviet aid competition is in North Vietnam. Both China and the U.S.S.R. have stepped up their economic and military aid to North Vietnam, partially as a result of U.S. air strikes, but also for the prosecution of the war in South Vietnam.

II. TRADE WITH THE COMMUNIST COUNTRIES

A. THE SOVIET BLOC

1. *Mutual Cooperation During the 1950's*

Communist China based its industrial and technological growth of the 1950's on the rapid buildup of trade with the Soviet Union, in particular the flow of Soviet-produced machinery and equipment to China. Sino-Soviet trade grew more than fivefold from $320 million in 1950 to more than $2 billion in 1959. More than $12 billion in

goods were exchanged between the two partners during this period. Of this amount, more than $1 billion worth of machinery and equipment for complete industrial installations was supplied China by the Soviet Union. Financial aid extended to China by the Soviet Union has been relatively small. The Soviet Union extended loans to China amounting to about $1.4 billion, of which $430 million was for economic development and the rest primarily for military purchases. The Soviet Union provided significant technical aid to China over the decade of the 1950's including (*a*) supplying vast quantities of blueprints and technical information, (*b*) sending 10,000 Soviet advisers and technicians to China to perform a wide variety of tasks, and (*c*) making available its own teaching facilities in the U.S.S.R. for training 8,000 Chinese technicians and researchers and 7,000 academic students.

(*a*) *Industrial Projects in China*

The core of Communist China's program for rapid industrialization was the Soviet commitment to assist China in the building of 291 major industrial plants by 1967. The Soviet equipment for these plants was valued at $3.3 billion, or some $11 million on the average for each project. By the end of 1959, $1.35 billion worth of equipment for these projects had been delivered and about 130 projects had been completed. (See table 6.) With Soviet and Eastern European support, Communist China expanded production of heavy industry from 1952 to 1959 at an annual average rate of about 25 percent; without this aid the rate would have been far lower. This flow of equipment and technical assistance had a vital effect on the quality of China's industrialization, enabling China to produce such prestige items as jet aircraft, submarines, large electric-generating equipment, metal-cutting machine tools, tractors, trucks, and electronic equipment. Soviet aid to China also included extensive training of Chinese scientists and technicians in the nuclear sciences in both the U.S.S.R. and China, including the supply of experimental reactors and other nuclear related technology, designed to eventually provide a base which could support native Chinese production of Soviet-designed weapons.

The sudden withdrawal of Soviet support in mid-1960 was, in the words of Chinese economic planner Po I-po, like "taking away all the

TABLE 6.—*Soviet project construction agreements with Communist China, 1950–59*

Date of agreement	Economic credits (million U.S. dollars)[1]	Number of projects	Value of complete sets of equipment[2] (million U.S. dollars)[1]
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 these projects.
[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.

dishes when you have only eaten half a meal." About 20 percent of the Soviet aid plants begun under agreements concluded prior to 1958 were incomplete. For example, much work remained to be done on the important steel complexes of Pao-t'ou and Wu-han, and on construction of the large hydroelectric station in San Men Gorge on the upper reaches of the Yellow River. Most of the 125 Soviet aid plants contracted for under agreements concluded in August 1958 and February 1959 and scheduled for completion by 1967 were still in the planning stage. These latter projects included facilities for the production of chemicals, the development of a more balanced steel industry, additional support to defense industries, and the provision of specialized machine tools and precision instruments. Thus, the Chinese were still highly dependent on the Soviet Union for new plants and product designs involving technology not already furnished or with which the Chinese had little experience. The degree of dependence varied, some industries requiring only capital equipment for further development, others needing only technical assistance, and still other more complex industries—depending on both imported knowledge and equipment.

Although none of the European satellites extended long-term financial assistance for Communist China's development efforts, they did negotiate assistance agreements calling for the construction in China of a number of large projects. Agreements for at least 100 projects were signed and construction of about two-thirds of these projects were completed and placed into operation by 1959, including electric power, chemical, and sugar-refining plants.

b. Trade Flows

(1) *U.S.S.R.* The U.S.S.R.'s share in China's foreign trade increased from a mere 5 percent before the Communist revolution to approximately 50 percent in 1959. By 1959, Soviet exports to China were as large as those to all Free World underdeveloped countries combined. One-sixth of Soviet exports of machinery and nearly three of every four complete plants sent abroad went to China. (Table 7.)

TABLE 7.—*Soviet exports to Communist China, 1958–65* [1]

[In millions of U.S. dollars]

	1958		1959 value	1960 value	1961 value	1962 value	1963 value	1964		1965	
	Value	Percent						Value	Percent	Value	Percent
Total exports	634.0	100.0	954.5	817.1	367.3	233.4	187.2	135.2	100.0	191.7	100.0
Machinery and equipment	318.0	50.2	597.5	503.9	108.1	27.3	42.2	57.6	42.6	77.0	40.2
Complete plants	(166.2)	(26.2)	(399.8)	(373.8)	(78.9)	(8.8)	(14.6)	(12.3)	(9.1)	(3.9)	(2.0)
Industrial raw materials	173.4	27.4	176.3	188.7	166.9	127.0	107.4	56.7	42.0	71.9	37.5
Petroleum and petroleum products	(92.4)	(14.6)	(117.7)	(113.1)	(120.7)	(80.5)	(60.7)	(21.6)	(16.0)	(2.2)	(1.1)
Ferrous metals	(60.8)	(9.6)	(48.0)	(59.3)	(34.7)	(28.2)	(27.4)	(20.8)	(15.4)	(34.7)	(18.1)
Nonferrous metals	(15.8)	(2.5)	(6.4)	(10.5)	(6.5)	(5.6)	(4.9)	(3.1)	(2.3)	(3.8)	(2.0)
Consumer goods	9.2	1.5	6.6	4.4	67.2	30.6	14.2	7.2	5.3	1.4	.7
Foods	(1.1)	(.2)	(.5)	(2)	(63.8)	(20.8)	(.7)	(.1)	(.1)	(2)	(2)
Other merchandise	17.0	2.7	12.3	13.1	6.1	3.4	2.3	5.6	4.1	16.9	8.8
Unspecified	116.4	18.4	161.4	107.0	19.1	45.1	21.2	8.2	6.1	24.5	12.8

[1] Figures based on *Vneshniaia Torgovlia S.S.S.R. za 1965 god*, Ministerstvo Vneshnei Torgovli S.S.S.R. (Moskva, 1965) and other volumes. Exports are f.o.b. Because of rounding components may not add to total shown.

[2] Negligible.

At the height of Sino-Soviet commercial relations in 1959, Communist China rivaled East Germany as the Soviet Union's principal trading partner. China supplied one-fifth of the Soviet Union's total imports, two-thirds of her food imports and three-quarters of her textile imports. Soviet willingness to accept Chinese agricultural raw materials and large amounts of industrial consumer goods, especially textiles, permitted China to pay for the large-scale imports of machinery and equipment needed for industrialization. (See table 8.)

TABLE 8.—*Soviet imports from Communist China, 1958–65* [1]

[In millions of U.S. dollars]

	1958		1959	1960	1961	1962	1963	1964		1965	
	Value	Percent	value	value	value	value	value	Value	Percent	Value	Percent
Total imports	881.2	100.0	1,100.0	848.1	551.4	516.3	413.0	314.2	100.0	225.6	100.0
Industrial materials	233.3	26.5	277.2	218.4	128.4	103.8	79.0	56.9	18.1	29.7	13.2
Ores and concentrates	74.0	8.4	73.3	61.2	48.3	35.3	25.9	13.2	4.2	11.6	5.1
Ferrous metals	19.2	2.2	7.6	12.8	8.7	6.6	10.9	10.6	3.4	------	------
Nonferrous metals	48.9	5.5	54.9	48.9	34.2	25.9	12.5	3.1	1.0	1.4	.6
Textiles	37.5	4.3	91.6	65.3	22.7	13.9	8.6	6.7	2.1	3.6	1.6
Consumer goods	483.0	54.8	644.4	518.4	360.6	382.3	309.6	230.1	73.2	172.9	76.6
Food	230.1	26.1	219.1	127.9	17.4	38.1	21.9	51.9	16.5	78.2	34.7
Fabrics and clothing	158.4	18.0	306.3	293.2	277.1	299.4	256.6	165.2	52.0	81.3	36.0
Other merchandise	160.7	18.2	171.6	96.6	31.0	26.6	19.0	15.5	4.9	13.4	5.9
Unspecified	4.0	.5	7.2	14.7	31.4	3.6	5.5	11.8	3.8	9.6	4.3

[1] Figures based on *Vneshniaia Torgovlia S.S.S.R. za 1965 god*, Ministerstvo Vneshnei Torgovli S.S.S.R. (Moskva, 1965) and other volumes. Imports are f.o.b. Because of rounding, components may not add to totals shown.

Communist China has acknowledged the receipt of long-term credits from the Soviet Union amounting to $1,405 million. These included an economic loan of $300 million granted in 1950; a further economic credit of $130 million in 1954; a loan in 1955 covering the transfer to China of Soviet holdings in four joint-stock companies and other Soviet-owned assets in China believed to total $330 million; and other miscellaneous credits totaling $645 million, probably mainly used for military purposes. The Soviet Union provided some additional financial aid to China following the collapse of the Great Leap Forward by funding $320 million of outstanding short-term indebtedness in 1961 over a 5-year period, and by extending a loan of $46 million for the import of 500,000 tons of Cuban sugar.

(2) *Eastern Europe.* Sino-East European trade started from a negligible base in 1950, but increased rapidly and by 1959 accounted for 15 percent of Communist China's total trade. (See table 9.) Up to 1960 East Germany and Czechoslovakia have accounted for approximately two-thirds of Chinese trade with the European Communist countries, Poland and Hungary for less than 30 percent, and Rumania, Bulgaria, and Albania the remainder. Although there are indications that imbalances have developed in Sino-East European trade, Chinese imports from these countries are not known to have been financed by long-term credits.

Next to the U.S.S.R., Eastern Europe has been the largest supplier of machinery and equipment to China, including industrial,

TABLE 9.—*Communist China: Trade with Eastern European Communist countries, 1950–65* [1]

[In millions of U.S. dollars]

	Total	China's imports	China's exports
1950	20	5	15
1951	205	65	140
1952	320	155	165
1953	340	190	150
1954	370	240	130
1955	435	235	200
1956	465	265	200
1957	500	275	225
1958	670	410	260
1959	655	325	330
1960	640	340	300
1961	325	165	160
1962	230	80	150
1963	225	70	155
1964	245	85	160
1965 [2]	299	132	167

[1] Including Albania and excluding Yugoslavia. Totals have been rounded to the nearest $5,000,000.
[2] Preliminary trade estimates compiled primarily from official yearbooks and monthly statistical bulletins of the East European Communist countries.

transport, agricultural, and communications equipment. East Germany and Czechoslovakia have been the chief exporters of machinery and equipment to China. During 1950–59, China received from Eastern Europe machinery and equipment valued at about $1.7 billion, approximately 40 percent of Chinese imports of these items from all sources. The Chinese have paid for imports by exports of basic raw materials and foodstuffs required by Eastern Europe. In the past some Eastern European nations on occasion supplemented their own exports to the West by reexporting Chinese products.

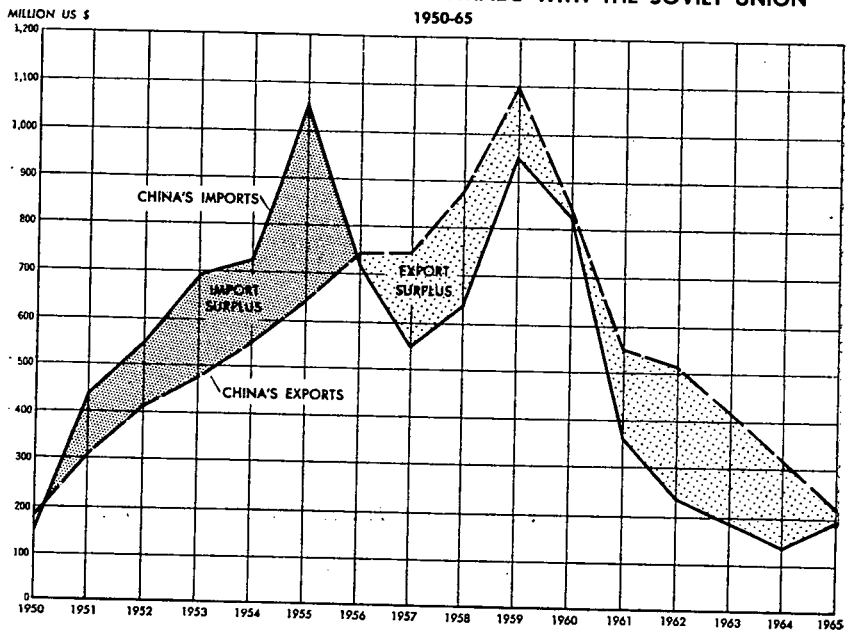
2. *Mutual Discord During the 1960's*

Toward the end of the 1950's discord between the Soviet Union and Communist China grew over a widening range of political and economic matters. For example, the Soviets had second thoughts over the wisdom of supplying China with nuclear information and the Soviets had grave doubts about China's freewheeling Leap Forward economic policy. Matters came to a head with the abrupt withdrawal of the Soviet technicians from China in mid-1960. Their departure was a serious blow to the Chinese economy at an already critical time, and marked the end of the period of large-scale Sino-Soviet economic collaboration. Trade fell rapidly. (See figure 2.)

a. *Union of Soviet Socialist Republics*

Sino-Soviet trade has declined each year since 1960, dropping to a level of $450 million in 1964, only one-quarter the level of 1959, and in 1965 amounted to only $417 million. Despite this reduction in trade, China maintained a large export surplus with the U.S.S.R. in order to pay off its indebtedness ahead of schedule. In 1963 and 1964 alone, China maintained an export surplus of over $400 million with the Soviet Union. In an attempt to bring trade into better balance in 1965, China increased its imports from the Soviet Union by over $50 million to $192 million. while decreasing exports by $90

COMMUNIST CHINA: BALANCE OF TRADE WITH THE SOVIET UNION
1950-65



*The sharp increase in Communist China's imports in 1955 probably reflects the transfer to China of joint stock companies and other Soviet-held assets.

million, to $225 million, reflecting the completion of Chinese debt payments.

After the withdrawal of Soviet assistance, Communist China's imports of machinery and equipment from the Soviet Union fell to a trickle, amounting to only $27 million in 1962. With the gradual upturn in China's industrial production since 1962, imports of machinery and equipment from the Soviet Union have revived slightly, reaching a level of $58 million in 1964 and $77 million in 1965. Though still not importing any complete plants, China has been purchasing more spare parts and replacements for existing stocks of Soviet equipment, particularly civil aircraft and transportation and construction equipment. As for exports, in 1964 China reduced shipments to the Soviet Union of almost all items. The sharpest drops were in fabrics (down $51 million), garments (down $40 million), ores and concentrates (down $13 million), metals (down $9 million), and construction materials, mainly cement (down $8 million). In 1965, China further reduced shipments to the U.S.S.R. of fabrics and clothing (down $84 million), and metals (down $12 million).

b. *Eastern Europe*

Following 1960, Sino-East European trade also dropped sharply, and in 1961 amounted to only one-half the level of 1960. This sudden drop in trade created difficulties for Eastern Europe both in marketing machinery produced to Chinese specifications and in finding alternate sources of supply and the means of financing of materials that

were normally imported from China. Sino-European trade continued to fall sharply in 1962, trade with some nations falling more sharply than that with others. China's trade with East Germany, Czechoslovakia, and Hungary, the important Chinese trade partners in Eastern Europe and those countries most strongly supporting the Soviet position in the Sino-Soviet political dispute, declined by 40 to 50 percent, while trade with Poland declined by some 20 percent. Chinese trade with Albania—China's strongest ally in the Sino-Soviet dispute—increased in 1962 chiefly due to increased Chinese aid deliveries to Albania under long-term credit arrangements.

By 1964, total Sino-East European trade increased by 6 percent over the 1962 level. Of this total increases in trade with Albania, Rumania, and to a lesser extent, Poland, offset a decline in trade with East Germany and Czechoslovakia. In 1965, China's trade with Eastern Europe jumped 22 percent over 1964, the largest increases occurring with East Germany (up $16 million) and Rumania (up $15 million). (See table 10.) The bulk of China's imports continue to be machinery and equipment.

TABLE 10.—*Communist China: Trade with Eastern Europe, by country, 1962–65* [1]

[In millions of U.S. dollars]

	China's exports				China's imports			
	1962	1963	1964	1965 [2]	1962	1963	1964	1965 [2]
Total	147.1	156.6	160.8	167	78.0	72.7	85.5	132
Albania	42.1	41.7	61.7	70	11.7	23.4	23.9	25
Bulgaria	3.2	2.3	1.1	1	3.3	1.3	1.5	1
Czechoslovakia	25.6	29.0	20.6	13	11.9	9.3	9.3	19
East Germany	32.0	24.7	19.5	25	21.9	10.4	15.6	26
Hungary	11.0	20.0	14.9	11	11.9	3.3	4.3	15
Poland	22.7	24.8	25.0	25	15.1	11.2	15.0	19
Rumania	10.5	14.1	18.0	22	2.2	13.8	15.9	27

[1] Trade data for 1962–64 are from CIA/RR ER 65-37, "Foreign Trade of the European Satellites in 1964: A Statistical Summary," Washington, D.C., December 1965.

[2] Preliminary trade estimates compiled primarily from official yearbooks and monthly statistical bulletins of the East European Communist countries.

B. ASIAN COMMUNIST COUNTRIES

Communist China's total trade with North Vietnam, North Korea, and Mongolia has been small, amounting to less than 10 percent of China's total trade and has been governed largely by its economic assistance programs to these countries. The rivalry between China and the U.S.S.R. in the extension of aid to these countries has been exacerbated since the flaring up of the Sino-Soviet dispute as each country has maneuvered to win adherents in the political struggle. As a result of this struggle, China's trade with North Korea and Mongolia has declined, while trade with North Vietnam has increased.

The extension of credits and grants by China has played an important role in the economic development of these nations. (See tables 11 and 12.) Communist China has supplied economic and technical assistance for the development of both light and heavy industry in North Vietnam including the Thai Nguyen iron and steel plant, and

the rehabilitation and development of North Vietnam's transportation and communications facilities as well as in the improvement of its irrigation system. North Korea has received equipment and technical assistance from China for light industrial projects and powerplants. China and North Korea are cooperating in the building of a large hydroelectric power station on the Yalu River. Chinese economic aid to Mongolia has been concerned primarily with the development of light industry and with housing construction. In addition, between 1956 and 1964 large numbers of Chinese laborers were sent to work on Mongolian construction projects.

TABLE 11.—*Derivation of Chinese Communist trade with the Far Eastern Communist countries, 1950–58* [1]

[In millions of U.S. dollars]

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Total trade [2]	5	20	30	50	95	115	120	130	160
Exports on credit or grant basis	[3] 3	[3] 14	[3] 21	[3] 35	[4] 75	[4] 97	[4] 82	[4] 48	[4] 58
Commercial trade (excluding credits and grants)	[3] 2	[3] 6	[3] 9	[3] 15	[5] 20	[5] 18	[5] 38	[5] 82	[5] 102
Derived trade: [2]									
Imports [6]	0	5	5	10	10	10	20	40	50
Exports [7]	5	15	25	40	85	105	100	90	110

[1] Table from CIA/RR ER 66-17, "Communist China's Balance of Payments, 1950–65," Washington, D.C., August 1966, p. 37.

[2] Includes North Korea, North Vietnam, and Mongolia. Data are rounded to the nearest $5,000,000.

[3] During 1950–54, as China restored and expanded its economy, commercial trade probably increased rapidly, although it amounted to a relatively small percentage of the aid goods which China provided to North Korea for its war with South Korea and to Viet Minh forces in Vietnam. Thus, commercial trade during 1950–53 is assumed to amount to about 30 percent of total trade. Exports on credit or grant basis are the residual of total trade less commercial trade.

[4] Based on announced credit extensions and drawings and related data.

[5] Total trade less exports on credit or grant basis.

[6] Half of the value of commercial trade, on the assumption that commercial trade has been balanced each year.

[7] Total trade less imports.

TABLE 12.—*Communist China: Trade with Far Eastern Communist countries, 1959–64* [1]

[In millions of U.S. dollars]

Year	Total trade [2]	Imports	Exports
1959	244	83	161
1960	255	96	159
1961	257	93	164
1962	262	88	174
1963	263	96	167
1964	227	92	135

[1] Table from CIA/RR ER 66-17, "Communist China's Balance of Payments, 1950–65," Washington D.C., August 1966, p. 40.

[2] Includes North Korea, North Vietnam, and Mongolia. Data based on miscellaneous and incomplete trade data of the Far Eastern Communist countries and information on the extension and implementation of Chinese credits and grants. In the absence of clearing account data, commercial trade is assumed to have been balanced between exports and imports. China's aid deliveries were largely estimated on the assumption of a straightline drawing of credits and grants.

Communist China's trade with Mongolia has declined in importance since 1959 largely because of Mongolia's firm commitment to the U.S.S.R. in the Sino-Soviet dispute. A similar decline in China's exports to North Korea since 1962 probably reflects the completion of drawings on credits provided by China in 1960 as well as the more recent political leanings of North Korea toward the U.S.S.R. Counter

to this declining trend has been an increase in China's trade with North Vietnam. China supplied large-scale assistance in support of North Vietnam's First Five-Year Plan (1961–65). But perhaps the large stimulus to increasing Sino-North Vietnamese trade has been China's increasing technical and materiel support to the bomb-damaged economy of North Vietnam and for the prosecution of the war with South Vietnam.

C. CUBA

Sino-Cuban trade first began to assume significant proportions in 1960 following the establishment of formal trade relations and the extension by Communist China of a $60 million interest free credit. This credit was to be drawn between 1961 and 1965 to finance exports of complete plants and for other technical aid to help Cuba develop its economy. Trade between the two countries developed rapidly, and between 1961 and 1965, the average annual turnover amounted to about $180 million.

The growth of Sino-Cuban trade between 1961 and 1965 was based chiefly on the exchange of Cuban sugar for Chinese foodstuffs, including rice, soybeans, textiles, machinery, and other industrial equipment, part of which was financed under the $60 million economic credit. (Table 13.) Apparently, Sino-Cuban trade will decline in 1966 because of a rapid deterioration in political relations. According to statements by Fidel Castro, China has decided to reduce its trade with Cuba in 1966 by importing less Cuban sugar and exporting less rice and other commodities than in 1965. China, moreover, has insisted that trade should be balanced and press announcements from Havana indicate that a total trade turnover of about $170 million is expected in 1966. This level of trade is slightly below the average annual turnover for 1961–65 and considerably below the record level reached in 1965.

TABLE 13.—*Communist China: Trade with Cuba, 1960–65* [1]

[In millions of U.S. dollars]

Year	Total trade	Imports	Exports
1960	42	32	10
1961	182	92	90
1962	171	89	82
1963	156	73	83
1964	180	81	99
1965	213	98	115

[1] Compiled from Chinese and Cuban sources but excluding shipping costs (which the Cuban sources apparently included), which are estimated at 10 percent of the value of imports.

III. TRADE WITH THE FREE WORLD

A. THE 1950'S—THE MARGINAL SUPPLIER

Communist China's trade with the Free World during the first half of the 1950's declined sharply in total value and in relative importance. China's total foreign trade doubled in the 5 years from 1950 to 1954, but trade with the Free World, which accounted for 70 percent of total trade in 1950, dropped in absolute value by nearly 30 percent and in relative terms to only 25 percent of total trade in 1954.

During the second half of the decade trade with the Free World re-

vived, rising from $785 million in 1955 to $1.4 billion in 1958 and to about $1.3 billion in 1959, when it accounted for about one-third of total Chinese trade. This upsurge was furthered by the rapid economic advance in Communist China, and, in part it represented an effort to develop alternate sources for industrial materials in short supply or not readily available within the Bloc. Growth in trade with Western Europe was particularly rapid, reflecting the rising Chinese need for chemicals and metals. Thus, while China's trade with Western Europe more than tripled, China's trade with less-developed countries—southeast Asia—grew by only 50 percent. Trade with the less-developed areas expanded in large measures to promote the political policy of developing closer relations with many of the uncommitteed countries of this area, and, where possible, to acquire foreign exchange to cover purchases from Western Europe. However, China's preoccupation with its own industrialization limited its expansion of economic assistance to the less-developed areas.

B. THE 1960'S—THE MAJOR SUPPLIER

Communist China's trade with the Free World has grown rapidly since 1960, and by 1965 accounted for more than two-thirds of China's total trade. (Table 14.) China's economic difficulties and the impact of the Sino-Soviet dispute have been the principal factors in the redirection of trade. Beginning in 1961, agricultural failures forced China to import 6 million tons of grain annually. At first, these purchases were financed by means of drastic cuts in imports of machinery and other investment goods, emergency sales of precious metals, and credits from Canada and Australia, the principal grain supplying countries. Later, China was able to shift exports to markets where urgently needed hard currency could be obtained.

Rapid shifts also occurred in the geographic distribution of trade with the Free World. Canada and Australia increased their exports (grain) to China manyfold in 1961 whereas Western Europe's exports (industrial products) declined by 75 percent. Imports of capital goods from the industrial West, however, have revived since 1962, following the gradual recovery in China's industrial production. In 1963, for the first time since 1950, the Free World accounted for more than half (55 percent) of China's trade. Moreover, since 1960 the greatly altered emphasis of China's investment program has meant a growing demand for chemical and petrochemical plants, mining equipment, and other capital goods that the Soviet Bloc economies are less able to supply.

Trade with Free World countries has been important to Communist China for certain raw materials (cotton, rubber, wool), producers' goods (some types of steel and nonferrous metal manufactures, chemical fertilizers, artificial fibers), and more recently grain and complete industrial installations. The Chinese also have benefited from small purchases of special purpose items embodying advanced designs such as instruments, machine tools, and electronic equipment. Particularly since the loss of Soviet technical assistance in 1960, China's entry into advanced fields of production will depend largely on the acquisition of Western equipment and technical knowledge. The Free World, on the other hand, has received useful but not critical imports from China; including an increasing range of textiles and light indus-

TABLE 14.—*Communist China—Trade with countries of the Free World, 1961–64*[1]

[In millions of U.S. dollars]

	1961	1962	1963	1964
Exports	560	605	740	1,040
Total, industrial West	222	210	265	415
Western Europe	181	149	172	229
Of which—				
United Kingdom	73	50	47	59
West Germany	35	32	34	49
France	13	15	19	28
Italy	10	12	19	21
Japan	29	44	71	150
Australia, Canada, and New Zealand	12	17	22	36
Total, less developed countries	223	259	304	371
South and southeast Asia	165	194	226	270
Of which—				
Burma	21	27	25	34
Ceylon	21	20	32	39
Indonesia	40	46	34	38
Malaya and Singapore	54	64	90	95
Pakistan	3	4	6	17
Middle East	27	32	42	45
Africa	29	31	34	54
Latin America	2	2	1	2
Of which Argentina	(2)	(2)	(2)	(2)
Hong Kong [3]	115	138	170	253
Imports	775	660	770	1,080
Total, industrial West	602	473	582	684
Western Europe	234	170	184	196
Of which—				
United Kingdom	52	28	35	56
West Germany	46	36	18	20
France	41	51	67	43
Italy	38	23	21	20
Japan	17	40	66	160
Australia, Canada, and New Zealand	350	263	332	328
Total, less developed countries	174	186	188	394
South and southeast Asia	109	100	94	131
Of which—				
Burma	40	20	13	18
Ceylon	16	33	22	25
Indonesia	32	40	37	68
Malaya and Singapore	9	(2)	6	1
Pakistan	10	2	12	13
Middle East	27	30	34	54
Africa	28	22	54	54
Latin America	9	34	7	155
Of which Argentina	5	33	4	112
Hong Kong	1	2	2	2
Total, Free World	1,335	1,270	1,510	2,120

[1] Data are based on the official statistics of Free World countries, adjusted to approximate Chinese foreign trade on an export f.o.b. and an import c.i.f. basis. Adjustments also have been made for double counting and for undercounting such as Chinese grain purchases sent to other countries. Because of rounding, components may not add to the totals shown.

[2] Less than $500,000.

[3] Net of entrepot trade with 3d countries.

trial products, agricultural commodities ranging from rice and tea through Chinese specialties such as tung oil, bristles, feathers, processed food, hog casings, oilseeds, and essential oils; and metals and minerals including tin, wolfram, mercury, pig iron, and coal. For individual Free World trade partners, except Hong Kong, trade with China has represented less than 10 percent of their total trade. But Chinese purchases of individual commodities have been quite important at times, such as in the case of Ceylonese rubber and Australian and Canadian grain.

1. *Grain*

Chinese Communist purchases of grain have become an established fact of life in the Chinese economy and purchases since 1961 have averaged about 6 million tons a year at an average annual cost of $400 million, as shown in the following tabulation.

Communist China: Grain purchases from the West, 1961–65

Year	Million metric tons	Value (c.i.f.) (million U.S. dollars)
1961	6.2	434
1962	5.3	371
1963	5.7	400
1964	6.8	475
1965	5.7	400
Total	29.7	2,080

China's retained imports, i.e., grain imports less grain exports, are lower than this, since each year there are shipments on Chinese account to other countries, notably Albania. About 80 percent of these imports of grain have come from the industrial West (Canada, Australia, and France), although other suppliers such as Argentina and Mexico have also been significant. (Table 15.) China's continued need for large grain imports is demonstrated by a contract signed with Canada in October 1965, which calls for the purchase of 5 million to 12.5 million tons over the next 3 to 5 years.

TABLE 15.—*Communist China: Net trade in grain, 1957–58—1965–66*

[In millions of metric tons]

	1957–58 [1]	1961–62	1962–63	1963–64	1964–65	1965–66 [2]
Retained imports:						
Canada		2.5	1.7	1.3	1.8	2.3
Australia		2.1	2.0	2.7	2.2	1.8
Argentina		.2	.3	1.2	.7	2.2
France		.5	.9	.3	.1	
Other		.7	.5	.4	.5	
Total		6.0	5.4	5.9	5.3	6.3
Exports	0.7	1.1	.8	.9	.8	.8
Net trade	−0.7	+4.9	+4.6	+5.0	+4.5	+5.5

[1] July 1–June 30.
[2] Tentative figures.

The reasons for China's concern to insure future supplies are not difficult to find. Over the past few years, food production has barely kept up with the growth in population, and domestic production of food may now be as much as 10 percent below the per capita level of 1957. Thus, China will have to continue importing grain for the foreseeable future, and probably at a gradually increasing rate to say 7 to 8 million tons a year. The Chinese claim they are buying wheat to facilitate the sale of more expensive rice. This trade makes economic sense as the caloric value of wheat per pound is almost equal to a similar amount of milled rice. However, this claim is only partly true as sales of rice in the past few years have averaged about 800,000 tons per year, or only about 14 percent of average annual grain imports.

As a consequence, agriculture now contributes far less to industrialization than it did in the 1950's. This is shown quite dramatically by the shift in export earnings from food. In 1959, China earned $820 million net from the sale of food abroad; from 1961 to 1965, however,

there was an average annual net deficit of about $125 million in food sales. As a result, China's capacity to import capital goods declined sharply; imports of machinery and equipment were only $300 million in 1965, compared with almost $1 billion in 1959. China's purchases of a few key plants from the West since mid-1963 have just begun to enter into China's trade returns in 1965, but these orders add up to a little less than one-tenth of the $2 billion spent for grain during 1961–65. The prospects that another $2 billion may have to be committed for grain purchases in 1966–70 must indeed be a sobering thought for the Chinese planners.

2. *Completed Industrial Installations*

A major feature of Communist China's foreign economic relations since mid-1963 has been the purchase of complete industrial installation from the Free World, financed in part by medium-term credits, and including, in some cases, the services of Western technicians. Contracts for 30 to 40 complete plants from Western Europe and Japan, valued at more than $170 million, have been negotiated since mid-1963. Over half the value of the contracts have been chemical plants, including plants for the production of chemical fibers, chemical fertilizers, plastic materials, and petrochemicals. (See table 16.) These plants, most of which will not be in operation until 1967–68 or later, will either supply vital products for the Chinese economy or will advance Chinese technical competence in important branches of industry. China is currently negotiating with a West German consortium for a steel-mill complex valued at between $125 and $175 million. If this contract is successfully concluded, it will almost double the value of Free World plants known to have been purchased by China through December 1965. China also has placed several large orders for other machinery in the past 2 years, particularly transportation equipment and heavy-duty equipment for construction purposes.

C. INDUSTRIAL WEST AND JAPAN

1. *Industrial West*

Communist China's trade with Japan and the industrial West has grown from about $700 million in 1962 to $1.4 billion in 1965—an annual average growth of roughly 25 percent. This growth can be accounted for chiefly by grain imports from Canada and Australia, the two main suppliers, and Peking's turn to Japan and Western Europe as its major source of foreign technology. The growth of trade with Japan has been particularly rapid, and in 1964–65 this trade greatly surpassed the earlier peak of $150 million reached in 1956. By 1965 trade with Japan had risen to $470 million, and Japan had replaced the U.S.S.R. as China's No. 1 trading partner. Although China's trade with Western Europe jumped by about 40 percent in 1965—to $600 million—this level of trade was still slightly less than the 1959 peak of $670 million. The bulk of China's imports from Japan and Western Europe have been machinery and equipment, steel products, and chemical fertilizer.

With the exception of Japan, the countries from which Communist China mainly wishes to import do not offer comparable markets for China's exports. This is particularly true of Canada and Australia

TABLE 16.—*Communist China: Purchase of whole plants from Western Europe and Japan, August 1963–December 1965*

Plant and equipment	Country of origin	Value (million U.S. dollars)	Capacity	Date of contract	Remarks
Whole Plants:					
Vinylon fiber plant	Japan	20.0	11,000 metric tons per year	August 1963	Trial production began in September 1965.
Urea plant	Netherlands	6.0	175,000 metric tons per year	September 1963.	Scheduled to begin production of fertilizer by October 1966.
Synthetic ammonia plant	United Kingdom.	7.0	105,000 metric tons per year	October 1963	This plant is to complement the Dutch urea plant
Petroleum refinery	Italy	5.0	150,000 to 200,000 metric tons per year	December 1963	
Ammonium nitrate plant	do	14.2	110,000 metric tons per year	do	This plant is being built in Albania. The contract includes facilities for the producton of ammonia, nitric acid, and ammonium nitrate fertilizer.
Synthetic ammonia plant	do	3.6	Not available	do	
Industrial alcohols plant	France	3.0	do	January 1964	
Palm oil processing plant	Netherlands	2.0	do	May 1964	
Crude oil cracking and olefins separation plant.	West Germany	12.5	50,000 metric tons per year	July 1964	The scheduled startup is mid-1967.
Synthetic fiber plant (nylon)	do	1.5	Not available	do	
Polyethylene plant	United Kingdom.	12.6	24,000 metric tons per year	September 1964	This plant will use ethylene produced by the olefins separation plant purchased from West Germany.
Polypropylene plant	do	7.3	Not available	November 1964	Both resin and fiber products will be made from propylene produced by the olefins separation plant.
Complete plant for the manufacture of porous silica material.	Sweden	1.8	150,000 cubic meters per year	December 1964	
Acetylene generating plant	Japan	.3	1,100 cubic meters per year	May 1964	This plant is in operation and complements the vinylon fiber plant.
Air liquefaction plant	do	1.7	Not available	September 1964	This plant was delivered in August 1965.
Precision measuring instrument plant	do	.8	do	November 1964	To be delivered by the end of 1966.
Oil hydraulic equipment manufacturing plant.	do	1.8	do	March 1965	Construction to be completed in December 1966.
Acrylonitrile plant	West Germany	4.6	10,000 metric tons per year	May 1965	Equipment is to be delivered by mid-1967.
Glass plant	do	3.5	Not available	Mid-1965	
Polyester resin plant	United Kingdom	.1	do	July 1965	This plant is scheduled to begin production before the end of 1966.
Acrylic fiber plant	do	8.4	do	August 1965	
Condenser manufacturing plant	Japan	2.0	200,000 condensers per year	September 1965	
Air liquefaction plant	West Germany	3.3	Not available	August 1965	
Wiredrawing plant	Japan	5.0	do	1965	
Instrument plant	United Kingdom	1.0	do	1965	
Tube-expanding pipe plant	Italy	3.0	do	1965	
Straw cellulose plant	Finland	(1)	62.5 metric tons of semichemical cellulose daily.	1965	
Bleaching plant	do	(1)	80 metric tons of bleached sulfur cellulose daily.	1965	
L–D steel plant	Austria	12.0	650,000 metric tons per year	1965	
Cold strip steel rolling mill	West Germany	17.0	Not available	1965	

[1] Not available.

with whom China has had an annual average import surplus of close to $300 million during 1961–64. Although China has managed to triple her exports to these two countries over this period, reaching some $35 million in 1964, the scope for additional increases does not appear to be large. China has managed to maintain a small export surplus with Western Europe in 1964 but it remains to be seen whether China can keep pace with a strong upward trend in imports once this is resumed in earnest. Western Europe probably would buy more Chinese agricultural products and industrial raw materials, but does not offer a ready market for low-quality Chinese manufactured products. The Chinese export drive must therefore be concentrated in the growing markets of the less-developed countries, particularly in the large overseas Chinese communities in southeast Asia.

2. *Japan*

The ability of industrial Japan to complement underdeveloped China is reflected in the rapid increase in recent years of Sino-Japanese trade, which has grown as follows:

Communist China: Trade with Japan, 1956–58 average, and 1960–65

[In millions of U.S. dollars]

	Exports	Imports	Total
1956–58 average	72.8	59.4	132.2
1960	20.4	2.8	23.2
1961	29.0	17.0	46.0
1962	45.9	38.6	84.5
1963	74.8	62.4	137.2
1964	157.9	152.9	310.8
1965	225.0	245.0	470.0

Japan is the most important customer for Chinese bulk products such as coal, pig iron, iron ore, salt, coke, soybeans, some perishable foodstuffs, and minerals. In turn, China has been purchasing from Japan an increasing quantity of steel products, chemical fertilizer, chemicals, machinery, synthetic fibers, motor vehicles, earthmoving equipment, and various other manufacturers.

D. THE LESS-DEVELOPED COUNTRIES

Communist China has met only with partial success in fashioning trade as a political weapon to capture the countryside of the world; that is, the less-developed countries of Africa, Asia, and Latin America. Basically, each side has an underdeveloped agricultural economy often producing the same type goods, or suffering from similar scarcities best supplied by more technically advanced and industrialized countries. China's trade with the less-developed countries almost doubled between 1959 and year-end 1965—reaching an estimated level of $825 million, or about 22 percent of China's total foreign trade in 1965. Over half of that trade was conducted with only five countries: Argentina, Indonesia, Malaysia,[2] the United Arab Republic, and Ceylon. Trade with these countries was of special importance to China's own economy; either for earnings of scarce hard currency

[2] Including Singapore.

as in the case of its lopsided trade with Malaysia (about $100 million in net exports), or for essential commodities as grain from Argentina, rubber from Indonesia and Ceylon, and cotton from the United Arab Republic. With the exception of grain purchases, China has run a trade surplus with the less-developed nations.

E. UNIQUE ROLE OF HONG KONG

The tiny British Crown Colony of Hong Kong inhabited by approximately 4 million Chinese and a small Western community provide Communist China with its most important source of hard currency. Hong Kong serves as China's largest customer while selling only a minimal amount to China as the following figures show:

Communist China: Trade with Hong Kong, 1963–65

[In millions of U.S. dollars]

	1963	1964	1965
Exports by China	259	345	407
Imports from Hong Kong	12	10	13
Export surplus of China	247	335	394

With the present level of her trade surplus running about $400 million, China can buy almost all her annual grain imports from the West with earnings from Hong Kong. China faces a leveling off of these earnings, however, as the colony can use only so much food, which is China's primary export to Hong Kong.

Hong Kong depends on Communist China for meat, fruit, and vegetables, dairy products and oil seeds, rice, wheat, and sugar. It also provides a growing market for Chinese textiles, simple machinery, and other manufactured goods.

Hong Kong also serves as an important trading outpost for Communist China. Hong Kong reexports a portion of the foodstuffs, textiles, and other products obtained from China to other southeast Asian countries, Japan, and Europe. This entrepôt trade is believed to have been running close to $90 million annually in the past few years.

The many economic benefits that Peking derives from Hong Kong would be lost or greatly diminished if it were a part of Communist China. Foreign exchange earnings would be sharply reduced because deliveries to Hong Kong for local consumption would be paid for in domestic currency. The ready exchange of non-Bloc currencies would disappear with the loss of British backing, and the loss as a British-sponsored port would bring a sharp reduction in the use of the commercial and financial facilities in Hong Kong by businessmen of non-Bloc countries.

IV. Outlook

The Chinese have claimed that the abrupt ending of Soviet economic assistance, although extremely damaging in the short run, would be to China's ultimate advantage, since it would force China to redouble its efforts to widen its own manufacturing capability and to reduce dependence on imports. This widely proclaimed policy of national

self-reliance has not been so restrictive as to have kept China from contracting for complete plants, machinery, and equipment and in some cases even for technicians, from Japan and Western Europe.

There are few sectors of Communist China's industrial economy that would not gain considerably from imports of plant and equipment and production technology; in fact, for the future development of many branches of the chemical, metallurgical, transportation, and machine-building industries such imports appear essential. There are, moreover, various raw materials which China must buy, perhaps in increasing quantities including rubber, cotton, copper, chrome, nickel, cobalt, and special alloy steels. Imports of chemical fertilizers, pesticides, and farm machinery also remain vital and may well maintain their upward trend. Even in the case of petroleum, where the advance toward self-sufficiency has been unusually rapid, some imports of high quality lubricants almost certainly will be needed for some time to come. Last but not least, Chinese imports of grain may well rise gradually over the next few years.

Communist China then has fundamental economic needs for large-scale trade with the outside world during the Third Five-Year Plan (1966–70). The prediction of the future rate of growth of foreign trade, its commodity composition, and its geographical distribution is made doubly hazardous by the current political turmoil in China. The so-called Proletarian Cultural Revolution is in part directed against "foreign" elements that have sneaked into the society. Conceivably the strong xenophobic elements in the political situation could hamper trade; already, foreign businessmen find that trade officials in China are reluctant to make decisions or enter into new agreements. No general policy decision, however, has been made to curtail trade. In any case, the strong unpredicted switches in the volume, composition, and distribution of China's foreign trade in the last 6 years should serve as an object lesson to those seers who attempt to foretell the future of trade in 1966–70.

Over the next 5 years—to lay aside these disturbing political elements—the extent to which foreign trade can expand will depend on how successfully the leadership deals with the problems of expanding agricultural and industrial production. Although China has managed over the past 5 years to make progress in narrow sectors of the economy—including its nuclear weapons program—the country has not regained the economic momentum that marked the 1950's. The economy has never recovered from the dual setback of Leap Forward economic policies and the withdrawal of Soviet economic assistance.

Communist China's foreign trade over the next 5 years will continue to grow, but will be tied more closely to production capabilities—particularly in agriculture—and thus a slower rate of growth subject to considerable fluctuations can be expected than in 1964–65. The trend toward increased trade with the West is likely to continue. The major growth in exports will still be in agricultural products and textiles although there should be some increase in mineral and metal exports. Imports of Western grain have become a continuing necessity and will require the expenditure of a large share of China's annual hard currency earnings. Thus, grain purchases will continue to restrict the import of capital equipment needed for the expansion of modern industry. Barring the receipt of long-term credits which

would help trade expand greatly, or a sustained increase in the export of agricultural products, there is little likelihood that imports of capital equipment will increase sufficiently during the Third Five-Year Plan (1966–70) to make the contribution to industrial development that they made in the 1950's.

Appendix

Methodological Supplement: Merchandise Trade of Communist China

Merchandise trade includes all commodity exports and imports, valued on an f.o.b. basis. Several adjustments were made in the foreign trade data, reported by the Chinese for 1950–58 and derived from trading partner statistics for 1959–65. It is believed that China records its foreign trade to show the country of destination and origin rather than the country of payment and receipt and furthermore, that its imports from the free world are valued on a c.i.f. basis. Therefore, two adjustments have been made in the Chinese foreign trade reports: the first, to place China's merchandise trade with the free world on an f.o.b. basis, and the second, to represent China's trade by country of payment and receipt. This latter adjustment was made because reexports of Chinese goods by the Eastern European Communist countries averaged almost $30 million a year between 1953 and 1961.

The estimates of Communist China's foreign trade for 1950–58 are based on Chinese official data on foreign trade and the trade data of China's trading partners. Because China in recent years has suspended the publication of all trade data, estimates of its foreign trade after 1958 have been derived exclusively from the information of its trading partners. China's foreign trade in 1950–58 as derived from the data of its trading partners approximated the comparable Chinese data for this period; thus the estimate of China's trade for 1959–65 based on trading partners' data can be combined with data of the earlier period.

Conversion of the yuan values of China's trade for 1950–58 into U.S. dollars has been made on the basis of the following exchange rates: US$1 equals 4 yuan in trade with Communist countries; in trade with the free world, US$1 equals 3.2 yuan in 1950, 2.24 yuan in 1951, 2.1 yuan in 1952, and 2.5 yuan in 1953–58. This dual exchange rate system is not reported by China but is derived from a comparison of the yuan values of trade as reported by China with the ruble and dollar values of trade as reported by or estimated from the trade data of China's trading partners. China's reason for establishing this system is not certain. Such factors as the greater stability of prices and the different commodity mix in trade with Communist countries compared with the free world trade, however, could justify a lower value of the yuan in the Communist trade. Or perhaps the yuan value of exports and imports is established arbitrarily under a system of prices that is insulated from domestic prices.

Estimates of China's trade for 1959–65 are based on the trade data of China's trading partners. To reflect the value of trade as China would report it, the trade data of free world countries have been

adjusted for (*a*) time leads and lags in shipping, (*b*) shipping costs, (*c*) double counting, and (*d*) unrecorded transactions.[1] On the other hand, only a few adjustments have been required in the trade data of Communist countries because (*a*) the Communist countries present their trade data on an f.o.b. basis, (*b*) reexports of Chinese products by the Communist countries to the free world almost completely disappeared during this period, (*c*) no shipping time adjustment is required for much of Sino-Soviet trade (that going by rail), and (*d*) data are insufficient to calculate the shipping time adjustments for the remaining share of Chinese trade with the European Communist countries. Also, the Far Eastern Comunist countries have only irregularly reported their trade with China. Trade with these countries has been estimated from miscellaneous data on total and commodity trade and on credit extensions and drawings.

[1] For a more detailed description of these adjustments see CIA/RR ER 66–17, "Communist China's Balance of Payments, 1950–51," Washington, D.C., August 1966, pp. 29–31.

COMMUNIST CHINA'S FOREIGN AID TO LESS-DEVELOPED COUNTRIES

BY

MILTON KOVNER

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TABLES

COMMUNIST CHINA'S FOREIGN AID TO LESS-DEVELOPED COUNTRIES

Introduction

Communist China's foreign aid program in non-Communist countries is an ironic contrast to the parlous state of its own economy and striking testimony to its readiness to sacrifice ideological consistency to political advangtage. Half of the developing countries which have received Chinese grants-in-aid and interest-free loans have a per capita gross national product roughly equal to or exceeding that of China. And Peking's leaders, despite sizable aid commitments, paradoxically extol the virtues of self-reliance and self-help, attack Soviet aid to nationalist governments as misplaced because it bolsters such regimes and weakens the position of the revolutionary forces, and give only nominal support to the idea of economic aid as a significant factor in the national liberation struggle.

The increasing Sino-Soviet rivalry for the allegiance of the former colonial world, Peking's efforts to establish wider diplomatic relations, and its desire to limit Western (particularly United States) and Nationalist China's influence in the area, however, have driven China increasingly to disregard revolutionary precept and engage in a highly opportunistic aid and trade program of its own. National self-interest has governed Chinese economic and military support of Pakistan, for example, despite its membership in such "imperialist" groupings as CENTO and SEATO, and substantial trade exchanges with South Africa which had antagonized some African opinion. Whatever ideological differences may be apparent in Soviet and Chinese propaganda attitudes toward "bourgeois nationalist" governments in developing countries, more than a decade of Chinese foreign aid reveals China's willingness to develop economic ties with a remarkable variety of such leaders in the pursuit of its ambitions in the area.

Magnitude and Direction

Communist China began its economic thrust into the less-developed countries of the free world in 1956. During the initial years of its drive, 1956–59, Chinese economic aid extensions[1] averaged less than $30 million annually and its aid recipients numbered only seven, virtually all Asian countries along China's southern periphery. Since 1960, average annual Chinese aid extensions have risen to almost $125 million, and the number of aid recipients, swelled by the rapid addition of new aid clients in Africa, has expanded to 21. By 1965, Com-

[1] The terms *extension, commitment* or *pledge* refer to Communist declarations of intent to provide, either as a grant or on medium- or long-term credit (normally 5 years or longer), goods and services not available in the recipient country. The terms *drawings, disbursements* or *expenditures* refer to the delivery of goods or the use of services.

munist China had extended almost $850 million in economic credits and grants to non-Communist countries, roughly half of the total directed to Asian countries, about 30 percent to African countries, and the remainder to the Middle East. (See table 1.)

There seems little question that Sino-Soviet rivalry for influence in developing countries has acted as a spur to both Soviet and Chinese aid extensions. Since 1961, the fluctuations in the amounts of new aid pledged by both the U.S.S.R. and China show striking similarities. Although Chinese aid extensions during the period 1961–65 were little more than a quarter of those of the U.S.S.R., in both cases extensions fell drastically from the high levels reached in 1961; during 1963 extensions resumed their upward trend and accelerated rapidly during 1964 when they reached for both the U.S.S.R. and China record

TABLE 1.—*Economic aid extended by Communist China to less-developed countries in the Free World, 1956–65*

[In millions of U.S. dollars]

	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	Total
Africa	------	------	------	0.5	26.0	39.2	1.8	71.6	115.1	15.0	269.2
Algeria	------	------	------	------	------	------	1.8	50.0	------	------	51.8
Central African Republic	------	------	------	------	------	------	------	------	4.0	------	4.0
Congo (Brazzaville)	------	------	------	------	------	------	------	------	25.2	------	25.2
Ghana	------	------	------	------	------	19.6	------	------	22.4	------	42.0
Guinea	------	------	------	.5	26.0	------	------	------	------	------	26.5
Kenya	------	------	------	------	------	------	------	------	18.0	------	18.0
Mali	------	------	------	------	------	19.6	------	------	------	------	19.6
Somalia	------	------	------	------	------	------	------	21.6	------	------	21.6
Tanzania	------	------	------	------	------	------	------	------	45.5	------	45.5
Uganda	------	------	------	------	------	------	------	------	------	15.0	15.0
Asia	51.7	15.8	21.7	------	47.5	123.8	14.5	------	114.2	44.0	433.2
Afghanistan	------	------	------	------	------	------	------	------	------	28.0	28.0
Burma	------	------	------	------	------	84.0	------	------	------	------	84.0
Cambodia	22.9	------	------	------	26.5	------	------	------	------	------	49.4
Ceylon	------	15.8	10.5	------	------	------	10.5	------	4.2	------	41.0
Indonesia	16.2	------	11.2	------	------	30.0	------	------	50.0	16.0	123.4
Laos	------	------	------	------	------	------	4.0	------	------	------	4.0
Nepal	12.6	------	------	------	21.0	9.8	------	------	------	------	43.4
Pakistan	------	------	------	------	------	------	------	------	60.0	------	60.0
Middle East	4.7	------	12.7	.7	------	------	------	16.5	108.5	------	143.1
Syria	------	------	------	------	------	------	------	16.3	------	------	16.3
United Arab Republic	4.7	------	------	------	------	------	------	------	80.0	------	84.7
Yemen	------	------	12.7	.7	------	------	------	.2	28.5	------	42.1
Total	56.4	15.8	34.4	1.2	73.5	163.0	16.3	88.1	337.8	59.0	845.5

Sources: A. Eckstein, *Communist China's Economic Growth and Foreign Trade* (New York, McGraw-Hill, 1966), p. 307, and U.S. Department of State, *Communist Governments and Developing Nations: Aid and Trade in 1965*, Research Memorandum, RSB-50, June 17, 1966, p. 2.

TABLE 2.—*Economic aid extended by the U.S.S.R. and Communist China to less-developed countries of the Free World, 1961–65*

[In millions of U.S. dollars]

	U.S.S.R.	Communist China
1961	547	163
1962	53	16
1963	236	88
1964	998	338
1965	653	59

levels. In 1965, the amount of new aid extended by both countries declined sharply from their 1964 levels.

Although China and the U.S.S.R. have parallel aid programs in 18 less developed countries, in terms of the actual pace of aid activity, China can be said to rival or exceed Soviet aid efforts only in Congo (Brazzaville), Burma, Cambodia, Ceylon, Indonesia, Mali, Nepal, and Yemen. Peking, on the other hand, has left the field entirely free to the Soviets in Ethiopia, Senegal, Sudan, Tunisia, Iran, Iraq, Turkey, and, of course, India.

The disproportionate publicity accorded the Chinese economic aid effort, however, has been a tribute more to the skill with which Peking has exploited its propaganda value than to its size. Although Chinese aid commitments are larger than those of any single East European country (Czechoslovakia, with aid extensions of some $675 million, is its nearest rival), Chinese extensions during the period 1956–65 were less than one-fifth the more than $5 billion in economic aid extended by the U.S.S.R. during the same period. Moreover, there has been a wide gap between Chinese aid pledges and actual aid disbursements—a circumstance attributable as much to the inability of its aid recipients to marshal domestic resources and finance local costs as to Chinese inexperience or unwillingness rapidly to implement its aid pledges. Cumulative expenditures under Chinese economic aid credits and grants during the decade 1956–65 totaled about $200 million, little more than 10 percent of Soviet aid expenditures. By comparison, the actual flow of U.S. aid to less developed countries during the same period amounted to almost $30 billion.

Betraying some sensitivity to the gap between his country's verbal protestations of support for new states and its modest aid expenditures, the Chinese delegate to the Economic Preparatory Meeting for the Second African–Asian Conference (Bandung II) in Geneva in 1964 maintained somewhat defensively:

> We have done as much as our capacity permits to help other Afro–Asian countries develop their national economies and to strengthen mutual assistance and cooperation with them. But at present China's economic level is not high. What we have been able to do is limited. Having attained independence earlier and with such a great manpower, China logically ought to make more of a contribution to the struggle of Afro–Asian peoples for winning and safeguarding national independence. What we have so far done falls far short of what we should have done. But we are sincere.[2]

Nonetheless China has endeavored to stretch its modest aid resources over a wide area in the less developed world. Four-fifths of its aid recipients have received cumulative aid commitments of less than $50 million—the only exceptions being $123 million in economic credits to Indonesia, two $84 million commitments to the United Arab Republic and Burma, and $60 million in aid to Pakistan. In contrast, two-thirds of Soviet economic aid extensions have gone to a relatively few large recipients—India and the United Arab Republic each have received credits exceeding $1 billion, Afghanistan, $550 million, Indonesia, $375 million, and Iran, $330 million.

[2] *Peking Review* No. 26, June 26, 1964, p. 10.

Composition and Terms

Chinese project aid as a rule covers expenditures for geological surveys and feasibility studies, the delivery of machinery and equipment and other material not available in the credit receiving country, technical assistance, and the training of indigenous personnel. Much of the aid has been channeled into a variety of small scale light industrial facilities such as textile plants, match and cigarette factories, paper, food processing, and cement plants and a number of labor-intensive projects such as the building of roads and the construction of bridges. However, more than one-half of the total drawings on Chinese aid have been in the form of foreign exchange deficit funding, budgetary support, goods to finance local currency costs of Chinese development projects, and emergency deliveries of commodities such as rice and wheat.

Although Peking cannot hope to compete in volume with the aid offered by the Soviet Union, China has nevertheless been aggressively competitive in the terms on which its aid has been extended. In contrast to the well publicized and relatively low interest rate of 2.5 percent and 12 year amortization period of most Soviet credits—East European credits have generally been at a slightly higher interest rate (3–4 percent) and for shorter repayment periods (5–8 years)—Chinese economic aid has been largely interest free and provides for repayment over 10 years with a 10-year grace period. Moreover, despite some recent shift in emphasis from grants to loans, about one-fifth of Chinese aid has been extended in the form of grants, compared to less than 5 percent of Soviet aid extensions in this category. Chinese repayment terms, not unlike those of other Communist aid donors, provide for repayment of principal and interest in commodity exports of the recipient country or, upon mutual agreement, in domestic or convertible currency.

Technical Assistance

All Communist countries have made technical assistance a major element of their foreign aid programs because they are aware that the shortage of technical skills and trained administrative and managerial personnel in less-developed countries provides a formidable obstacle to the effective implementation of their aid undertakings. In addition to the large numbers of Communist technicians in aid-recipient countries engaged in planning or in supervising the construction of projects being built with Communist aid, a considerable number of technicians from developing countries have been brought to donor countries for training in plants similar to those under construction in their home countries.

In recent years, the number of Chinese technicians sent abroad under technical assistance programs has increased rapidly. Although Communist China accounted for less than 10 percent of all Communist aid expenditures in less-developed countries, it's share in the total number of communist personnel in developing countries nearly doubled in 1965, exceeding the number of technicians from Eastern Europe, and numbering about half the 9,500 Soviet technicians in the field.[3] The

[3] *The U.S.S.R. and Developing Countries* (Moscow, 1966), p. 37.

disproportionate number of Chinese technicians is attributable primarily to the presence of large numbers of manual laborers whose technical skills are limited but who provide the necessary manpower for certain labor-intensive projects in which Communist China is involved. Chinese technicians have been concentrated in Mali, Nepal, Guinea, and Yemen and are engaged there primarily in agricultural projects, roadbuilding activities, and dam construction.

Another important component of the Communist aid effort has been the awarding of all expense scholarships for academic study in Communist countries for periods as long as 5 or 6 years. Through such prolonged training programs the Communists hope to establish lasting rapport and contact with a potential elite in less-developed countries which they hope will exert substantial influence on the orientation of existing regimes and on the choice of their successors. However, because of the vast cultural and language differences, an educational system already strained by China's domestic requirements, and a stage of economic development likely to impress only those from the most backward of developing countries, the Chinese endeavors in this field have been modest, accounting for only about 3 percent of the more than 21,000 students trained in all Communist countries during the past decade. In September of 1966, ostensibly on grounds that the time and energies of faculties and staffs of educational institutions will be absorbed by the cultural revolution, university programs were suspended until the fall of 1967 and all foreign students asked to return home.[4]

Aid and Trade

Although Communist China's trade with less-developed countries has risen rapidly in recent years—accounting in 1965 for about 22 percent of China's total trade—the increase has been attributable largely to a doubling of Chinese imports during the period 1963–65 due to increased purchases of grain from Argentina and rubber from Indonesia. (See table 3.) Chinese Communist exports to the area have remained sluggish in sharp contrast to the exports of other Communist countries for whom the extension of credits has had a considerable impact on the expansion of their trade with less-developed countries. An analysis of the relationship between disbursements under the Soviet aid program and exports to less-developed countries, for example, reveals that in recent years as much as 45 percent of all Soviet exports to the area were financed under long-term credits. With more than half of all Soviet economic aid allocated for industrial development, aid disbursements have had a particular impact on Soviet exports of machinery and equipment. In recent years such goods have accounted for almost half of all Soviet exports to less-developed countries. In contrast only about 3 percent of Chinese exports to the area are machinery and equipment.

There is as yet little evident relationship between the small volume of Chinese aid expended—much of it in the form of foreign exchange deficit funding, budgetary support and miscellaneous consumer goods to finance the local currency cost of Chinese aided projects—and the

[4] The Chinese expulsion of 15 Soviet students prompted a Soviet retaliatory move and the U.S.S.R. expelled some 65 Chinese students studying in the Soviet Union.

TABLE 3.—*Trade of Communist China with selected less-developed countries, 1963–65*

[In millions of current U.S. dollars]

	1963		1964		1965 [1]	
	Exports	Imports	Exports	Imports	Exports	Imports
Total	292.8	179.4	348.6	317.8	285.5	420.9
Africa	33.2	45.4	57.4	42.5	81.2	76.6
Ghana	2.1	.5	2.7	2.8	13.6	6.2
Morocco	6.8	6.2	11.8	12.3	11.9	9.2
Sudan	4.3	12.5	6.6	4.9	6.4	16.8
Tanzania	.3	10.4	.9	6.5	4.9	12.1
Uganda	.9	11.2	.7	9.1	2.7	17.5
Asia	212.2	89.2	242.3	133.4	231.0	181.3
Burma	26.4	12.3	31.7	16.7	27.9	17.5
Ceylon	29.0	21.1	42.9	25.6	23.9	36.0
Indonesia	35.9	35.6	40.8	69.6	40.0	70.0
Malaysia	94.0	5.4	98.8	.3	106.4	7.3
Pakistan	5.9	12.9	16.3	14.8	18.4	43.4
Latin America	2.1	3.8	1.9	91.9	2.0	93.9
Argentina	.1	3.7	.2	91.7	.3	83.7
Middle East	43.6	40.8	46.5	49.8	69.3	69.1
Iraq	12.5	4.5	14.6	4.9	14.2	4.7
Syria	3.0	19.9	5.4	28.3	5.8	16.7
United Arab Republic	19.9	16.4	16.6	16.6	26.7	45.1

[1] Data for 1965 are estimated.

Sources: Official trade statistics of China's trading partners.

growth of its exports to less-developed countries. In recent years, only between 10 and 15 percent of Chinese exports to the area appear to have been credit financed: and China's largest export market in the less-developed world, Malaysia, which has accounted for about 30 percent of China's exports to the area, has not been a recipient of Chinese aid.

THE SINO-SOVIET DIALOG OVER FOREIGN AID

Much of the Sino-Soviet dispute has tended to revolve around the proper Communist strategy and tactics to be pursued in the less-developed world because the Chinese, for reasons of geography, racial affinity, and revolutionary appeal have regarded that area as one in which they can most effectively challenge Soviet authority. China has singled out Soviet foreign aid to non-Communist countries as a particularly vulnerable target of overall Soviet strategy in the area, insisting that the national liberation struggle still finds its "most concentrated expression" in armed struggle and "in no case can it be said that national independence and social progress are due solely to the economic aid they received from Socialist countries and not mainly to the revolutionary struggles of their own peoples." [5] Indeed, indiscriminate Communist aid to non-Communist leaders in such countries, they maintain, only serves to help strengthen such regimes and make necessary a more protracted armed struggle for Communist elements to seize control.

[5] *Peking Review*, No. 43 (Oct. 25, 1963), p. 8.

The force of such Chinese criticisms, however, has been vitiated by China's more modest aid efforts in the less-developed world. Thus Chinese theoretical objections to Soviet foreign aid seem reduced to the more pragmatic question of priorities; i.e., which regimes are to be aided and to what degree rather than an issue of whether or not to extend aid. Peking obviously has been influenced by what it believes to be its own regional and national needs when it loudly denounces Soviet aid to India but at the same time extends economic and military aid to Pakistan and seeks to compete with Soviet aid efforts elsewhere in the less-developed world.

Unable to compete with the larger Soviet assistance program in developing countries, Communist China has waged an unremitting campaign to discredit the quality and intent of Soviet foreign aid. During his much publicized visit to Africa early in 1964, Premier Chou En-lai advanced "Eight Principles" of foreign aid which he maintained governed China's economic and technical aid to other countries but which also have been exploited by Chinese propagandists to feed the latent apprehensions of many Soviet aid recipients. The principles assert:

(1) The Chinese Government always bases itself on the principle of equality and mutual benefit in providing aid to other countries.

(2) In providing aid to other countries, the Chinese Government strictly respects the sovereignty of the recipient countries and never attaches any conditions or asks for any privileges.

(3) The Chinese Government provides economic aid in the form of interest-free or low-interest loans and extends the time limit for the repayment when necessary so as to lighten the burden of the recipient countries as far as possible.

(4) In providing aid to other countries, the purpose of the Chinese Government is not to make the recipient countries dependent on China, but to help them embark step by step on the road of self-reliance and independent economic development.

(5) The Chinese Government tries its best to help the recipient countries build projects which require less investment while yielding quicker results, so that the recipient governments may increase their income and accumulate capital.

(6) The Chinese Government provides the best quality equipment and material of its own manufacture at international market prices. If the equipment and material provided by the Chinese Government are not up to the agreed specifications and quality, the Chinese Government undertakes to replace them.

(7) In giving any particular technical assistance, the Chinese Government will see to it that the personnel of the recipient country fully master such techniques.

(8) The experts dispatched by the Chinese Government to help in construction in the recipient countries will have the same standard of living as the experts of those countries. The Chinese experts are not allowed to make any special demands or enjoy any special amenities.[6]

The references to Chinese respect for the sovereignty of aid recipients, the absence of imposed conditions, interest-free or low-interest

[6] *Peking Review*, No. 34, Aug. 21, 1964, p. 16.

loans, concessions on repayments, quality equipment at world market prices, and the exemplary conduct of Chinese technicians, were an ill-disguised effort to draw invidious comparisons with Soviet foreign aid practice and to undermine the attraction of the Soviet program.

Under the impact of the withdrawal of Soviet aid in 1960, which admittedly "inflicted incalculable difficulties and losses on China's economy," the Chinese have made a virtue out of necessity and have enshrined the principle of self-reliance as a cardinal tenet of economic development and political independence. While not foreclosing aid "given on the basis of proletarian internationalism, aid coming from Socialist countries which uphold Marxist-Leninism," and aid from other "revolutionary people," the Chinese warn that "life has taught us the lesson that it is important to discern the real nature of foreign aid before accepting it. The foreign aid provided by imperialism and old and new colonialism is nothing but an instrument of aggression." [7]

In June 1964 a Chinese delegate to the Second Asian Economic Seminar in Pyongyang, North Korea, attended by representatives from 34 Afro-Asian nations, attacked the motivation of Soviet aid more directly by warning that, "not unlike the 'imperialists' of the West, modern revisionists also talk about 'economic cooperation and economic aid.'" But "they have no sincere desire to help the Asian and African countries develop their independent national economies." In dealing with the Asian and African countries, the Chinese delegate warned, "they sometimes provide the machinery while holding back the key units and parts; sometimes they provide equipment while withholding technical knowledge, trying all they can to make the African and Asian countries dependent on them." And, in an obvious allusion to China's own experience with Soviet aid, he added: "They have even gone so far as to cancel aid, withdraw experts, and tear up contracts as a means of applying pressure." [8]

In response to such attacks, Soviet publicists have warned the Chinese, "if you are sitting in glass houses, don't throw stones." [9] *Izvestiya*, on July 12, 1964, delivered a sharp rebuke to Chinese efforts to "defame, blacken, and slander" Soviet foreign aid by concentrating its attack on the most vulnerable area of the Chinese program—its small size and poor implementation record. The article asserted that Chinese propagandists have no grounds to "brag" about China's foreign aid: China, which itself only recently started on the road to industrialization, "was hardly in a position to render effective assistance to developing countries." *Izvestiya* noted that, while China was rendering economic and technical assistance to 18 developing countries, the U.S.S.R. and its East European allies were extending such aid to 45 developing countries, and "the volume of aid given by the Chinese Peoples Republic amounted to only 8 percent of the aid granted to young national states by the Soviet Union and the other Socialist CEMA countries." Moreover, China's "Eight Principles," it was alleged, serve one "unseemly" end—"that of discrediting the disinterested assistance of the Soviet Union and of other socialist countries to young national states."

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[7] *Peking Review*, No. 25, June 18, 1965, p. 15.
[8] *Peking Review*, No. 27, July 3, 1964, p. 20.
[9] *Sovets Kaya Rossiya*, Oct. 5, 1963, p. 3.

Citing the Chinese aid program in Nepal, Guinea, Cambodia, Burma, and Indonesia, the article further asserted that the Chinese were lagging in the implementation of their aid pledges and that Chinese plant and equipment were of a "low technical level" and failed to meet world standards. In spite of the "flowery declarations of the Chinese leaders about aid to new states," *Izvestiya* concluded, "such people will judge their real friends not by their words but by their deeds."

The Soviets have directed their strongest attacks against the Chinese doctrine of self-reliance because they see in the concept an ill-disguised challenge to their policies in both Eastern Europe and the less developed world. For the U.S.S.R. the Chinese formula for "the construction of socialism mainly by its own forces would, in its direct meaning, give rise to no objections." Indeed, Moscow would regard it as an erroneous interpretation of the principle of proletarian internationalism to think "that the people of some country may sit with folded arms and rely exclusively on the assistance of other countries of socialism." [10] But they argue: "Is there truly a problem, and a controversial one at that, about whether each country should rely on its own resources in the building of socialism? There is no such problem. Why then have the Chinese leaders invented it and why do they offer it as a subject of debate?" [11]

For Moscow the answer is clear enough. The Chinese doctrine of "go it alone" is meant to undercut Soviet efforts to bind Eastern Europe more closely to Soviet purposes. The U.S.S.R. has long sought to invest the Council for Mutual Economic Assistance (Comecon) with new dimension and greater depth and to coordinate Communist economies not only on the level of trade but, through meshing of long-term development plans and specialization assignments, at the level of output as well. Moscow opposes the Chinese formula because "it conceals the concept of creating self-sufficient national economies for which the economic contacts with other countries are restricted to trade only." What is worse, "the Chinese comrades are trying to impose this approach on other Socialist countries too . . . This policy . . . cannot be regarded otherwise than as an attempt to undermine the unity of the Communist commonwealth.[12]

Moreover, the Soviets maintain that the Chinese prescription of relying on one's own resources is as inapplicable to the current stage of the economies of the developing countries as it is damaging and disruptive to relations among Communist countries. They maintain the Chinese appeal, "to produce everything regardless of expenditure leads the newly free states . . . to squander their means and resources. The disruption of their economic relations with Socialist countries and the other highly developed countries, and the failure to utilize their advanced experience, can bring the young developing countries nothing but the weakening of their positions in the struggle against imperialist exploitation, the slowing down of the rate of growth of their national economies, and aggravation of their difficulties, grave as they are." [13]

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[10] *Pravda*, July 14, 1963, p. 4.
[11] *Pravda*, Apr. 28, 1964, p. 6.
[12] *Pravda*, July 14, 1963, p. 4.
[13] *Ekonomicheskaya Gazeta*, No. 34, Aug. 22, 1964, p. 19.

The Soviets pointedly note that "whereas large countries in general can afford pursuing an autarkic economic policy for some time despite an obvious economic loss, as is seen from the experience of the PRC itself, such a policy is fraught with more serious consequences for smaller countries." [14] Or does such a policy "conceal an attempt to subordinate the economies of those countries to Peking by way of isolating them from the U.S.S.R. and other Socialist countries?" [15]

Prospects

Whatever Peking's ultimate expectations when it began its thrust into the less-developed world 10 years ago, at the close of the decade its reach seems clearly to have exceeded its grasp. Chinese policy reverses in Burundi, Dahomey, the Central African Republic, Ghana, and Indonesia, coupled with the preoccupation of its leaders with economic and political dislocation at home and with the uncertain problems and hazards of military escalation in Vietnam appear, for the moment, to have slowed the momentum of China's drive in developing countries.

Although Peking may be inclined to be more cautious in undertaking extensive new aid commitments in the immediate future (Chinese aid commitments in 1966 do not appear to exceed substantially the level of 1965), it will undoubtedly continue to expend the resources necessary to maintain its economic presence in countries such as Mali, Tanzania, Guinea, Cambodia, and Nepal, where its policies have met with some success and where its economic investment already is substantial. It will also remain alert, and responsive, to the emergence of new radical regimes which look to China for support. Certainly the current level of annual Chinese expenditures under foreign aid, which amount to considerably less than one-tenth of 1 percent of its GNP, suggests no significant economic restraints on the program. Moreover, Peking is undoubtedly aware that any prolonged curtailment of economic aid would not only forfeit advantages already won and provide new opportunities for the expansion of Soviet influence in the less-developed world, but would also serve to tarnish its image as a model for economic and political development for other Afro-Asian nations.

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[14] *Ibid.*
[15] *Ibid.*, p. 19.

APPENDIX

COMMUNIST CHINA'S BALANCE OF PAYMENTS, 1950–65

BY

CENTRAL INTELLIGENCE AGENCY

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COMMUNIST CHINA'S BALANCE OF PAYMENTS, 1950–65

Summary

The wide swings in Communist China's economic fortunes since 1949 have been the major influence on the course of its international payments. During 1950–57 the rapid growth of the economy provided an upsurge in exports, which, supplemented by more than a billion dollars in long-term foreign aid and almost another billion in remittances from overseas Chinese, helped China meet its expanded requirements for foreign machinery and raw materials. In contrast, the Leap Forward debacle (1958–60) caused imports quickly to outpace exports, resulting in a sharp rise in short-term foreign indebtedness and a decline in China's international reserves. The country's difficulties in meeting its international obligations during 1958–62 were compounded by the growing Sino-Soviet dispute and by agricultural failures, which led to the purchase of about 6 million tons [1] of Free World wheat annually beginning in 1961. The deterioration of China's international payments position nevertheless was almost halted in 1961–62, largely by virtue of a deep slash in imports from Communist countries [2] and by new infusions of foreign credit.

By 1963, China's international financial position began to improve, as the gradual recovery of the economy brought a revival of exports and the Chinese leadership continued to restrict purchases of machinery and raw materials from both the U.S.S.R. and the West. By the end of 1964, gold and hard-currency reserves stood at $400 million, and China's clearing deficits with the U.S.S.R. and Eastern Europe had been almost eliminated. Moreover, by generating a large export surplus with the U.S.S.R. each year, the Chinese were able by 1965 to finish repaying their billion-dollar debt to the U.S.S.R.

Since 1963, when China's Free World trade surpassed its trade with Communist countries for the first time since 1950, the Chinese increasingly have turned to the West for credit to help finance heavy imports of grain and growing purchases of capital equipment, fertilizer, and other goods. So far, China has sought only short-term and medium-term (up to 5-year) credits. Such credit has given little relief to China's hard-currency payments position, however, because the large outflow of repayments due each year has almost offset new drawings. If the Chinese leaders continue to rely on medium-term credits, repayments are likely to surpass new drawings in the next few years. It is possible, therefor, that they may seek long-term credits from the West to finance imports of additional plant and equipment needed

[1] Tonnages are given in metric tons.

[2] The term "Communist countries" as used in this report includes the U.S.S.R., the Eastern European Communist countries (Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Rumania), Cuba (since 1960), Yugoslavia (unless otherwise indicated), and the Far Eastern Communist countries (Mongolia, North Korea, and North Vietnam). The term "Soviet Bloc" includes the U.S.S.R. and the Eastern European Communist countries.

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to accelerate their industrial development. (For data on the direction and balance of China's foreign trade, 1950–64, see table 1, and for China's international payments and receipts during this period, see fig. 1.)

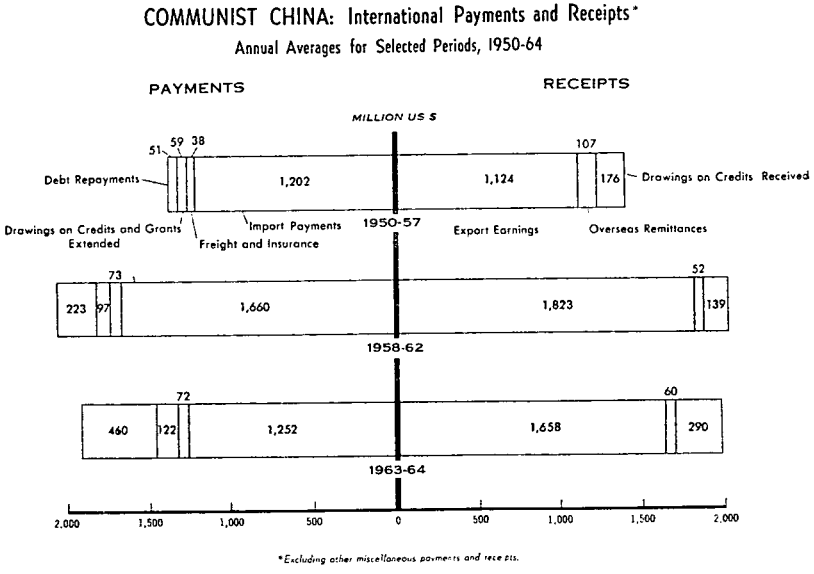
TABLE 1.—*Communist China: Direction and balance of foreign trade,*[1] *annual averages for selected periods, 1950–64*

[In millions of U.S. dollars]

Period	Annual averages			Trade surplus (+) or deficit (−)
	Total	Imports	Exports	
	With the Free World			
1950–57	778	402	376	−26
1958–62	1,268	669	599	−70
1963–64	1,732	842	890	+48
	With the Communist countries			
1950–57	1,548	799	749	−50
1958–62	2,215	991	1,224	+233
1963–64	1,178	410	768	+358
	Total			
1950–57	2,326	1,202	1,124	−78
1958–62	3,483	1,660	1,823	+163
1963–64	2,910	1,252	1,658	+406

[1] Trade data are presented on a balance-of-payments basis as derived in table 8, p. 642, below.

Figure 1



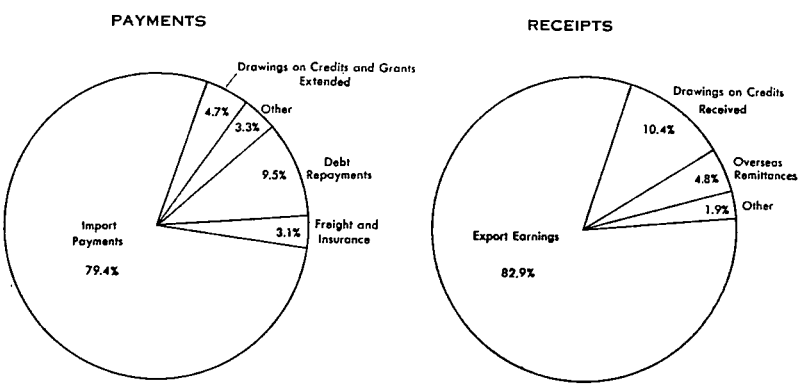
I. Changes in China's Balance of Payments

The balance of payments is a standardized accounting statement which summarizes a country's foreign economic transactions and discloses changes in patterns of financing trade, in currency holdings, in foreign debt, and in other indicators of a country's international financial position. During 1950–65, China's balance of payments underwent dramatic changes which reflected shifts in the country's internal economic fortunes and the impact of its deteriorating political relations with the U.S.S.R. and Communist Eastern Europe.

To pay for its imports, as well as to accumulate a small foreign exchange reserve and to support a foreign aid program, China has relied on commodity exports, foreign credits, and overseas remittances. It derives very little from the sale of gold or services or from interest (see fig. 2). Exports have been by far the dominant source of international receipts, accounting for roughly four-fifths of total receipts each year during 1950–65. Foreign credits have provided an important supplement to export earnings. In the early 1950's, long-term credits from the U.S.S.R. supplied the essential capital for China's rapid industrialization. Since early 1961, however, the country's growing estrangement from the U.S.S.R. and its urgent requirements for Western grain have caused the Chinese to turn to the West, rather than to the Communist countries, for credit. Western credits, however, have been almost exclusively of a short-term character. The third important source of international receipts, remittances from overseas Chinese to their relatives on the mainland, brought in an average of more than $80 million each year during 1950–64 to finance an import surplus in China's Free World trade.

Figure 2

COMMUNIST CHINA: Percentage Distribution of International Payments and Receipts
1950-64



A. Strengthening of China's International Payments Position, 1950–57

During its first 8 years under Communist rule (1950–57), China strengthened its international financial position by accumulating substantial foreign exchange reserves (see table 2). Starting with almost

no international financial resources in 1950, the country built up its foreign exchange reserves to about $645 million by the end of 1957.[3] This task was accomplished with the help of long-term credits from the U.S.S.R. but at the same time China was rapidly expanding imports and launching a foreign aid program.

TABLE 2.—*Communist China: Summary of the balance of payments,[1] totals for 1950–57, 1958–62, and 1963–64*

[In millions of U.S. dollars]

	Free World		Communist countries	
	Credit	Debit	Credit	Debit
	1950–57			
Current account (net)	*415*			*630*
Merchandise trade balance		215		405
Freight and insurance		225		75
Overseas remittances	855			
Other transactions (net)				150
Capital and monetary gold (net)	*195*		*270*	
Credits and grants extended:				
Net drawings		25		445
Credits received:				
Drawings			1,405	
Repayments				405
Transfer of Soviet-owned assets				330
Expropriation of convertible currencies	250			
Other transactions (net)		30	45	
Errors and omissions (net)[2]		*610*	*360*	
	1958–62			
Current account (net)		*595*	*1,010*	
Merchandise trade balance		350	1,165	
Freight and insurance		290		75
Overseas remittances	260			
Other transactions (net)		15		80
Capital and monetary gold (net)		*60*		*855*
Credits and grants extended:				
Net drawings		55		405
Credits received:				
Drawings	330		365	
Repayments		210		905
Other transactions (net)		125	90	
Errors and omissions (net)[3]	*455*			*155*
	1963–64			
Current account (net)	*30*		*745*	
Merchandise trade balance	95		715	
Freight and insurance		160	15	
Overseas remittances	120			
Other transactions (net)		25	15	
Capital and monetary gold (net)	*0*			*595*
Credits and grants extended:				
Net drawings		45		190
Credits received:				
Drawings	580			
Repayments		490		430
Other transactions (net)		45	25	
Errors and omissions (net)[3]		*30*		*160*

[1] Data are rounded to the nearest $5,000,000.
[2] This transfer was financed by Soviet credits (see app. B, item 9(*b*), p. 658 below).
[3] Assumed to be changes in foreign currency balances (Free World) and clearing balances (Communist countries).

[3] Changes in hard-currency holdings are assumed to account for almost all of the item "Errors and omissions (net)" in China's balance of payments with the Free World.

Possibly one-half of its foreign exchange (currency and gold) reserves were accumulated by expropriating private holdings and by monetizing the small amount of domestically produced gold. The remaining increment to the reserves represented net earnings on transactions with other countries. Altogether, foreign currency and gold reserves increased by $645 million. Partly offsetting the increase in these items was a clearing indebtedness with Communist countries (especially the U.S.S.R.) amounting to about $360 million,[4] so that China's net international financial resources were about $285 million at the end of 1957 (see table 3).

TABLE 3.—*Communist China: International financial resources,[1] year-end balances, 1957 and 1959–64*

[In millions of U.S. dollars]

	1957 [2]	1959	1960	1961	1962	1963	1964
Foreign exchange reserves	645	530	415	355	320	335	400
Foreign currency balances [3]	610	450	300	215	155	145	185
Monetary gold holdings [4]	35	80	115	140	165	190	215
Clearing account balances (with Communist countries) [5]	−360	−435	−625	[6] −260	−205	−120	−55
Net international financial resources	285	95	−210	[6] 95	115	215	345

[1] Data are rounded to nearest $5,000,000.
[2] Because foreign exchange reserves were negligible at the beginning of 1950, reserves at the end of 1957 represent the net changes during 1950–57.
[3] Net balance of errors and omissions (from China's balance of payments with the Free World), which are assumed to be almost entirely changes in foreign currency balances arising from transactions with the Free World.
[4] Net balance of changes in holdings of monetary gold.
[5] Net balance of errors and omissions (from China's balance of payments with the Communist countries), which are assumed to be almost entirely clearing account balances arising from transactions with Communist countries.
[6] The reduction in the clearing debt in 1961 and the consequent improvement in China's clearing and foreign exchange position are due almost entirely to the U.S.S.R.'s funding of China's clearing debt of $320,000,000.

During this period, merchandise imports—largely capital goods—increased by about 14 percent annually, from more than $550 million in 1950 to nearly $1.4 billion in 1957, and averaged about $1.2 billion a year.[5] Even considering the low level of trade in 1950, this increase was an achievement surpassing the rate of import expansion of most of the less developed countries of the free world. Current imports could have been even greater had China not used some of its export resources to provide long-term economic assistance to other countries. From the beginning of the aid program in 1954 to the end of 1957, China provided, mostly to other Communist countries, about $475 million in both goods and foreign currency—a total volume of credits and grants which compares favorably with that provided by all but the two leading industrial powers of the world.

Three factors were largely responsible for this strengthening of China's international payments position. Foremost was the regime's tight control of the economy, including a system of strict and highly effective trade and foreign exchange controls. Its pervasive control of economic activity enabled the leadership to channel domestic goods to export and to allocate export earnings to the purchase of capital

[4] Changes in clearing account balances are assumed to account for almost all of the errors and omissions (net) in China's balance of payments with Communist countries.
[5] Unless otherwise indicated, data in this report are presented in or derived from the global and regional tables of China's balance of payments in app. A (tables 5 through 7) and from the supporting tables in app. B (tables 8 through 22).

goods rather than to increased consumption. Thus between 1950 and 1957, imports of consumer goods grew from about $60 million to around $100 million, while imports of capital goods increased by 1½ times, from less than $500 million to $1.3 billion during the same period. At the same time, merchandise exports more than doubled, rising from $625 million in 1950 to about $1.6 million in 1957. Second, China obtained from the U.S.S.R. long-term credits totaling $1.4 billion. These credits were equivalent to 15 percent of China's total imports and about 30 percent of its imports from the U.S.S.R. during this period. Because of large repayments beginning in 1954, however, the outstanding debt to the U.S.S.R. at the end of 1957 was only $1 billion. Third, China absorbed foreign currencies from both domestic and external sources. Through such campaigns as the "three-anti" and "five-anti" movements,[6] China is estimated to have collected on the mainland $250 million of privately held foreign exchange. The country also received about $855 million in remittances from overseas Chinese, an amount which was more than sufficient to cover the deficit on the trade and shipping accounts with the free world over these 8 years.

B. DETERIORATION OF THE BALANCE OF PAYMENTS, 1958–62

The adoption of the Leap Forward in 1958 suddenly reversed the progress that China had made in strengthening its international payments position. The resulting deterioration of the balance of payments dissipated the achievements of the previous 8 years, as indicated in table 3.

From 1958 to mid-1960, China drew heavily on its foreign exchange and clearing resources to finance its growing import requirements. Under the Leap Forward banner the pursuit of the maximal growth in every sector of the economy, along with an almost complete lack of concern over imbalances in the rates of growth among economic sectors, stimulated a disproportionate demand for imports. Merchandise imports had grown at 7 percent a year—about half as fast as exports—during the First Five-Year Plan (1953–57) but now increased at a rate of 20 percent a year in 1958–59, outpacing the growth of exports. During the first half of 1960, moreover, imports probably grew even more rapidly than in 1959, while merchandise exports registered little or no growth. China continued to have export surpluses in 1958 and 1959, but in the first half of 1960 an import surplus appeared for the first time since 1955.

Primarily because of this widening gap between the growth of imports and exports during 1958–60, China's gold and hard-currency reserves declined by about $230 million. The rapid growth of imports from the U.S.S.R. caused China's clearing indebtedness to rise by $265 million. The decline in Western currency holdings was aggravated by the large volume of export resources earmarked for debt repayment to the U.S.S.R.

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[6] The "three-anti" (*san fan*) movement was directed against the "three evils" of corruption, waste, and bureaucracy among Government workers. The "five-anti" (*wu fan*) movement was directed against the capitalists, emphasizing the "five evils" of bribery of Government workers, tax evasion, theft of state property, cheating on Government contracts, and stealing economic information from Government sources.

The collapse of the Leap Forward movement in mid-1960 compelled China to take prompt and vigorous steps to contain the deterioration of its balance of payments. Disruption of both agricultural and industrial production had led to a sharp decline in exports. Agricultural exports, which in normal years accounted for at least half of total exports, were hardest hit. China's response was to slash imports, especially from the free world. Imports from this area in the second half of 1960 were reduced by nearly one-fourth in comparison with the first half; imports from Communist countries probably were reduced, although not as rapidly. Sales of silver were expanded from $2 million in the first half of 1960 to $20 million in the second half. These actions were not enough, however, to prevent a further reduction in foreign exchange reserves during the latter half of 1960, accompanied by a continuing rise in clearing indebtedness with Communist countries.

For the next 2 years, China continued to adjust its trade position to accommodate large imports of grain while endeavoring to prevent further deterioration in its international reserve position. Exports fell off in 1961 but were maintained at the 1961 level in 1962. Merchandise imports were ruthlessly cut in 1961 and again in 1962, resulting in export surpluses of $95 million in 1961 and $415 million in 1962. Large grain imports in these years were accompanied by a reduction of more than one-half in imports of all other commodities, which fell from $2 billion in 1960 to about $800 million in 1962—the lowest level since 1950.

Despite these adjustments in trade, China still needed foreign credits to supplement export earnings (see table 2). Nearly $330 million in short-term credits was obtained from the free world to help finance $630 million worth (f.o.b.) of grain imported during the 2 years 1961–62. Because repayments were largely scheduled within 9 to 18 months, China had paid off all but about $120 million of this indebtedness by the end of 1962.

The U.S.S.R. and the Eastern European Communist countries also provided credits to ease China's balance-of-payments distress. The U.S.S.R. extended a $46 million credit in 1961 to finance China's imports of about 500,000 tons of Cuban sugar on Soviet account. China also obtained a long-term credit of $320 million from the U.S.S.R. in 1961 to fund the bulk of its accumulated clearing debt. The $54 million of clearing indebtedness remaining at the end of 1960 was settled in 1961 through trade.[7] Some clearing indebtedness with the Eastern European Communist countries probably was funded or converted into long-term credits in 1961, but the amount of these credits is unknown.

To meet payments falling due in 1961 and 1962, China undertook extraordinary sales of precious metals. Sales of silver to free world countries were increased from $22 million in 1960 to more than $50 million in 1961 and $47 million in 1962.[8]

[7] See app. B, item 5 (b).
[8] By statistical convention, silver transactions are included in China's exports of goods. Gold transactions are itemized separately.

C. REVIVAL OF THE BALANCE OF PAYMENTS, 1963–65

Gradual recovery of the economy from the Leap Forward and its aftermath contributed to a small improvement in China's international financial position iin 1963–64. Fragmentary data indicate that this improvement continued through 1965. In 1963, for the first time since the initiation of the Leap Forward, China was able to finance its international obligations while neither drawing down its international reserves nor curtailing its imports.

A surprisingly rapid rise of 12 percent earnings from merchandise exports in 1964 enabled China to continue to expand imports and to replenish reserves as well as to reduce its international indebtedness by $200 million. Merchandise exports and imports both increased by roughly $200 million. International financial resources, mainly as a result of a decline in clearing balances, rose by $130 million to a total of $345 million at the end of 1964. Holdings of Western currencies alone increased by about $70 million in spite of sizable prepayments of grain credits.

During these 2 years, China retired almost all of its remaining debt with the Communist countries. The $425 million merchandise export surplus with the U.S.S.R. during 1963 and 1964 was sufficient to pay off all China's debt except $28 million in kind still due on a sugar credit. Similarly, by the end of 1964, China had almost completely liquidated its remaining debt of about $100 million with the Eastern European Communist countries. China's indebtedness with the Free World increased, because of continued heavy drawings on credits for grain and capital equipment, from $145 million in 1963 to $210 million in 1964. These drawings are net of repayments to the Free World amounting to $490 million during this period.

In spite of these improvements, China's international financial position at the end of 1964 remained extremely tight. Holdings of Western currencies and gold are estimated to have totaled about $400 million—a level substantially below that of 1957, when China's Free World trade was considerably smaller. In 1957, gold and hard-currency reserves were roughly equivalent to China's total merchandise imports from the Free World; in 1964, these reserves were equal to two-fifths of such imports.[9]

Incomplete trade data indicate that exports continued to expand in 1965, but not quite as rapidly as in 1964. Imports, on the other hand, apparently increased more rapidly than in 1964. This rise was made possible by the completion in 1964 of China's debt repayments to the U.S.S.R., thereby releasing some $170 million in export resources, and by China's apparent decision not to make prepayments on its Western grain credits in 1965. These two factors facilitated a continued expansion of imports from the Free World and the further replenishment of China's international reserves.

Indeed, the most noteworthy feature of China's payments position in 1965 was the increased use of export earnings to build up reserves. During 1965 its holdings of gold and convertible currencies probably rose by $100 million to $150 million. In 1965, moreover, Communist China made its first purchases of gold on the world market, which

[9] Despite provision in the trade agreements for settlement of its Soviet Bloc clearing imbalances with gold and convertible currencies, China probably has rarely used these resources in this manner.

amounted to $135 million and were paid for in sterling. This exchange of sterling for gold reflected not only the leadership's decision to diversify its international reserves, as a hedge against the possible devaluation of sterling, but also its more immediate concern over the deepening political and military crisis in southeast Asia. The Chinese nevertheless must have continued to hold some sterling balances overseas.

II. Financial Relations With Communist and Free World Areas

Communist China's financial relations with the Free World are conducted in a way much different from those with the Communist countries. Although generally preferring bilateralism in its trade with other countries, China is forced to finance most of its Free World trade on a multilateral basis with settlement in convertible currencies. Only a few of the less developed countries, especially those with payment difficulties such as Burma and Indonesia, have concluded agreements for bilateral clearing accounts with China.

In conrast, China's financial transactions with the Communist area are channeled almost entirely through bilateral clearing accounts. Although the agreements establishing the clearing accounts povide for settling any imbalance in trade by increased shipments of goods or by transfers of convertible currency or gold, the latter option appears to be seldom used. If standard Soviet practice is followed, then an adverse clearing balance is carried over to succeeding periods until the indebtedness has been cleared.

China has also entered into multilateral payments arrangements involving both Communist and Free World countries. In 1952, China, the U.S.S.R., and Finland entered into a trilateral trade and clearing arrangement. It proved to be unsatisfactory, however, and after 1 year China and Finland concluded a bilateral trade agreement. In addition, China and individual Communist countries have occasionally used Free World currencies to settle certain mutual trade and services transactions. For example, China used convertible currencies to purchase sizable quantities of steel products from Poland in 1956.

Communist China's deteriorating relations with the U.S.S.R. have reversed the regional direction of its trade and capital transactions and have affected balance-of-payments management as well. Early in the 1950's, when China and the U.S.S.R. were consolidating their mutual political and economic ties, China's trade with Communist countries rapidly expanded while trade with the free world declined. Thus by 1955 the Communist countries accounted for three-fourths of China's total trade.[10] Since 1955, however, Sino-Soviet ties have progressively weakened, and China has relied to an ever-greater degree on the free world as a source of essential imports. In addition, China's bid for a larger role in world affairs has led to its growing economic support for the less developed countries of the free world. As a result the share of the free world in China's trade increased from roughly one-fourth in 1955 to one-third in 1960.

The free world's role in Chinese trade grew especially rapidly after 1960 as a result of the widening of the Sino-Soviet rift follow-

[10] Trade data in this section vary somewhat from those used in tables 5 through 7 because the latter reflect balance-of-payments adjustments.

the withdrawal of Soviet technicians in midyear and the urgent need for grain to fill the gap left by a disastrous harvest. During 1961–64, trade with the Communist countries was more than halved while that with the free world increased about 50 percent. In 1963, for the first time since 1950, the free world accounted for more than half (55 percent) of China's trade. In 1964 the free world share was nearly two-thirds. This reorientation of trade relations led to a marked expansion in China's trade with Japan and Hong Kong. In 1963 and 1964, Sino-Japanese trade, which had been in the doldrums since the sudden deterioration in political relations in 1958, increased by nearly three times. Trade with Hong Kong, the primary market in the free world for Chinese exports, doubled during these 2 years. With the growing reorientation of its trade from the Soviet Bloc, where clearing credits were almost automatically extended to cover trade deficits, to the West, where each transaction generally requires settlement in foreign exchange, China's leadership must be cautious and astute in managing its slim holdings of Western currencies.

Similarly, Communist China's capital imports have been affected by the shift in its political relations with the Soviet Bloc. In 1961 the U.S.S.R., which had been China's only previous source of economic aid, assisted the Chinese by funding a large part of China's clearing indebtedness and by extending a small credit to China for the purchase of sugar. Several European Communist countries probably also funded China's clearing debts at this time. Since early 1961, no further aid has been extended to China by other Communist countries. Indeed, in 1961 China for the first time turned to the West for credits. Unlike the credits from Communist countries, however, those from the West have provided only short-term and medium-term financing (of up to 5 years' duration), most of which was 18 months' credit to cover a large part of China's huge annual grain purchases since 1961.[11] In 1963–64, China signed at least 13 contracts (valued at about $100 million) to purchase Western industrial installations, most of which have involved medium-term credit, but had not drawn against these credits by the end of 1964. Because of the relatively short term of all the Western credits received so far, new drawings are being offset largely by repayments. Unless the Chinese seek long-term Western credits—a quest that probably would be successful—this situation is likely to prevail over the next few years, and may worsen.

In contrast to the redirection of Chinese trade and of capital imports toward the Free World, China continues to channel its foreign aid chiefly to the Communist countries, especially those of Asia. Since the start of the foreign aid program in 1954, it is estimated that 60 percent of China's foreign aid has gone to North Korea and North Vietnam together and about 30 percent to other Communist countries; a little more than 10 percent has been channeled to Free World nations. The predominant role of the Communist countries in China's foreign aid program is likely to continue, inasmuch as these nations are the main areas in which China and the U.S.S.R. are competing for influence.

[11] Because these credits are considered normal commercial credits in world trade, the Chinese authorities have not designated them as "foreign debt."

III. Curtailment of External Indebtedness

A distinguishing feautre of Communist China's balance of payments has been the rapid reduction of external indebtedness. From 1950 to 1955, China received credits from the Soviet Bloc totaling almost $1.7 billion, including $1.4 billion in long-term Soviet credits and $300 million more in short-term clearing credits from the U.S.S.R. and the Eastern European Communist countries. China began in 1954 to repay these debts, as a result of which total external indebtedness at the end of 1955 amounted to just under $1.5 billion (see table 4). Over the next 5 years (1956–60), China's new borrowings from abroad shrank to about $360 million, comprising almost entirely an accumulation of clearing debts to the U.S.S.R. and the Eastern European Communist countries. Because, however, repayments (excluding interest) on the Soviet long-term credits were much greater than borrowings, China's total foreign indebtedness was reduced by about $290 million to less than $1.2 billion at the end of 1960. In effect, the clearing credits received during these years to a large extent enabled China to fulfill its debt repayment obligations to the U.S.S.R.. During 1961 (when it received its last credit from the U.S.S.R.) through 1964, China repaid about $890 million of its debts to the Soviet Bloc. Of the $910 million of short-term (up to 2 years) credits received from the Free World during these years, only some $210 million remained outstanding at the end of 1964. Consequently, China's total foreign indebtedness at that time had been reduced to just under $300 million. In 1965, China repaid the small remaining "sugar credit" of $28 million to the U.S.S.R., and its overall indebtedness to the West perhaps increased slightly.

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Table 4.—*Communist China: Net capital imports,*[1] *1950–64*

[Millions of U.S. dollars]

	1950–55	1956–57	1958–59	1960	1961	1962	1963	1964	Total, 1950–64
Credit drawings	1,370	35			[2] 490	205	285	295	2,680
Credit repayments	−200	−205	−280	−165	−175	−495	−490	−430	−2,440
Changes in clearing indebtedness [3]	300	60	75	190	−365	−55	−85	−65	55
Net capital imports	*1,470*	*−110*	*−205*	*25*	*−50*	*−345*	*−200*	*−200*	*295*

[1] Data are rounded to the nearest $5,000,000.
[2] Including the funded clearing debt of $320,000,000, which represents merely the conversion of a short-term debt into a long-term debt.
[3] Estimated on the assumption that these data account for almost all of the errors and omissions (net) in China's balance of payments with Communist countries and exclude clearing debts with the free world, which were relatively insignificant.

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IV. Prospects

In its earlier attempts to achieve rapid industrialization, Communist China depended heavily on imports of Soviet capital equipment, technical aid, and industrial materials, a sizable part of which the U.S.S.R. supplied on long-term credit. If the Chinese are to resume a rapid pace of industrial growth, they again will have to depend on imports.

This time, however, because of the deepening Sino-Soviet rift, it is unlikely that they will seek assistance from the U.S.S.R. Instead they will have to turn to the industrial West and Japan, where purchases must be paid for largely in hard currency. China's capacity to import capital plant needed for industrial development during 1966–70 therefore depends on (1) its capability to expand exports, especially to hard-currency areas; (2) its success in checking the drain of foreign exchange caused by large imports of grain; and (3) its willingness to seek sizable medium- and long-term credits in the Free World.

Although the Chinese will attempt to promote exports of new products, they probably will continue to rely largely on their traditional agricultural products to expand export earnings. During 1962–64, for example, their exports of nonagricultural products probably increased by no more than $50 million, while total merchandise exports grew by about $230 million. In 1964, agricultural products still accounted for more than a third of total exports. Even industry—notably the textile industry, which supplies roughly half of China's exports—depends in large part on agricultural raw materials. Thus China's balance of payments will remain inextricably linked to the fortunes of agriculture.

Substantial progress can hardly be made in correcting the imbalance between the food supply and the population in the short space of 5 years. Therefore, the prospects for expanding agricultural exports are, at best, uncertain. If food shortages become acute, the acreage devoted to production of crops for export and the number of animals slaughtered for food exports will shrink. The population will grow from 764 million at the beginning of the Third Five-Year Plan to approximately 853 million at the end. To help feed this huge mass of people, China must continue to import on the average at least 5 million tons of grain a year, at an annual cost of more than $300 million in hard currency. This sum is equal to approximately 30 percent of China's earnings (excluding credit drawings) from the Free World in 1964. Furthermore, unless the domestic agricultural sector is buttressed by imports of fertilizer and equipment for fertilizer plants, requirements for western grain may become much greater.

Short-term grain credits and medium-term industrial credits are expected to do little to relieve the pressure on China's hard-currency payments. In 1966, repayments should about equal and may even exceed new drawings. Even if the Chinese decide to expand medium-term industrial credits sharply, they would postpone for only a few years the time when repayments would surpass new drawings, and, after that, payments would rise sharply. More to China's advantage would be long-term credits which would defer repayments for 10 years or more.

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China, however, has not sought long-term credits from the Free World. The explanation may be that the leadership wants to depend as little as possible on foreign capital to finance economic development. Alternatively, practical concern over the long-term payment position, and especially over future requirements for Western grain, may be the overriding consideration. Should the Chinese reverse their

position and seek long-term credits, there is little doubt that Western European countries and possibly Japan, in competition with each other, would make such credits available.[12]

Communist China's nuclear development program and its recently stepped-up military construction activities related to the hostilities in Vietnam will continue to enjoy a higher priority than investment in industries that produce goods for export or export substitutes. Barring a sharp escalation of the Vietnamese conflict, however, China's resources are not expected to be so heavily committed as to seriously restrict the capacity to export or to absorb capital from abroad. For the time being at least, China's limited export capability and the need to spend a large part of limited hard-currency receipts to buy Free World grain seem to be more immediate constraints on industrialization.

[12] This paragraph has been edited for this reprinting.

APPENDIX A

BALANCE-OF-PAYMENTS TABLES

TABLE 5.—*Communist China: Balance of payments,*[1] *1950–64*

[In millions of U.S. dollars]

Item No.	Item	1950–57		1958–59		1960		1961		1962		1963		1964		Total, 1950–64	
		Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit
	Current account (net)		*180*	*265*			*50*	*90*		*440*		*445*		*380*		*1,390*	
1	Merchandise trade (valued f.o.b.)	8,995	9,615	4,120	3,780	1,945	1,980	1,525	1,430	1,525	1,110	1,560	1,140	1,755	1,365	21,425	20,420
2	Nonmonetary gold	35		45		35		25		25		25		25		215	
3	Freight and insurance on international shipments (net)		300		145		80		85		55		55		90		810
4	Interest payments		85		35		15		15		15		15		15		195
5	Other payments and receipts (net)		65		30		5	10		10		10		10		1,235	60
6	Overseas remittances	855		90		50		60		60		60		60			
	Capital and monetary gold (net)	*430*			*600*		*290*	*190*			*445*		*370*		*275*		*1,260*
7	Credits and grants extended:																
7.1	Drawings		475		170		80		105		130		130		115		1,205
7.2	Repayments (including interest)	5		10		5		5		5		5		5		40	
8	Credits received:							490		205		285		295		2,680	
8.1	Drawings	1,405			280		165		175		495		490		430		2,440
8.2	Repayments		405														330
9	Transfer of Soviet-owned assets		330														
10	Changes in clearing account balances with the Free World	15			15		15				5		15		5		40
12	Expropriation of convertible currencies	250														250	
13	Changes in holdings of monetary gold		35		45		35		25		25		25		25		215
	Errors and omission (net)		*250*	*235*		*340*			*280*	*5*			*75*		*105*		*130*

[1] This table is the summation of the area tables 6 and 7, except for item 2 and part of item 13, which are unallocated by area. Items 11.1 and 11.2 appear only in the area tables because they always are mutually offsetting entries. For methodology, see app. B. Data are rounded to the nearest $5,000,000.

TABLE 6.—*Communist China: Balance of payments with the Free World,* [1] *1950–64*

[In millions of U.S. dollars]

Item No.	Item	1950–57		1958–59		1960		1961		1962		1963		1964		Total, 1950–64	
		Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit
	Current account (net)	*415*			*105*		*90*		*180*		*20*	*10*		*20*		*50*	
1	Merchandise trade (valued f.o.b.)	3,005	3,220	1,225	1,315	610	695	555	715	605	620	740	715	1,040	970	7,780	8,250
3	Freight and insurance on international shipments (net)		225		105		55		75		55		65		95		675
4	Interest payments								5		10		10		15		40
6	Overseas remittances	855		90		50		60		60		60		60		1,235	
	Capital and monetary gold (net)	*195*			*55*		*60*	*95*			*40*		*20*	*20*		*155*	
7	Credits and grants extended:																
7.1	Drawings		30		30		10		10		15		20		25		140
7.2	Repayments (including interest)	5		10				(2)		(2)		(2)		(2)		15	
8	Credits received:																
8.1	Drawings							125		205		285		295		910	
8.2	Repayments										210		260		230		700
10	Changes in clearing account balances with the Free World (net)	15			15		15				5		15		5		40
11	Convertible currency transactions with Communist countries		45		20		35		20		15		10		15		160
12	Expropriation of convertible currencies	250														250	
13	Changes in holdings of monetary gold							(2)									
	Errors and omissions (net)		*610*	*160*		*150*		*85*		*60*		*10*			*40*		*185*

[1] Items listed under total balance of payments but not included here are not applicable. [2] Negligible.
Data are rounded to the nearest $5,000,000.

TABLE 7.—*Communist China: Balance of payments with Communist countries* [1] *1950–64*

[In millions of U.S. dollars]

Item No.	Item	1950–57		1958–59		1960		1961		1962		1963		1964		Total, 1950–64	
		Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit
	Current account (net)		*630*	*325*		*5*		*245*		*435*		*410*		*335*		*1,125*	
1	Merchandise trade (valued f.o.b.)	5,990	6,395	2,895	2,465	1,335	1,285	970	715	920	490	820	425	715	395	13,645	12,170
3	Freight and insurance on international shipments (net)		75		40		25		10		(2)	10		5			135
4	Interest payments		85		35		15		10		5		5		(2)		155
5	Other payments and receipts (net)		65		30		5	10		10		10		10			60
	Capital and monetary gold (net)	*270*			*400*		*195*	*120*			*380*		*325*		*270*		*1,180*
7	Credits and grants extended:																
7.1	Drawings		*445*		140		70		95		115		110		90		1,065
7.2	Repayments (including interest)					5		5		5		5		5		25	
8	Credits received:																
8.1	Drawings	1,405						365								1,770	
8.2	Repayments		405		280		165		175		285		230		200		1,740
9	Transfer of Soviet-owned assets		330														330
11	Convertible currency transactions with Communist countries	45		20		35		20		15		10		15		160	
	Errors and omissions (net)	*360*		*75*		*190*			*365*		*55*		*85*		*65*	*55*	

[1] Items listed under total balance of payments but not included here are not applicable. [2] Negligible.
Data are rounded to the nearest $5,000,000.

APPENDIX B

METHODOLOGY

Data from sources in Communist China have been used to the greatest extent possible in preparing the estimates of China's balance of payments. Because of the ambiguity or inadequate coverage of most of these data, information from non-Chinese sources has been extensively used to supplement the Chinese source material. Although a few specific figures in this report can be traced to a single source, in most instances the data shown have been computed on the basis of information derived from more than one source. For this reason, source references have been linked to this methodological appendix rather than to the tabulated estimates.

The methodology for each category of international transaction recorded in tables 5 through 7 is presented by region according to the item number in those tables. For example, the methodology for drawings on credits received from the free world and from the Communist countries will be found here under item 8.1(a) and item 8.1(b), respectively. In the case of merchandise trade (item 1), nonmonetary gold (item 2), convertible currency transactions with Communist countries (item 11), and changes in holdings of monetary gold (item 13) the methodology is explained on a global rather than a regional basis.

Item 1. *Merchandise Trade*

Merchandise trade includes all commodity exports and imports, valued on an f.o.b. basis. For balance-of-payments purposes, several adjustments must be made in the foreign trade data, which are reported by the Chinese for 1950–58 and are derived from trading partner statistics for 1959–64. It is believed that China records its foreign trade to show the country of destination and origin rather than the country of payment and receipt and, furthermore, that its imports from the free world are valued on a c.i.f. basis. Therefore, two adjustments have been made in the Chinese foreign trade reports: the first, to place China's merchandise trade with the free world on an f.o.b. basis, and the second, to represent China's trade by country of payment and receipt. This latter adjustment was made because reexports of Chinese goods by the Eastern European Communist countries averaged $30 million a year between 1953 and 1961. In addition, the following merchandise transactions probably were excluded from official trade data: the food packages that overseas Chinese in Hong Kong sent to China by parcel post; the aid goods that China provided Hungary in 1957; and the Cuban sugar that China shipped to the U.S.S.R. in 1964 in part payment of the 1960 sugar credit. Such transactions have been added to the estimate of trade as shown in table 8.

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TABLE 8.—*Communist China: Direction of foreign trade: A balance-of-payments view*[1] *1950–64*

[In millions of U.S. dollars]

	1950–57		1958–59		196		1961		1962		1963		1964	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
With the Free World	3,445	3,205	1,420	1,275	745	625	775	560	660	605	770	740	1,065	1,040
Adjustments:														
Shipping costs on imports from the Free World	−225	-------	−105	-------	−55	-------	−75	-------	−55	-------	−65	-------	−95	-------
Food shipments by overseas Chinese[2]	-------	-------	-------	-------	5	-------	15	-------	15	-------	10	-------	-------	-------
Reexports by the Eastern European Communist countries to the Free World	-------	−200	-------	−50	-------	−15	-------	−5	-------	-------	-------	-------	-------	-------
Total merchandise trade (f.o.b.) with the Free World	*3,220*	*3,005*	*1,315*	*1,225*	*695*	*610*	*715*	*555*	*620*	*605*	*715*	*740*	*970*	*1,040*
With the Communist countries	6,395	5,775	2,465	2,845	1,285	1,320	715	965	490	920	425	820	395	695
Adjustments:														
Unrecorded trade	-------	[3] 25	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	[4] 20
Reexports by the Eastern European Communist countries to the Free World	-------	190	-------	50	-------	15	-------	5	-------	-------	-------	-------	-------	-------
Total merchandise trade (f.o.b.) with the Communist countries	*6,395*	*5,990*	*2,465*	*2,895*	*1,285*	*1,335*	*715*	*970*	*490*	*920*	*425*	*820*	*395*	*715*
Total merchandise trade (f.o.b.)	9,615	8,995	3,780	4,120	1,980	1,945	1,430	1,525	1,110	1,525	1,140	1,560	1,365	1,755

[1] As reported by the Chinese or as estimated on the basis of data of the trading partners. Unless otherwise indicated, data are from tables 11 through 20. Data are rounded to the nearest $5,000,000.

[2] See item 6.

[3] China provided aid totaling $50,000,000 of which $25,000,000 was in foreign currency and the remaining $25,000,000 presumably in goods. However, an examination of Hungary's trade data for 1957 indicates that these aid goods had been excluded from the trade statistics.

[4] Cuban sugar shipped to the U.S.S.R. in party payment of the 1960 sugar credit and clearly not included in trade as reported by the U.S.S.R.

The estimates of Communist China's foreign trade for 1950–58 are based on Chinese official data on foreign trade and the trade data of China's trading partners. Because China in recent years has suspended the publication of all trade data, estimates of its foreign trade after 1958 have been derived exclusively from the information of its trading partners. China's foreign trade in 1950–58 as derived from the data of its trading partners approximated the comparable Chinese data for this period; thus the estimate of China's trade for 1959–64 based on trading partners' data can be meaningfully compared with the combined data of the earlier period.

In a unique report published in 1959, Communist China gave the yuan value of total trade for each of the years 1950–58. Apart from this information, the Chinese have released only fragmentary trade reports generally expressed in percentage terms. These data, together with data reported by China's trading partners, permit the calculation of the yuan value of China's trade with Communist and free world countries. The resulting estimates for 1950–58 are presented in table 9.

TABLE 9.—*Communist China: Direction of foreign trade in yuan, 1950–58* [1]

[In millions of yuan]

Year	Total trade [2]	Free World	Communist countries			
			Total	U.S.S.R.	Eastern European	Far Eastern
1950	4,150	[3] 2,760	[3] 1,390	[4] 1,282	[4] 83	[4] 25
1951	5,950	[3] 2,059	[3] 3,891	[5] 2,996	[5] 814	[5] 81
1952	6,460	[3] 1,208	[3] 5,252	[5] 3,857	[5] 1,279	[5] 116
1953	8,090	[3] 1,853	[3] 6,237	[5] 4,659	[5] 1,370	[5] 208
1954	8,470	[6] 1,533	[7] 6,937	[8] 5,082	[8] 1,483	[9] 372
1955	10,980	[6] 1,965	[7] 9,015	[10] 6,807	[8] 1,744	[9] 464
1956	10,870	[11] 2,685	[11] 8,185	[11] 5,837	[11] 1,870	[11] 478
1957	10,450	[6] 2,747	[12] 7,703	[13] 5,183	[6] 1,992	[9] 528
1958	12,870	[9] 3,483	[6] 9,387	[9] 6,060	[6] 2,683	[9] 644

[1] Data are taken or derived from Chinese data, which apparently exclude Yugoslavia from the grouping "Socialist countries" in reporting the direction of Chinese trade.
[2] See source reference 1, app. C, p. 660.
[3] See source reference 2, p. 660.
[4] See source reference 3, p. 660.
[5] Trade with each Communist partner is assumed to be in the same proportion to the total trade with Communist countries as reported in source reference 4, p. 660.
[6] Residual.
[7] See source reference 5, p. 660.
[8] Assumed to be 60 percent.
[9] Estimated, based on data of the trading partners.
[10] See source reference 6, p. 660.
[11] See source reference 7, p. 660.
[12] See source reference 8, p. 660.
[13] See source reference 9, p. 660.

Conversion of the yuan values of China's trade for 1950–58 into U.S. dollars has been made on the basis of the following exchange rates: US$1 equals 4 yuan in trade with Communist countries and, in trade with the free world, US$1 equals 3.2 yuan in 1950, 2.24 yuan in 1951, 2.1 yuan in 1952, and 2.5 yuan in 1953–58. This dual exchange rate system, such as that between China's free world and Communist trade, is not reported by China but is derived from a comparison of the yuan values of trade as reported by China with the ruble and dollar values of trade as reported by or estimated from the trade data of China's trading partners. China's reason for establishing this

system is not certain. Such factors as the greater stability of prices and the different commodity mix in trade with Communist countries compared with free world trade, however, could justify a lower value of the yuan in the Communist trade. The dollar value of China's trade is presented in table 10.

TABLE 10.—*Communist China: Direction of foreign trade in dollars,*[1] *1950–58*

[Million U.S. dollars]

Year	Total trade	Free World	Communist countries			
			Total [2]	U.S.S.R.	Eastern European [2]	Far Eastern
1950	1,210	860	350	320	20	5
1951	1,890	920	975	750	205	20
1952	1,890	575	1,315	965	320	30
1953	2,300	740	1,560	1,165	340	50
1954	2,345	615	1,735	12,70	370	95
1955	3,040	785	2,255	1,700	435	115
1956	3,120	1,065	2,055	1,460	475	120
1957	3,025	1,090	1,935	1,295	505	130
1958	3,740	1,385	2,355	1,515	680	160

[1] Data are rounded to the nearest $5,000,000. Because of rounding, components may not add to the totals shown.
[2] Including trade with Yugoslavia.

Although China has reported exports and imports as shares of total trade (valued in yuan) for each year during 1950–58, the calculation of the dollar value of exports and imports from these data is frustrated by the existence of the dual exchange rate. Consequently, the import-export breakdown of the Chinese data on total trade in dollars has been derived from the import-export data of China's trading partners. These calculations are noted and explained in tables 11 through 15 and the results are summarized in table 16.

TABLE 11.—*Derivation of Chinese Communist trade with the Free World,*[1] *1950–58*

[In millions of U.S. dollars]

Year	Trade reported by China	Trade reported by trading partners [2]	Difference [3]	Unrecorded imports [4]	Imports reported by trading partners	Derived trade	
						Imports [5]	Exports
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1950	860	850	10	10	440	450	410
1951	920	760	160	160	445	605	315
1952	575	520	55	55	250	305	270
1953	740	605	135	55	280	370	370
1954	615	570	45	45	275	320	295
1955	785	745	40	40	320	360	425
1956	1,065	955	110	40	410	475	590
1957	1,090	1,070	20	20	545	560	530
1958	[6]	1,385	[6]	[6]	[6]	[7] 725	660

[1] Excluding trade with Yugoslavia. Data are rounded to the nearest $5,000,000.
[2] Adjusted for time leads and lags in shipping, shipping costs, and double counting.
[3] Col. 1 less col. 2.
[4] The difference between col. 1 and col. 2 is assumed to represent goods circumventing Free World trade controls and other unrecorded imports. In 1953 and 1956, however, the difference appears to be excessively large and has been reduced to the level of the preceding year. The remaining difference in these 2 years has been allocated to derived imports and exports.
[5] Unless otherwise indicated, the sum of unrecorded imports and imports reported by trading partners (see footnote 4).
[6] Not available.
[7] Estimated.

TABLE 12.—*Derivation of Chinese Communist trade with the U.S.S.R.,[1] 1950–58*

[U.S. dollars in millions]

Year	Trade reported by China (1)	Trade reported by the U.S.S.R. (2)	Trade reported by China as a percent of trade reported by the U.S.S.R.[2] (3)	Soviet imports from China (4)	Derived trade	
					Imports[3] (5)	Exports[4] (6)
1950[5]	$320	$575	(5)	$190	$135	$190
1951	750	810	92.6	330	445	305
1952	965	960	99.5	415	550	415
1953	1,165	1,170	99.6	475	690	475
1954	1,270	1,340	94.8	580	720	550
1955[5]	1,700	1,390	(5)	645	1,055	645
1956	1,460	1,495	97.7	765	715	745
1957	1,295	1,280	101.2	740	545	750
1958[6]	----------	1,515	----------	880	635	880

[1] Assuming that the ratio of exports to imports in the trade data reported by the trading partners is the same as in the trade data reported by China. Value data are rounded to the nearest $5,000,000.
[2] Unless otherwise indicated, col. 1 divided by col. 2.
[3] Unless otherwise indicated, col. 6 subtracted from col. 1.
[4] Unless otherwise indicated, col. 3 multiplied by col. 4.
[5] The wide discrepancies between Chinese and Soviet reports of Sino-Soviet trade in 1950 and 1955 suggest major differences in precedures for recording trade. Because these procedures are more likely to have varied in the reporting of Chinese imports from the U.S.S.R. (especially aid goods for the Korean war and goods for the joint-stock companies) than in the reporting of Chinese exports, the data on China's exports are assumed to be identical in value to Soviet-recorded imports from China and China's imports are calculated as the residual of total trade reported by China and exports.
[6] Imports and exports as reported by the U.S.S.R.

TABLE 13.—*Derivation of Chinese Communist trade with the Eastern European Communist countries,[1] 1950–58*

[In millions of U.S. dollars]

Year	Trade reported by China (1)	Trade reported by trading partners (2)	Reexports of Chinese goods by the Eastern European Communist countries[2] (3)	Exports to China as reported by trading partners (4)	Derived trade	
					Imports (5)	Exports[3] (6)
1950	20	----------	----------	----------	[4] 5	[4] 15
1951	205	----------	----------	----------	[5] 65	[5] 140
1952	320	----------	----------	----------	[5] 155	[5] 165
1953	340	370	30	190	190	150
1954	370	430	60	240	240	130
1955	435	465	30	235	235	200
1956	465	500	35	265	265	200
1957	500	535	35	275	275	225
1958	670	700	30	410	410	260

[1] Including Albania and excluding Yugoslavia. Some of the difference between the values of trade as reported by China and as reported by the Eastern European Communist countries probably results from seasonal movements in trade and timelags in the recording of this trade; however, the bulk of the difference is accounted for by those Chinese products which are reexported by the Eastern European Communist countries without ever physically entering Eastern Europe. Such Chinese exports move directly from China to some Western port, whence they were dispatched to the Free World purchaser. These exports are assumed to be recorded by China as exports to the Free World and by the Eastern European Communist countries as imports from China and exports to the Free World. For balance-of-payments purposes, these reexports have been included in China's trade with the Eastern European Communist countries and excluded from China's trade with the Free World (see table 8). Data are rounded to the nearest $5,000,000.
[2] Col. 1 subtracted from col. 2.
[3] Col. 5 subtracted from col. 1.
[4] Derived from Chinese data which indicate an export surplus of about $10,000,000. See source reference 10, p. 660.
[5] A probable timelag between China's placement of orders for Eastern European machinery—the major import from the Eastern European Communist countries—and their import by China would have resulted in a large trade surplus in 1951 estimated at $75,000,000 and a much smaller surplus in 1952 of some $10,000,000.

TABLE 14.—*Derivation of Chinese Communist trade with the Far Eastern Communist countries, 1950–58*

[In millions of U.S. dollars]

Year	Total trade [1] [2]	Exports on credit or grant basis	Commercial trade (excluding credits and grants)	Derived trade [3]	
				Imports [3]	Exports [4]
1950	5	[5] 3	[5] 2	0	5
1951	20	[5] 14	[5] 6	5	15
1952	30	[5] 21	[5] 9	5	25
1953	50	[5] 35	[5] 15	10	40
1954	95	[6] 75	[7] 20	10	85
1955	115	[6] 97	[7] 18	10	105
1956	120	[6] 82	[7] 38	20	100
1957	130	[6] 48	[7] 82	40	90
1958	160	[6] 58	[7] 102	50	110

[1] From table 10, p. —.
[2] Data are rounded to the nearest $5,000,000.
[3] Half of the value of commercial trade, on the assumption that commercial trade has been balanced each year.
[4] Total trade less imports.
[5] During 1950–54, as China restored and expanded its economy, commercial trade probably increased rapidly, although it amounted to a relatively small percentage of the aid goods which China provided to North Korea for its war with South Korea and to Vietminh forces in Vietnam. Thus, commercial trade during 1950–53 is assumed to amount to about 30 percent of total trade. Exports on credit or grant basis are the residual of total trade less commercial trade.
[6] Based on announced credit extensions and drawings and related data.
[7] Total trade less exports on credit or grant basis.

TABLE 15.—*Communist China: Trade with Yugoslavia,[1] 1956–58*

[In millions of U.S. dollars]

Year	Imports	Exports
1956	5	5
1957	5	5
1958	5	0

[1] From Yugoslav trade data, adjusted for time leads and lags in shipping and for shipping costs. Chinese trade with Yugoslavia during 1950–55 was negligible. Data are rounded to the nearest $5,000,000.

TABLE 16.—*Communist China: Direction of foreign trade[1] 1950–64*

[In millions of U.S. dollars]

Year	Total		Free World		Communist countries	
	Imports	Exports	Imports	Exports	Imports	Exports
1950	590	620	450	410	140	210
1951	1,120	775	605	315	515	465
1952	1,015	875	305	270	710	605
1953	1,260	1,035	370	370	890	670
1954	1,290	1,060	320	295	970	765
1955	1,660	1,375	360	425	1,300	950
1956	1,480	1,635	475	590	1,005	1,045
1957	1,425	1,595	560	530	865	1,065
1958	1,825	1,910	725	660	1,100	1,250
1959	2,060	2,210	695	615	1,365	1,595
1960	2,030	1,945	745	625	1,285	1,320
1961	1,490	1,525	775	560	715	965
1962	1,150	1,525	660	605	490	920
1963	1,195	1,560	770	740	425	820
1964	1,460	1,735	1,065	1,040	395	695

[1] Data are derived from tables 11–15 and 17–20. Trade with Yugoslavia for 1950–58 has been subtracted from China's trade with the Free World and added to China's trade with Communist countries. Data are rounded to the nearest $5,000,000.

Estimates of China's trade for 1959–64 are based on the trade data of China's trading partners. To reflect the value of trade as China would report it, the trade data of free world countries have been adjusted for (*a*) time leads and lags in shipping, (*b*) shipping costs,

(*c*) double counting, and (*d*) unrecorded transactions. On the other hand, only a few adjustments have been required in the trade data of Communist countries because (*a*) the Communist countries present their trade data on an f.o.b. basis, (*b*) reexports of Chinese products by the Communist countries to the free world almost completely disappeared during this period, (*c*) no shipping time adjustment is required for much of Sino-Soviet trade (that going by rail), and (*d*) data are insufficient to calculate the shipping time adjustments for the remaining share of Chinese trade with the European Communist countries. Also, the Far Eastern Communist countries have only irregularly reported their trade with China. Trade with these countries has been estimated from miscellaneous data on total and commodity trade and credit extensions and drawings. The estimates of the dollar value of China's trade for 1959–64 are summarized in table 16 and are derived in tables 17 through 20.

TABLE 17.—*Derivation of Chinese Communist trade with the Free World,*[1] *1959-64*

[In millions of U.S. dollars]

Year	Trade reported by trading partners	Shipping leads and lags [2]	Double counting [3]	Unrecorded trade [4]	Shipping costs [5]	Derived net trade
Imports						
1959	670	7	−36		54	694
1960	656	52	−23	2	57	745
1961	664	32	−16	24	73	777
1962	598	16	−14	5	55	661
1963	737	−26	−11	9	64	772
1964 (preliminary)	961	−13	−8	32	95	1,067
Exports						
1959	701	28	−63		−53	613
1960	774	−30	−70		−49	625
1961	652	4	−64	15	−47	560
1962	785	−70	−75	10	−44	607
1963	859	16	−91	5	−52	738
1964 (preliminary)	1,151	46	−91	5	−71	1,039

[1] Because of rounding, components may not add to the totals shown.

[2] Adjusted to account for the time difference between China and Free World countries in recording a specific trade transaction. For countries of Western Europe, Latin America, and Western Africa, exports during the 12 months ending Oct. 31 in each year and imports during the 12 months ending Feb. 28 in the following year represent Chinese imports and exports, respectively, for the calendar year. Similarly, for all other countries except Japan, Hong Kong, Macao, and Taiwan, for which no adjustments are made, exports during the 12 months ending Nov. 30 in each year and imports during the 12 months ending Jan. 31 in the following year represent Chinese imports and exports, respectively.

[3] Adjusted to avoid duplicating reexports recorded as trade with China both by the reexporter (mainly Hong Kong) and the country of origin or of final destination. Reexports by Hong Kong of Chinese goods are estimated by comparing Hong Kong's exports to Free World countries with these countries' reported imports from Hong Kong. Reexports by Hong Kong of Western goods to China are reported by Hong Kong.

[4] Adjusted to account for Chinese purchases of Free World commodities for direct delivery to other countries that were reported by the Free World exporter as an export to a country other than China, including Free World grain shipped to Albania, East Germany, and Ceylon, and Mexican wheat and cotton shipped to China but shown as an export by Mexico to Switzerland.

[5] In using the trade statistics of China's Free World trading partners to arrive at China's exports on an f.o.b. basis and imports on a c.i.f. basis comparable with the trade data for 1950–58, a deduction must be made for the shipping costs included in the Free World's value of imports from China, and an addition must be made for the shipping costs which are excluded by the Free World from its value of exports to China. Shipping costs on Free World exports are calculated as a constant percentage of the reported export value: 10 percent for exports of Western Europe, Latin America, and Western Africa (where the average voyage time to China is between 1 and 2 months) and 5 percent for all other countries. For Free World imports, the percentages are 15 percent for Western Europe, Latin America, and Western Africa and 5 percent for all other countries with the exception of Hong Kong, Macao, and Taiwan. Because the recent large purchases of grain have significantly affected the average shipping cost percentages since 1961, shipping costs now are calculated separately for China's grain imports by applying average freight rates (for grain shipments to China) to the volume of grain imports; and the shipping costs of the remaining value of trade are calculated on the basis of the above-stated shipping cost percentages.

TABLE 18.—*Communist China—Trade with the Soviet Bloc and Yugoslavia,*[1] *1959–64*

[In millions of U.S. dollars]

Year	U.S.S.R.		Eastern European Communist countries [2]		Yugoslavia	
	Imports	Exports	Imports	Exports	Imports	Exports
1959	955	1,100	325	329	1	3
1960	817	848	339	301	1	1
1961	367	551	165	158	----------	(3)
1962	233	516	78	148	(3)	(3)
1963	187	413	71	157	----------	(3)
1964	135	314	86	148	(3)	(3)

[1] Compiled from trade statistics of the trading partners.
[2] Including Albania. The value of exports in 1959, 1960, and 1961 has been reduced by the value of reexports to the Free World estimated at $20,000,000, $15,000,000, and $5,000,000, respectively. Reexports are believed to have been negligible since then. (For methodology, see table 13.)

TABLE 19.—*Communist China: Trade with the Far Eastern Communist countries,*[1] *1959–64*

[In millions of U.S. dollars]

Year	Imports	Exports
1959	83	161
1960	96	159
1961	93	164
1962	88	174
1963	96	167
1964	92	135

[1] Based on miscellaneous and incomplete trade data of the Far Eastern Communist countries and information on the extension and implementation of Chinese credits and grants. In the absence of clearing account data, commercial trade is assumed to have been balanced between exports and imports. China's aid deliveries were largely estimated on the assumption of a straight-line drawing of credits and grants.

TABLE 20.—*Communist China: Trade with Cuba, 1960–64* [1]

[In millions of U.S. dollars]

Year	Imports	Exports
1960	32	10
1961	92	90
1962	89	82
1963	73	83
1964	81	99

[1] Compiled from Chinese and Cuban sources (*see* source reference 11, p. 660) but excluding shipping costs (which the Cuban sources apparently included), which are estimated at 10 percent of the value of imports. Cuban trade with China for 1959 is included in the trade of the Free World with China.

Item 2. *Nonmonetary Gold*

In accordance with conventional balance-of-payments procedures, gold reserves of China's monetary authorities are treated as if they are foreign assets, whereas gold held by the nonmonetary sector is treated as a domestic asset, similar to merchandise. Consequently, domestic purchases of gold by the monetary authorities are included in the balance of payments as a credit to "nonmonetary gold" and a debit to "changes in holdings of monetary gold"—that is, changes in gold reserves. Since the domestic transactions between the monetary authorities and the rest of the economy are mutually offsetting, the net balance of the two items—nonmonetary gold and gold reserves—reflects solely international gold transactions.

Because the amount of domestically produced gold which is consumed by domestic industries is believed to be relatively small, the entire annual increment in gold production is counted as a purchase of nonmonetary gold and an addition to gold reserves. The value of gold production is based on the relatively few Chinese reports on the country's gold industry in conjunction with gold production data of the 1920's and 1930's. Because the Chinese Communists appeared to give as little attention to the gold industry from 1950 to 1956 as the Chinese Nationalists gave in the 1930's, gold production during these two periods is assumed to have been similar in magnitude. The total value of gold production during 1950–56 is therefore estimated at $24 million. No production figures were announced in 1957. In 1958, however, China reported that gold production was double that of 1957. [Reference 12, C.]* Gold production in 1958, considering the failure of the nonferrous metals industry to achieve most of its production goals, is estimated to have been equal to the combined goals (16 tons) announced for only 12 of the 17 gold-producing provinces in China. Thus the value of gold production in 1957 and in 1958 would total $9 million and $18 million, respectively. China's increasing interest since 1957 in raising the output of gold and its success in doubling output in 1958 suggest that by 1960 it could have reached the peak level of gold output of the 1920's. On this basis the value of gold production in 1959 and 1960 is estimated at $27 million and $35 million, respectively. Because the collapse of the Leap Forward movement curtailed production in almost all fields, annual gold production in the 4 years that followed probably was lower than the $35 million produced in 1960 and, accordingly, is estimated at $25 million annually for 1961–64.

Item 3(a). *Freight and Insurance on International Shipments (Free World)*

Estimates of China's payments for freight and insurance on international shipments are based on the assumption that all the goods in its free world trade are transported in free world vessels and that the purchaser pays the cost of the transportation either directly or indirectly. China has practicallly no oceangoing fleet and must use free world ships and the ships of other Communist countries. It is assumed that China's ruble payments to vessels of other Communist countries transporting imports from the free world are roughly equivalent to its free world currency payments to free world vessels transporting goods from the Eastern European Communist countries. Because of the high costs of land transport across the U.S.S.R., only a limited amount of China's free world trade moves by land.

Freight and insurance costs are estimated by geographical area as a constant percentage of the value of China's imports from each area of the free world. For Western Europe, Western Africa, and North and South America, these shipping costs are estimated at 10 percent of the f.o.b. value of China's imports. For all other countries, shipping costs are estimated at 5 percent of the f.o.b. value. The results of this simplified method of estimated shipping costs when used for the 3-year period 1954–56 have been found to be

*Full-size figures enclosed in brackets occurring in text hereinafter refer to source references which are listed in app. C, p. 660.

roughly comparable to estimates derived from actual freight rates and trade data expressed in physical volume terms.

Item 3(b). *Freight and Insurance on International Shipments (Communist Countries)*

Because the U.S.S.R., North Korea, North Vietnam, and Mongolia have contiguous borders with China and because their exports are priced f.o.b. the border, shipping costs on imports from these countries are negligible insofar as the balance of payments is concerned. Although China incurs some shipping costs for ocean shipments from them, such costs probably are offset by earnings from these countries' goods transiting China. Thus the main shipping costs paid to other Communist countries are incurred in trade with the European Communist countries and, since 1960, with Cuba.

Shipping costs on Chinese imports from the European Communist countries are largely incurred on rail shipments across the U.S.S.R. The volume of these imports probably is a small part of total imports from these countries. The main imports—machinery and iron and steel products—generally are delivered by ship, a cheaper form of transportation in this case than rail shipment. These costs are estimated to have averaged $5 million a year from 1950 through 1952, $10 million a year from 1953 through 1956, approximately $20 million a year from 1957 through 1960, and about $5 million a year after 1960. In addition, until 1962, it is estimated that China's payments for freight costs on its seaborne imports from these countries probably were offset by earnings from the China-Polish Ship Brokers Co., Chipolbrok. Because of the sharp decline in China's trade with the European Communist countries since 1960, Chipolbrok's ships have increasingly participated in free world trade and therefore probably produced small (net) earnings to China during 1962–64, possibly as much as $5 to $10 million each year.

China's imports of sugar from Cuba have incurred relatively large freight payments. Because China has used free world ships almost exclusively, these payments have been in free world currencies. On the basis of average freight rates for sugar exports to China and the volume of sugar imported annually by China as reported in Cuban export statistics, these freight payments are estimated as follows:

Year	Volume [1] (metric tons)	Average freight rate [2] (U.S. dollars per metric tons)	Freight costs (million U.S. dollars)
1960	476,500	13.20	6.3
1961	1,032,100	16.10	16.6
1962	937,900	12.70	11.9
1963	500,900	13.70	6.9
1964	[3] 193,000	[3] 10.30	[3] 2.0
	368,400	15.50	6.0

[1] See source reference 13, p. 660.
[2] See source reference 14, p. 660.
[3] To the U.S.S.R. on Chinese account.

Because Chinese-chartered ships appear to have been used largely to carry Cuba's imports from China, it is estimated that China has received payments for shipping costs equivalent to 10 percent of the value of these imports, or $10 million a year from 1961 through 1964.

Item 4(a). *Interest Payments (Free World)*

Because of wide variations in payment terms, China's interest payments on its borrowings from the free world have been calculated for each contract. Western lenders have not revealed the interest rates on credits extended to the Chinese, but the Chinese probably paid much higher than the going money market rate but not as high as the long-term government bond yield for Canada and Australia—or an average annual interest rate of about 5 percent. [15] Interest probably is paid at the time the credit is drawn. Consequently, these interest costs are calculated by applying the above interest rate, in accordance with the payment terms of each contract, to the value of shipments reported by each exporting country. Refunds of interest, arising because of China's sizable advance payments in 1963 and 1964, have been deducted from these interest costs.

TABLE 21.—*Communist China—Calculation of interest payments to the free world, 1961–64*

Exporting country	Total drawings [1] (millions of U.S. dollars)	Average duration of credits (months)	Drawings [2] (on an annual) (millions of U.S. dollars)	Gross interest payments [3] (millions of U.S. dollars)	Less interest refund [4] (millions of U.S. dollars)	Net interest payments (millions of U.S. dollars)
1961:						
Australia	51	9.33	40			
Canada	56	9	42			
France	8	12	8			
West Germany	10	6	5			
Total	*125*		*95*	5	0	5
1962:						
Australia	55	9.33	49			
	7	10				
Canada	105	9	79			
France	17	12	32			
	10	18				
West Germany	12	6	6			
Total	*206*		*166*	8	(5)	8
1963:						
Australia	155	10	129			
Canada	56	12	80			
	16	18				
France	31	18	46			
Japan	9	24	27			
	18	6				
Total	*285*		*282*	14	2	12
Argentina	49	9	37			
Australia	107	10	89			
Canada	105	18	158			
France	24	18	36			
Japan	8	24	16			
Total	*293*		*336*	18	4	14

[1] From tables 23 and 24.
[2] The equivalent amount of drawings which could have been extended for 1 year rather than the given period. (The product of "total drawings" and "average duration of credits" divided by 12.)
[3] Calculated at an estimated average annual interest rate of 5 percent.
[4] The value of interest refunds is calculated on the assumption that prepayments were made on the average 6 months prior to maturity; that is, 2½ percent of the value of prepayments.
[5] Negligible.

Item 4(b). *Interest Payments (Communist Countries)*

For methodology and sources, see item 8.2(b).

Item 5(a). *Other Payments and Receipts (Free World)*

Other noncommercial payments and receipts, such as profits from foreign investments and travel income and expenditures, are assumed to be relatively small and essentially in balance. China's investments abroad have been largely concentrated in Hong Kong and in the ownership of a few branches of the Bank of China in other countries. In Hong Kong the Chinese Communists have owned or controlled about 14 banks since 1950, and they have increased their investments in other enterprises which now number between 30 and 40 retail stores and a few miscellaneous companies like the China Travel Service and the China Resources Co. Scant information suggests that investments and therefore earnings in all firms, including the banks, have been quite small compared with trade earnings from Hong Kong. One source speculates that profits—of which only a part accrue to the Chinese—of Communist-owned or controlled retail outlets in Hong Kong amounted to about $2 million in 1965. [16] Partly because China has consistently invited a large number of foreign diplomats and businessmen to visit the country at its expense, its foreign exchange outlays for travel and propaganda probably greatly exceed receipts and essentially offset investment income.

According to a *New York Times* article, China's investment income from Hong Kong has made substantial increases each year, from less than $400 million in 1963 to an expected $625 million in 1965. [17] By subtracting from this total the Chinese exports to Hong Kong and overseas remittances, the residual receipts (arbitrarily assumed to be largely investment income) can be calculated at about $50 million in 1963 and more than $100 million in 1964. But annual income of $100 million, even with a 25-percent return on investment, implies total investments of $400 million—an amount that appears to be greatly in excess of Chinese Communist investments in Hong Kong. It seems more likely that these residual receipts may in large part represent export earnings channeled from other countries through Hong Kong to China and that they may therefore already be included in the merchandise account.

Item 5(b). *Other Payments and Receipts (Communist Countries)*

An analysis of China's international accounts with the U.S.S.R. indicates that China during 1950–60 made sizable payments in addition to the specific payments which have been estimated on current and capital account. Although the U.S.S.R. in 1961 funded $320 million in Chinese clearing debts accumulated through 1960, this sum apparently did not cover China's cumulative clearing deficit with the U.S.S.R. which probably amounted to $374 million at the end of 1960. In 1961, China had a surplus of $240 million on current account, comprising an export surplus of $230 million (after excluding imports of sugar financed by long-term credits) and is estimated to have had $10 million of other, unspecified earnings. This was more than sufficient to cover the estimated debt repayment of $186 million due in 1961 and suggests that the difference—$54 million—was used to settle a clearing deficit carried over from 1960 in excess of the $320 million funded clearing debt. Although the additional earnings of $54 million could have been used to prepay its long-term indebtedness, China reportedly did not commence such prepayments until the

following year. Thus the total cumulative indebtedness on China's clearing account with the U.S.S.R. at the end of 1960 would have amounted to $374 million. Net cumulative payments to the U.S.S.R. would have been specifically estimated, however, total only $273 million, leaving $101 million unaccounted for. It is likely that this sum represented payments for technical assistance and other noncommercial payments rather than capital expenditures. The technical assistance payments would thus represent payments for the services of Soviet technicians other than those associated with specific Soviet-built industrial installations, which have been recorded in the merchandise account.

These unaccounted for payments probably fluctuated roughly in proportion to the volume of trade. Thus during 1950–57 these (net) payments would have increased rapidly from less than $5 million to $10 million a year. During the first 2 years of the Leap Forward, payments may have reached a peak of $15 million annually. The Soviet withdrawal of technicians in mid-1960 probably brought these payments to an end, so that for the whole year of 1960 payments are estimated to have totaled $6 million.

With a decline in payments to the U.S.S.R. as a result of the collapse of the Leap Forward and the intensification of the Sino-Soviet dispute, plus an increase in transit receipts from the U.S.S.R. associated with the expansion of Soviet trade with North Korea and North Vietnam, China's receipts from the U.S.S.R. probably exceeded payments from 1961 on. These additional receipts are estimated at a minimum of $40 million (prorated at $10 million annually) during 1961–64. As a result, China's total receipts from the U.S.S.R. during these 4 years are just sufficient to cover the repayments on its long-term debt to the U.S.S.R.

In the case of the Eastern European Communist countries (excluding Albania), almost all of the receipts and payments seem to have been accounted for. By the end of 1964, China's estimated payments to these countries exceeded receipts by less than $35 million. This estimate is consistent with China's claim that its foreign debt (apparently referring to the clearing and long-term debts with Communist countries) had been liquidated sometime in 1965 and with the few available statistics for trade between China and the Eastern European Communist countries in 1965, which show a small export surplus—$4 million compared with $10 million in 1964—with Poland after 9 months of 1965 and an import surplus with Hungary.

Item 6. *Overseas Remittances (Free World)*

Although remittances to China from Chinese residing in foreign lands are inadequately reported, these transfers probably are almost entirely channeled through Hong Kong. Hence the estimate of total overseas remittances that is derived from Hong Kong banking data, supplemented by reports of foreign exchange received in connection with unilateral transfers in kind (see table 22), is believed to cover practically all such transactions.

The value of remittances handled by Hong Kong banks is estimated on the basis of Bank of China remittance data reported for 1950–60. [18] Because the Bank of China is only one of many banks and agencies handling remittances in Hong Kong, these Bank of

TABLE 22.—*Communist China: Personal remittances from overseas Chinese, 1950–64*

[In millions of U.S. dollars]

Year	Remittances through the Bank of China in Hong Kong	Total currency remittances [1]	Other remittances	Total remittances from overseas Chinese
1950	44.4	133	----------	133
1951	48.4	145	----------	145
1952	49.5	148	----------	148
1953	35.9	108	----------	108
1954	33.3	100	----------	100
1955	30.7	92	----------	92
1956	25.4	76	----------	76
1957	18.1	54	----------	54
1958	17.3	52	----------	52
1959	12.1	36	----------	36
1960	15.8	47	[2] 5	52
1961 [2]	----------	47	15	62
1962 [2]	----------	47	15	62
1963 [2]	----------	52	10	62
1964 [2]	----------	62	----------	62

[1] Unless otherwise indicated, 3 times the value of remittances through the Bank of China in Hong Kong.
[2] Estimated.

China data have been increased by twofold to cover other remittances from Hong Kong to China. It is likely that currency remittances during 1961–62 remained at about the same level as in 1960 and increased during 1963–64 to the extent that remittances for food shipments fell.

Beginning in 1960, these traditional currency remittances were supplemented by remittances in the form of fertilizer and food shipments. In the case of fertilizer remittances, overseas Chinese have forwarded currency to the Bank of China in Hong Kong, which then arranged the delivery of fertilizer to the mainland recipient. The value of these remittances would be included in the above estimates. In the case of food shipments, which have followed a different pattern, the value of foreign currency earnings is not available. Consequently, foreign currency earnings from food shipments have been estimated on the basis of miscellaneous reports of customs and postage collections and food parcel purchases. These food shipments were mainly sent by parcel post and have not been recorded in Hong Kong's trade statistics.

Item 7.1(a). *Credits and Grants Extended: Drawings (Free World)*

Estimates of drawings by free world countries through 1960 are based on reported drawings and scattered references on the implementation of the Chinese aid program. For four countries—the United Arab Republic, Indonesia, Ceylon, and Nepal—annual drawings have been reported. In addition, the probable substantial drawings by Cambodia and Nepal during these years have been estimated by prorating the total value of aid extensions. For the years 1961–63, drawings have been calculated as the difference between the estimated value of total drawings for 1956–63 as a whole as reported by Alexander Eckstein [19] and the value of the estimated aid drawings for 1956–60. Annual drawings during this period and in 1964 are estimated to have risen gradually, reflecting the expansion of China's aid program and the slow recovery in the domestic economy.

Item 7.1(b). *Credits and Grants Extended: Drawings (Communist Countries)*

Drawings by Communist countries against Chinese credits through 1959 are fairly reliably estimated from data on actual aid expenditures; but since that year, estimates of the drawings have been derived from scattered references on aid and trade. China's budget reports gave total drawings by all countries during 1954–59. The value of drawings by Communist recipients was calculated by subtracting from this total the independently estimated drawings by free world countries. (See item 7.1(a).) The value of drawings since 1959 is the summation of estimates for each recipient Communist country, based on the reported value of credit extensions and related trade and aid data. Generally, annual drawings are assumed to have been equivalent to the value of the credit extension prorated over the effective period of the credit as announced. In the case of Cuba, China has agreed to fund the annual clearing credits. Thus drawings essentially represent the sum of China's export surplus with Cuba plus shipping costs.

Item 7.2(a). *Credits and Grants Extended: Repayments (Free World)*

Of credits extended by China to the free world, only Indonesia has reportedly made repayments to date. According to Indonesian's balance-of-payments data for 1958–62, a $1 million payment was made in 1961. [20] However, it would seem likely that this annual payment has continued since 1961. In addition, the funded trade deficit of 1956 required repayment over the next 3 years (1957–59). Although the balance-of-payments data do not show such a repayment, we have estimated an annual repayment of slightly more than $5 million during these years.

Item 7.2(b). *Credits and Grants Extended: Repayments (Communist Countries)*

Hungary is the only Communist country scheduled to have made repayments to China, and repayment terms have been reported for only one of the two credits that China extended to it in 1957. [21] On the assumption that the repayment terms of both credits are the same, Hungary would have been scheduled to make repayments in annual installments of $5 million during 1960–69. Because repayments of credits extended to Communist countries usually are not scheduled to begin until after drawings are completed, credit repayments from other Communist countries are not yet due.

Item 8.1(a). *Credits Received: Drawings (Free World)*

To finance many of its purchases of grain, fertilizer, and machinery following the collapse of the Leap Forward movement, China obtained from the free world special commercial credits with payment terms varying from 6 to 18 months in the case of grain and fertilizer and up to 5 years in the case of machinery and equipment. Although the free world has extended credits against some 13 complete plants sold to China during 1963–64, actual drawings (which are assumed to occur only when equipment is delivered) probably were negligible during these 2 years. The value of China's total drawings from the free world from 1961 to 1964 is estimated in tables 23 and 24.

TABLE 23.—*Communist China: Drawings and repayments on Free World grain credits, 1961–64*

[In millions of U.S. dollars]

Exporting country	Drawings [1]	Repayments [1]	Net drawings
1961:			
Australia	51	0	51
Canada	56	0	56
France	8	0	8
West Germany	10	0	10
Total	*125*	*0*	*125*
1962:			
Australia	62	75	−13
Canada	105	[2] 114	−9
France	27	8	19
West Germany	12	13	−1
Total	*206*	*210*	*−4*
1963:			
Australia	155	[3] 113	42
Canada	72	[4] 104	−32
France	31	27	4
West Germany	0	9	−9
Total	*258*	*253*	*5*
1964:			
Argentina	[5] 49	0	49
Australia	107	[6] 135	−28
Canada	105	[6] 61	44
France	24	24	0
Total	*285*	*220*	*65*

[1] Drawings and repayments are calculated by applying the stated credit terms per contract to the appropriate monthly or quarterly trade data of each exporting country.
[2] Including a prepayment of $28,000,000 due in 1963. [*See* source reference 22, p. 660.]
[3] Including estimated prepayments of $43,000,000 due in the 1st quarter of 1964, based on a report that China was paying its grain debts about 3 months in advance. [*See* source reference 23, p. 660.]
[4] Including estimated prepayments of $57,000,000 due in 1964–65, derived from a report that China owed $10,000,000 at the beginning of December 1963 and an estimate of additional drawings of $5,000,000 during December. [*See* source reference 24, p. 660.] In effect, China prepaid all credits maturing during 1964.
[5] *See* source reference 25, p. 660.
[6] Including estimated prepayments of $84,000,000 to Australia and $61,000,000 to Canada, representing payments due in 1965. This assumes that China continued to prepay in 1964 its Canadian credits maturing in 1965 (see footnote 4). In view of a report of substantial prepayments to Australia as of April 1964, it also has been assumed that China paid in 1964 its Australian credits maturing in 1965. [*See* reference 26, p. 660.]

TABLE 24.—*Communist China: Drawings and repayments on other Free World credits, 1963–64*

[In millions of U.S. dollars]

Commodity	Country of origin	Drawings		Repayments		Repayment after 1964
		1963	1964	1963	1964	
Steel products	Japan	[1] 4	[1] 6	----------	----------	[2] 10
Industrial machinery (other than textile machinery).	do	[1] 1	[1] 2	----------	----------	[2] 3
Consumer goods	do	[1] 4	----------	----------	----------	[2] 4
Fertilizer (urea)	do	[3] 18	----------	[3] 8	[3] 10	----------
Total		27	8	8	10	17

[1] See source reference 27, p. 660.
[2] Repayment terms are assumed to be the same (payment after 2 years) as those reported for the credits financing Japanese exports of steel products and industrial machinery in 1963. [*See* source reference 28, p. 660.]
[3] Japan exported $18,000,000 worth of urea on 180-day credit terms; but because less than half, or $8,000,000 worth, of the urea was exported in the 1st half of the year, $8,000,000 of this credit matured in 1963 and the remaining $10,000,000 in 1964. [*See* source reference 29, p. 660.]

Item 8.1(b). *Credits Received: Drawings (Communist Countries)*

The U.S.S.R. and some Eastern European Communist countries have provided credits to China. Those extended by Eastern Europe were clearing credits, funded in 1961, for which no value has been

reported. The total value of credits which China has received from the U.S.S.R. is estimated to amount to $1.8 billion. Although these credits are considered in this report as part of China's "foreign debt," China apparently differentiates between short-term and intermediate-term commercial credits on the one hand and long-term developmental credits on the other. Thus, when China speaks of its "foreign debt," it usually refers to the developmental credits received before 1961. In their controversy with the U.S.S.R. the Chinese refer to the so-called Korean war credits. China claims that the U.S.S.R. is now demanding repayment of what were originally stipulated as grants. A comparison of the respective credit information of China and the U.S.S.R. suggests that these credits may total as much as $500 million, [30] but, insofar as can be determined, the imports which they financed have been excluded from China's trade data. (China's revision of its trade data in the mid-1950's may reflect the expunging of the goods received under these grants from the trade data.) In view of the fairly complete budget and trade data for 1952–60, it is unlikely that other large credits exist over and above those reported.

Through 1960, China had received about $1,404 million in Soviet long-term developmental credits. Although the Chinese reported that the value of Soviet credits during 1950–57 totaled 5,294 million yuan [31] ($1,324 million at the exchange ratio of 1 yuan equals $0.25), it is likely that an additional credit of $80 million was extended sometime before 1952. [32] This is suggested by Chinese budget data, which showed what appeared to be a foreign loan repayment of this amount in 1952. Moreover, a comparison of total repayments with total credits received (as reported by the Chinese) suggests either that this credit should be included or that China paid unrealistically high interest charges. According to budget data, no credits were drawn during 1958–60.

In 1961, China obtained two special interest-free credits from the U.S.S.R. The first was a funding of a clearing debt of $320 million, repayable by the end of 1965. The second credit covered Chinese imports of sugar from the U.S.S.R. valued at nearly $46 million in the Soviet official trade statistics. The sugar loan was scheduled to be repaid in kind during 1964–67—100,000 tons ($9 million) a year in 1964 and 1965 and 150,000 tons ($14 million) a year in 1966 and 1967.

Item 8.2(a). *Credits Received: Repayments (Free World)*

Estimates of repayments are given in item 8.1(a).

Item 8.2(b). *Credits Received: Repayments (Communist Countries)*

The Chinese have reported the total value of their debt repayments to the Communist countries, including interest charges. Chou En-lai stated that, of China's total foreign debt (principal plus interest) amounting to $1,560 million, 99 percent had been repaid by the end of 1964 and the remaining $19 million was to be prepaid, apparently from the 1964 export surplus. [33] Other Chinese reports indicate that the interest-free funded clearing debt of 1961 had been paid in full by the end of 1964. The U.S.S.R. has reported receiving 163,000 tons of sugar in 1964 as partial repayment of the sugar loan of 1961. [34] It is likely that nearly 30,000 tons were also en route to the U.S.S.R. from Cuba on Chinese account, so that about $18 million

of the sugar loan—the equivalent of the first two scheduled annual payments—would have been repaid by the end of 1964. Thus debt repayments during 1950–64 total $1,898 million,[13] of which $1.742 million were payments against the principal.

This sum of debt repayments closely approximates the cumulative total of annual repayments derived from budget and trade data. Annual repayments for 1954–60 have been estimated previously on the basis of Chinese budget data. [35] For the earlier years, 1950, 1951, and 1953, repayments were assumed to have represented interest charges only and were calculated at about 1 percent of outstanding credits at the end of the preceding year plus one-half percent of drawings during the year. The value of the repayment in 1952 was calculated at $84 million—$4 million in interest in addition to the budgeted $80 million on repayment. [36] Interest payments during 1950–54 are calculated to have been about 1 percent of outstanding credits and, beginning in 1955, about 2 percent of outstanding credits (excluding the interest-free credits received in 1961). Thus total interest payments during 1950–64 amounted to $156 million. The debt repayment for 1961 was assumed to have been slightly greater than in 1960, in line with the gradual increase in repayments in the preceding 5 years. But for the following years, when prepayments became commonplace, debt repayments probably rose sharply in value and were in fact equal to China's export surplus with the U.S.S.R. plus other net receipts. The value of the debt repayment in 1964—$200 million—is calculated as the difference between the reported total of debt repayments—$1,898 million—and the cumulative total of the estimated annual repayments through 1963—$1,698 million.

Item 9(b). *Transfer of Soviet-Owned Assets in China (Communist Countries)*

In 1955 the U.S.S.R. transferred to China its assets in the Port Arthur-Dairen area and in the Sino-Soviet joint stock companies and provided a credit, probably of equal value, to facilitate China's payment for them. The value of this credit, and therefore of China's purchases of foreign-owned assets, has been derived from China's reported total credit drawings for 1955 [37] less the estimated value of drawings against other Soviet credits. The value of these other drawings in 1955 is calculated at $85 million on the following assumptions: (1) these drawings were against the $130 million Soviet credit extended in October 1954, (2) the 1954 credit was fully drawn during 1954–57, (3) drawings for the final 2 or 3 months of 1954 amounted to $10 million, and (4) the total reported credit drawings of $35 million in 1956 and 1957 [38] represented drawings under the 1954 Soviet credit. Inasmuch as credit drawings, according to budget data, totaled about $415 million in 1955, the value of China's purchases of Soviet-owned assets (by subtraction) amounted to $330 million.

Item 10(a). *Changes in Clearing Account Balances With the Free World*

Estimates of changes in clearing account balances are based on balance-of-payments data of Ceylon, Indonesia, and Burma and on

[13] Because the $19 million prepayment of the foreign debt scheduled for 1965 came from the 1964 export surplus, it has been considered as a payment in 1964.

miscellaneous trade and financial data of the several other countries having clearing arrangements with China. Because many of these latter countries—notably the United Arab Republic, Finland, Iraq, and Syria—have continuously run an export or an import surplus over many years, it is likely that these accounts are regularly settled with foreign exchange payments (or that some trade is carried on in addition to trade on the clearing account). On balance, it is believed that net changes in these clearing accounts each year are relatively small and essentially offsetting.

Item 11.1 (a) and (b). *Convertible Currency Transactions With Communist Countries*

Estimate of convertible currency payments by Communist China to other Communist countries have been derived largely from a Polish report of a Chinese convertible currency payment of about $10 million for Polish exports of iron and steel products to China in 1956 [39] and the Chinese credit extension to Hungary of $25 million in convertible currency. [40] On the basis of these reports, it appears that China may have paid Western currency in other years for a part of its imports from the European Communist countries. Accordingly, such payments are estimated at $10 million each year during 1957–60 and $5 million a year since then. In trade with Cuba, China has made large payments in Western currency. Freigh costs on its imports from Cuba are payable in convertible currency. These costs, essentially equal to freight costs on its sugar imports, are estimated in item 3(b). Furthermore, in 1960 China appears to have settled its import surplus with convertible currency.

Item 12. *Expropriation of Convertible Currencies*

For many years before the Communist revolution, the native population of China extensively used large quantities of Hong Kong dollars and other convertible currencies in preference to the inflated domestic currency. The Communist authorities tried to sop up this foreign exchange to supplement the extremely limited exchange earnings in the early 1950's. Because China inherited practically no foreign exchange reserves and yet ran a deficit of some $100 million during 1950–51, it is estimated that China may have collected during these years as much as $150 million in foreign currencies from the private sector not only to finance this payments deficit but also to accumulate a necessary working balance of foreign exchange. Additional foreign currencies privately held probably were raised over the next several years, especially during the course of the *wu fan* movement of 1952. Total expropriations from 1950–57 are estimated at $250 million.

Item 13. *Changes in Holdings of Monetary Gold*

For an explanation of the balance-of-payments concept and an estimate of the amount of gold purchased from the domestic sector, see item 2.

China apparently has monetized its gold production except for a negligible amount consumed domestically or exported. Although gold exports to the U.S.S.R. have been suggested as means of debt settlement, the only firm report of the export of gold is the sale in 1961 of about $1 million of gold to the United Kingdom. In 1965, China purchased about $135 million worth of gold [41]; for the implications of this gold buying, see the text.

APPENDIX C

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    thousand and not $1,200 thousand as implied in this article).

DEVELOPMENT OF TRANSPORTATION IN COMMUNIST CHINA*

By Victor D. Lippit

Ambitious aspirations for railway development in China had long antecedents prior to the establishment of Communist rule in 1949. During the First World War, Sun Yat-sent presented a program calling for the construction of 100,000 miles of railroads.[1] A quarter of a century later, in 1943, Chang Kia-ngau, Kuomintang Minister of Communications, presented a 10-year plan for railroad construction.[2] He called for 14,000 miles of railroads to be built within 10 years following the end of the war. The new lines he envisioned were to be added to a total of 12,036 miles of railroad which had been built by 1942. Of this meager existing mileage, "3,726 miles were lost through the Japanese invasion of Manchuria in 1931, and 6,566 miles were lost or destroyed during the first 5½ years of the Sino-Japanese war." [3] While lines lost but not destroyed could presumably be utilized after the war, the scope of his program, as can be seen from comparison with the existing mileage, was considerably beyond what China could hope to achieve with her own resources. Like Sun Yat-sen before him, Chang Kia-ngau hoped that massive conversion of Western war industries to the production of construction goods would provide the material inputs to make his program feasible. A plan based on the expectation of a beneficence the West has yet to display to the underdeveloped world was of course foredoomed to failure.

If we compare Mr. Chang's 14,300 miles of projected construction with the 4,115 miles of principal trunk lines[4] built by the People's Republic of China between 1950 and 1958, some very interesting results emerge. The fourth column in table 1 indicates whether the railway, or one covering substantially the same route, had been anticipated by the Kuomintang railroad minister.

Of the mileage actually laid in the 1950–58 period, some 80 percent was included in Mr. Chang's projection. The unplanned routes were almost exclusively very short ones, including the two forest routes, a short line in Chekiang and two short lines to provide for heavier traffic flow around Peking. The only long distance line Mr. Chang had not envisioned in its entirety was the Yingtan-Amoy line, the first railroad in Fukien province. This he had planned as far south as Nanping, heading east from there to Foochow, rather than south to Amoy, as the Communists built it. As Amoy is on the coast

* Reprinted from *The China Quarterly*, July–September 1966.)

[1] Chang Kia-ngau, *China's Struggle for Railroad Development* (New York: John Day, 1943), p. 46.
[2] *Ibid.*, pp. 297–305.
[3] *Ibid.*, pp. 299–300.
[4] The total length of track laid on all new lines, excluding special purpose lines, was 4,668 miles between 1950 and 1958: see table 2.

TABLE 1.—*Principal new railways (1950–58)*

Name of railway	Length [5] (miles)	Date opened to traffic	Planned or unplanned
Laipin-Munankuan (Kwangsi)	260	October 1951	Planned.
Chengtu-Chungking (Szechuan)	314	July 1952	Planned.
Tienshui-Lanchow (Kansu)	220	October 1952	Planned.
Litang (Kwangsi)-Chankiang (Kwangtung).	196	July 1955	Planned.
Fengtai (Peking)-Shacheng (Hopei).	63	July 1955	Unplanned.
Chining-Erhlien (Inner Mongolia).	209	December 1955	Planned.
Hsiaoshan-Chuanshan (Chekiang).	87	April 1956	Unplanned.
Paochi (Shensi)-Chengtu (Szechuan).	416	July 1956	Planned.
Yingtan (Kiangsi)-Amoy (Fukien).	455	April 1957	Partly planned.
Paotow (Inner Mongolia)-Lanchow (Kansu).	616	August 1958	Planned.
Nanping-Foochow (Fukien)	104	December 1958	Planned.
Tuyun-Kweiyang (Kweichow)	91	December 1958	Planned.
Greater Kkingan Mountains Forest Railway.	160	1957 (partly completed).	Unplanned.
Lesser Khingan Mountains Forest Railway.	71	1957 (partly completed).	Unplanned.
Huaijou (Peking)-Chengteh (Hopei).	66	1958 (partly completed).	Unplanned.
Lanchow (Kansu)-Sinkiang Friendship Line.	715	October 1958 (up to Kizil Ulson).	Planned.
Neikiang (Szechuan)-Kunming (Yunnan).	72	October 1958 (Neikiang-Ipin section).	Planned.
Total	4, 115		

Sources: (1) *Ten Great Years* p. 70; (2) Chang Kia-ngau *China's Struggle for Railroad Development*, pp. 301–305.

directly opposite Formosa, defense considerations, which he could not have been expected to envision, played an important part in determining the route.[6] The line was built by the People's Liberation Army. Subsequently, an eastward line linking Nanping with Foochow was also built.

In view of the strong parallels between Kuomintang planning and Communist execution, we need not dwell on the role of ideology in determining the major outlines of China's transportation network. The Communists filled in important gaps in the existing network, facilitating the development of regional specialization and interregional trade. At the same time they built lines which radiated out from the existing network in order to contribute to the growth of foreign trade or to exploit natural resources. Such lines are the

[5] In order to maintain consistency of measurement units all of the mileage figures in the tables as well as some in the text, have been converted from kilometers at the rate of 1 kilometer = 0.62137 mile. The totals have been computed from the mileage conversions.

[6] Through provision of hinterland communications should ultimately spur the development of Amoy's excellent natural harbor.

Lanchow-Sinkiang Railway reaching out through the northwest toward the Soviet Union, the Tsining-Ehrlien line to Outer Mongolia and the Soviet Union and the line from Litang to the new planned port of Chankiang in the far south. This pattern of development was intended to bring the entire nation into the development process. One new aspect of transport development under the new regime, besides the speed and efficiency with which it was carried out, is its incorporation in a comprehensive scheme to develop the western reaches of the country.

In general, China's goals for development of communications facilities and location of industry parallel closely those of the Soviet Union.[7] The account given in *China's Socialist Industrialisation* by Tseng Wen-ching sheds some light on modern Chinese development strategy. He presents the following six principles:

1. Bring industry close to the source of raw materials and markets to cut unnecessary transportation costs.
2. Develop more rapidly the backward regions of the country: to lessen historical inequality.
3. Develop a balance between regional division of labor and complete development of the economy of each region. Consumer goods, food products, fuel and building materials should be developed locally to reduce long shipments.
4. Dispersion of industry and the creation of new cities is part of the program to eliminate the distinction between city and village.
5. Industry should be scattered in areas which are not too vulnerable to attack.
6. Industrial location should take into account economic ties with other Socialist countries.[8]

While both China and Russia stressed the development of their vast underdeveloped regions, in China this emphasis was placed at the core of development strategy. The distribution of productive resources in Kuominatang China was extremely unbalanced.

> According to the data from an examination of the 20 most important cities as published in 1947 by the Ministry of the Economy of the Kuomintang government, 50 percent of the enterprises of the country and the workers employed at enterprises were in Shanghai; in Tientisin there was 9 percent of the enterprises and 8 percent of the workers; in Tsingtao and Kwangchow there were 3 percent of the enterprises and workers. In these four coastal cities together was concentrated 70 percent of the total number of enterprises and 69 percent of the workers.[9]

In 1952 maldistribution still prevailed. Li Fu-chun, Vice Premier and Chairman of the State Planning Commission, said that in 1952 more than 70 percent of China's industrial output was produced in the coastal Provinces.[10] The desire to correct this geographic imbalance often conflicted with another important goal: maximization of the rate of growth. For example, a 4 million yuan investment in expansion of the Hsin Cheng Instruments and Meters factory in Shanghai, as of

[7] See Holland Hunter, *Soviet Transportation Policy* (Cambridge, Mass.: Harvard University Press, 1957), pp. 21–38.
[8] Tseng Wen-ching, *China's Socialist Industrialisation* (Peking: People's Publishing House, 1958), reprinted in *Joint Publications Research Service* (*JPRS*), No. 3800, p. 137.
[9] *Ibid.*, pp. 134–135.
[10] Li Fu-chun, *Report on the First Five-Year Plan for Development of the National Economy of the People's Republic of China in 1953–57* (Peking: Foreign Languages Press, 1955), p. 50.

1956, could be completed in a year and enable the factory to produce an additional 500,000 instruments and meters of all types. The construction of a comparable factory in the interior to produce 1 million instruments and meters would cost 40 million yuan and take 3 years to complete.[11]

To meet the problem created by such conflicting goals, the Chinese have adopted a development strategy which calls for the strengthening of existing industrial bases along the coast to support the development of new bases further in the interior. The latter will subsequently support the development of northwest and southwest China. For example, two new huge-scale iron and steel complexes were planned for Paotow in Inner Mongolia and Hwangshih, near Wuhan, along the Yangtze. But it was estimated that under the best conditions a period of 10 years would be required from the early mineral survey work until the plants came on stream.[12] The subsequent years of crop failure and, more significantly, the Russian withdrawal of aid have lengthened the period required for full utilization of the new integrated facilities, but to wait even 10 years for a major increase in iron and steel output would be obviously unsatisfactory in terms of the capital construction needs of the country. Morever, the construction of new bases in the interior and the improvement or construction of supporting transportation facilities both require an increase in the output of construction or railroad materials.[13] Meanwhile the older producers enjoy the advantages of technical experience and trained manpower, transport and power facilities, various services, vertical integration with raw material-supplying or end-product-using industries and the direct support of existing cities. In this context China relied primarily on the Ansham works in Manchuria to meet her iron and steel needs during the 1950's, as part of the general strategy to strike a balance between investment in new and old facilities, using the increased output stemming from the latter to support the former. Tseng Wen-ching presents the strategy in these terms:

> The most important aspect of both the First and Second Five-Year Plans has been the emphasis on the development of industry in the interior regions. . . . During the First Five-Year Plan the existing industrial bases of the eastern regions were utilized for the construction of new industrial bases in the central regions. During this period the basic construction was conducted in such cities of the center as Wuhan, Paotow, Chang-chou, Lo-yang, Sian, and Lanchow. The industrial construction in the central part of the country and also the preparations in the western part of the country will create the conditions for the further movement to the west in order to develop its rich natural resources. During the Second Five-Year Plan we will build industrial bases in the central regions of the country; also we will begin the construction of industrial bases and some industrial enterprises in the southwest, the northwest, and in the area of Sinkiang.[14]

Despite frequent conflict, there are also numerous instances in which the goals of geographic dispersion and maximization of the growth rate are harmonious. The concentration of the textile industry in Kiangsu Province[15] provides a striking example. While the province

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[11] Li Fu-chun, *Report to the Third Session of the First National People's Congress*, June 18, 1956. Reported in U.S. *Current Background (CB)* (Hong Kong: U.S. Consulate General), No. 393.

[12] Both plants began production in 1960, but the departure of Russian technicians and blueprints at this critical juncture has evidently resulted in a large loss of potential production over the past 5 years.

[13] Approximately 30,000 tons of steel rail and rolled steel together with great quantities of lumber and other raw materials are needed to build 100 miles of new railway: *Jen-min Jih-pao (People's Daily)*, May 12, 1964. Translation in *JPRS*, No. 25062.

[14] Tseng Weh-ching, pp. 144–145.

[15] Within the province Shanghai was overwhelmingly predominant.

produced only 19.8 percent of the country's cotton output, it contained 61.4 percent of the production capacity of the textile industry.[16] The large cotton-producing areas of southern Hopei, central Shensi, and northern Honan had little processing industry development and cotton from these areas had to be shipped in enormous quantities to Shanghai, Tientsin, and Tsingtao for processing. Cotton cloth then had to be shipped back to these areas.[17]

Although the lack of cost and output data makes it difficult to judge whether the timing of the expansion into the northwest was sound, the development of productive facilities there to complement its mineral wealth may satisfy both dispersion and growth rate development objectives from a longrun perspective. The northwest covers one-third of China's territory and is rich in mineral resources, notably oil, but as of the late 1950's accounted for only 5 percent of China's industrial output.[18] The emphasis on development of this area has enabled China to achieve self-sufficiency in oil production, of crucial importance to the speed of the overall development program at a time when foreign exchange is sharply restricted by the diminution in trade with the Soviet Union and when there is a need to import food grains on a large scale.

The shift in industry away from the coastal areas is evident in the distribution of major industrial construction projects begun during the First Five-Year Plan period. Of the 694 above-norm [19] industrial construction projects which were begun between 1953 and 1957, 472 were distributed in the interior of the country and only 222 along the coastal regions.[20] The general development strategy of gradual western expansion is also well brought out by an examination of the allocation of railroad investment funds over the First Five-Year Plan period. The vast majority of the above-norm industrial projects begun in these years, including those in the interior, were of necessity located on existing rail lines in order to meet the transport needs of production and construction. This in turn required considerable investment in the reinforcement and renovation of the existing rail lines. Of the planned 5,671 million yuan investment in railway capital construction over the First Five-Year Plan, 32.7 percent was set aside for renovating and reinforcing existing lines, 21.5 percent for increasing the number of locomotives and rail cars, 41.7 percent for building new lines, and the rest as investment in designing and execution of work departments. As most of the locomotives and rail-cars to be produced in the 5 years were used to increase the traffic load on existing railways, over one-half of the railroad investment from 1953 to 1957 involved the strengthening of existing lines.[21]

This policy is reflected in the planned increase in railroad mileage. According to the Five-Year Plan, 2,538 miles of new line were to be constructed, but including railways to be restored, reconstructed, or double-tracked, extended station spurs, and industrial and other spe-

[16] Tseng Wen-ching, p. 135.
[17] *Ibid.*
[18] *Ibid.*, p. 136.
[19] Cost norms were set out for each investment category. The norms, for example, were 20 million yuan for integrated iron and steel works and 5 million yuan for the textile industry. The large-scale projects whose cost exceeded these norms formed the core of the development program, receiving priority in material allocation and state support.
[20] Li Fu-chun, *Report on the First Five-Year Plan*, p. 51.
[21] Teng Tai-yuan, Minister of Railways, speech to National People's Congrses, July 21, 1955: *CB*, (1956).

cial rail lines the total rail network was scheduled to increase by some 6,214 miles.[22] It was expected that most of the above-norm projects would be thrown into large-scale production around the 1959–60 period. Since most of these new projects were located along existing rail lines, it was anticipated that a great additional burden would be placed on these lines, which explains why over half the investment funds were devoted to improving and strengthening the old lines.

Still, as table 1 indicates, new lines were reaching out into as yet "unopened" parts of the country, and particularly into the northwest bringing new regions into the national market and opening them up for development. The longest line was built out into Sinkiang from Lanchow, and was ultimately expected to link up with the Soviet rail network; a line was planned from Lanchow to the Tsaidam Basin in western Tsinghai Province, which was expected to be developed as a major oil center; the Paochi-Chengtu line connected the northwest and the southwest by rail for the first time, and the extension of the Lunghai Railroad past Paochi to Lanchow helped fill in the network. To the south, Chengtu was connected with Neikiang and Chungking, giving Szechuan, the most populous and one of the richest provinces in China, its first railroad connections. In the southeast the Yingtan-Amoy line gave Fukien Province its first rail line and rail connections with Shanghai; further south lines extended from Litang to the new planned port of Chankiang and southwestward to Hanoi; a line from Neikiang to Kunming provided a second route connecting North Vietnam and China; a line was constructed north from Tsining in Inner Mongolia, providing connections with Outer Mongolia and the U.S.S.R.[23] Also, the new steel center of Inner Mongolia, Paotow, was linked with the new northwestern railway hub and manufacturing center, Lanchow. Other lines were planned for the south and southwest. Data on the length of railway tracks laid is provided in table 2.

While track mileage expanded rapidly in the 1950's, the proportional rate of increase of railroad freight turnover was much greater. In 1958 railroad freight turnover increased 4.7 times over the 1950 level, and passenger turnover increased 93 percent, while labor productivity increased 3.2 times.[24] This rapid increase reflects the intensive use of available equipment. Table 3 gives some of the more important indicators of efficiency improvement.

With the precipitous climb in railroad freight turnover during the 1950's, serious transportation bottlenecks began to appear at the end of the decade. The situation was exacerbated by the prodigious output increases of 1958 and early 1959. In 1955 when Li Fu-chun presented the outline of the First Five-Year Plan he announced that devoting 8.2 billion yuan, or 19.2 percent of the 42.7 billion yuan (planned) capital construction budget, to transport, posts and telecommunications was "* * * not large, but it can, in the main, satisfy the needs of the First

[22] In actuality, 3,020 miles of new lines were built and, excluding the narrow-gage forest railways, the overall figure comes to 5,792 miles. The figure exceeds 6,214 miles if the narrow-gage forest railways are included.

[23] Prior to the completion of this line in December 1955, China's only rail links with the Soviet rail network were through northern Manchuria: westward via the Harbin-Manchouli Railway and eastward via the Harbin-Suifenho Railway. The Tsining-Ehrlien Railway, cutting the rail distance between Peking and Moscow by more than 620 miles, has facilitated Sino-Soviet trade.

[24] *JPRS*, No. 3605, p. 56.

TABLE 2.—*Length of railway tracks laid (miles)*

Year	Trunk and branch lines					Special purpose lines
	Total	New lines	Restored lines	New double-track lines	Restored double-track lines	
1950	502	60	265	----------	176	107
1951	634	462	86	----------	87	115
1952	766	298	376	----------	92	147
1953	439	365	----------	9	65	307
1954	703	516	----------	30	157	176
1955	874	759	24	54	36	285
1956	1, 393	1, 086	177	128	2	538
1957	725	295	93	334	2	354
1958	1, 476	828	65	583	----------	738
Total	7, 512	4, 669	1, 086	1, 138	617	2, 767

NOTE.—Above does not include 2,734 miles of narrow-gage forest railway track.

Source: *Ten Great Years*, p. 69.

TABLE 3.—*Efficiency of locomotives and goods wagons*

	1949	*1952*	*1957*	*1958*
Average daily run per freight locomotive—miles	191. 8	246. 6	227. 4	243. 0
Average gross weight hauled per freight locomotive—tons	1, 011	1, 245	1, 520	1, 704
Average daily efficiency per freight locomotive—thousand ton-miles	183	270	296	373
Coal consumption per freight locomotive per thousand ton-miles—pounds	8. 94	69. 2	51. 8	52. 5
Average turnaround time per goods wagon—days	4. 39	2. 90	2. 84	2. 75
Average daily run per goods wagon—miles	96. 3	144. 8	155. 3	158. 8
Average load per goods wagon—tons	26. 6	28. 9	34. 7	37. 6
Average daily efficiency per goods wagon ton-miles	1, 559	2, 832	3, 728	4, 099

Source: *Ten Great Years*, p. 153.

Five-Year Plan period and the initial stage of the Second Five-Year Plan." [25] While his assessment appears essentially correct for the First Five-Year Plan period, despite constant pressure on the transport facilities, extensive piling up of goods waiting for transport did become a serious problem with the surge in output of 1958 associated with the initiation of the Great Leap Forward. Table 4 indicates the pickup in transportation investment following the severe pressure on facilities in 1958.

The strain on transport facilities was met in three ways. First, redoubled efforts were made to utilize existing facilities and equipment

[25] Li Fu-chun, *Report on the First Five-Year Plan*, p. 24.

still more intensively[26]; second, as can be seen from table 4, an increasing share of the capital construction budget was devoted to transport; third, technological improvement in local transport was stressed. The following description of transport innovation in a Peking municipality is indicative of the kind of activity that was appearing all over the nation.

TABLE 4.—*Transport investment in relation to total capital construction*

[Unit: billions of *yuan*]

	1st 5-year plan (1953–57)	1958	1959	1960 (planned)
Capital construction	49.3	21.4	26.7	32.5
Transport, posts and telecommunications	9.0	3.4	4.9	6.8
As percent of capital construction	19.5	15.9	18.3	21.0
Railroads	5.9	2.0	N.a.	5.0
As percent of capital construction	12.0	9.3	N.a.	15.4

NOTES

1. Posts and telecommunications regularly account for only a small portion; 4 percent, in 1960, for example, of the funds allocated to transport, posts and telecommunications.
2. The capital construction figures include only the capital formation supported by the Central Government budget. An additional 5,700,000,000 *yuan* is estimated to have been invested in the 1st 5-year plan period, 5,300,000,000 *yuan* in 1958, 5,000,000,000 *yuan* in 1959 and a planned 6,000,000,000 *yuan* in 1960.
3. N.a.=not available.

SOURCES

1. *Ten Great Years*, pp. 55–58.
2. Li Fu-chun, reported in *People's Daily*, March 31, 1960. Translation in *JPRS*, No. 3781, pp. 15–26.
3. Li Hsien-nien, Vice Premier, reported in *People's Daily*, April 1, 1960. Translation in *JPRS*, No. 3781, pp. 26–30.

The communes within Tung Hsien, a municipality of Peking, had run into the problems of transport inadequacy that were common in 1959–60. Shipments of fertilizer, farm equipment, and so forth could not be received on time, while delays in shipping out farm produce and in moving coke and limestone for local iron and steel operations were of serious duration. With extremely primitive tools and facilities the transport workers within the *hsien* came up with a host of innovations that enabled the freight volume to increase from 3,500 tons daily to 5,700 tons daily within a period of 7 months. Three of the principal transport innovations in Tung Hsien, whose chief means of transport is the horsecart, are described as follows.

Tung Hsien has invented and promoted the use of three vehicles for short-distance transportation. First, there is the horsecart train. The carts have four wheels equipped with automatic brakes. They can be pulled quite smoothly as the tires are only half as wide as those on old horsecarts; hence, there is less

[26] In 1959 coal transport, for example, according to the Ministry of Coal Industry: "For the country as a whole, the net weight of coal loaded per car has * * * been rising each quarter * * *. Without increasing the number of cars, the tonnage of coal transported in the third quarter was 2,730,000 metric tons greater. The proportion of 'direct destination' trains has risen from 31.5 percent, in the first quarter to 42.4 percent, in the third quarter, which means a saving in coal transportation of approximately 21,400 loaded cars. Although such notable results have been achieved in coal transportation, there is still much latent capacity that can be developed": *Coal Industry*, December 1959. Reported in *JPRS*, No. 3686.

surface friction. The four-leaf springs of the wheel are made of No. 11 bamboo sticks bound together. Loading tests have proved that the bamboo sticks are satisfactory for this purpose. Each cart weighs only half a ton, two-thirds less than the old horsecart. Each train consists of eight carts drawn by four horses. Its loading capacity is 8 tons and together with the weight of the carts, which is 4 tons, the total burden on the horses is 12 tons, or 3 tons per horse. Tests have shown that a strong horse or mule is capable of carrying a 2½-ton or 3-ton load on flat roads. The old horsecart has only two wheels, therefore the front load is on the back of the horse. Although the old cart can carry only 1 ton of load, the total burden to the horse is equivalent to 2½ tons. With the new cart, the same horse can pull twice the amount of freight.

The second invention is a trackless steam train. It is made of old renovated boilers and is similar to a steam locomotive. The new train uses steam generated by coal as its power supply. Therefore, it represents a great economy in gasoline and diesel oil. The vehicle is adapted for highway traffic and is capable of pulling seven rubber-tired wagons—each wagon has a loading capacity of 3 tons—at a speed of 10 kilometers (6.2 miles) per hour. Its loading capacity is equivalent to that of 20 ordinary horsecarts. During busy farm seasons, the vehicle, equipped with a belt, can be adapted to supply power for irrigation purposes.

The third invention is a barge that is pointed at the front and square at the rear. It is equipped with a renovated automobile engine. It uses coal and is capable of carrying some 100 tons of freight at a speed of 8 kilometers (5 miles) per hour.[27]

In the absence of further information it is difficult to appraise the true value of such innovations. It is probably safe to assume, however, that the kind of mass participation in technological innovation suggested by the above, as well as by numerous other examples which have appeared in Chinese publications, indicates a relatively rapid development of a scientific orientation among the Chinese people.

Most important in the category of local transport innovation was the development of local railways to serve in moving goods short distances where the annual freight volume ranged between 100,000 and 1 million tons. These railways bear comparison with those serving English mines in the early part of the 19th century, both in the nature of the services provided and in the important cost savings accompanying the replacement of horse-drawn carts and other primitive means of transport. The local railways in China, using principally iron rails and crude locomotives, were designed mainly to connect the numerous small-scale production units that appeared during the Great Leap Forward with various terminals of the modern transport system, as well as to fill other local transport needs where the volume warranted it. Lu Cheng-tsao, Vice Minister of Railways, in a speech reported in *People's Daily* on April 9, 1960, presented a lucid explanation of the economic rationale of the local railways:

The local railway emerged as a necessity in the Great Leap Forward * * * In particular, the vigorous promotion of the "small-modern-mass" development of the iron and coal industry and the blooming of medium and small plants and mines throughout the country have enhanced the tempo in transportation. Although over 10 million people were regularly organized to perform short-distance transportation in the country, nevertheless, it was inadequate. In the absence of railways it was impossible to transport coal, ore, and timber from many small pits, small mines and forest grounds, and to utilize many usable things. Some mines and plants were unable to sufficiently develop the capacity of their primitive facilities, because of the lack of transportation facilities for their raw materials * * *. These (local) railways require less materials and capital, at between one-tenth and one-fifth of that required for the large railways. As compared to the other modes of local means of transport, the small railways show a higher efficiency, lower cost, and less requirement for man-

[27] *People's Daily*, Oct. 27, 1960. Reprinted in *JPRS*, No. 6627, pp. 57–59.

power * * *. Under ordinary circumstances, the cost of transportation by the small railways using indigenous or modern equipment is about one-fifth that of motor transportation, and about one-tenth to one-fifteenth that of animal-drawn carts. At the same time, it is also less affected by changes in weather and season and capable of running day and night * * *. The small railways using indigenous or modern equipment are also attractive because their construction is simple and easy, using locally available materials, and the management of them is suitable to the local needs * * *. The question confronting us now is whether we would rather wait for the increased output of steel rails before we start the large railways, thus delaying the progress of the economic construction of our country, or should we simultaneously adopt both the modern and the indigenous methods, and use both the steel and iron rails to actively build local railways to speed up economic construction.[28]

The local railway first appeared in Shansi Province after the industrial spurt of 1958. The rails were produced locally and a 1.1 mile railway was opened.[29] By the end of 1959 more than 3.728 miles of track had been laid on some 400 local railways, of which some 1,491 miles were open to traffic.[30] From Feng-yang hsien to Lin-Chiao in Anhwei Province, an 8-mile local railway replaced 36 motor vehicles, 500 carts and 75 wooden boats, and doubled the daily transportation volume.[31] Chengtu City in 1959 built a 31-mile local railway around the city, replacing the transport work of 900 motor vehicles.[32] While the official information indicates impressive cost savings from the local railway program the available information is inadequate to present an overal assessment of its rationality. The chief problems involved concern the adequacy of local skills in design, construction, management and operation, and the durability of the railways. Instances of the iron rails snapping under weight have been cited, probably increased by reliance on the output of the local blast furnaces. For reasons discussed below, the local railway program has been by and large discontinued for the present. Even so, gradual improvement in managerial and technical skills together with attainable improvements in the quality of material inputs may make increased usage of local railways feasible in the future.

Nonrail Transport

While railroad freight turnover increased rapidly in the 1950's, the ton-miles carried by other means of modern transport increased still more rapidly. The following table indicates the annual freight turnover in the modern sector.

Shipping on inland waterways grew more rapidly than coastal shipping, whose development was limited by American-Taiwanese military harassment.[33] The principal waterways for inland shipping are the Yangtze, Pearl, and Sungari Rivers, in that order, of which the Yangtze is by far the most important. It serves China's principal industrial city, Shanghai, and one of the two new centers for an integrated iron and steel complex, Wuhan, as well as Chungking and Nanking.

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[28] Translation in *JPRS*, No. 3781.
[29] *JPRS*, No. 6165.
[30] *JPRS*, No. 3781.
[31] Translation from *Hung Ch'i* (*Red Flag*), May 1960, in *JPRS*, No. 3901.
[32] *Ibid.*
[33] "The military situation in the Formosa Strait has largely brought to a standstill the coastal trade of such important ports as Swatlow, Amoy and Foochow"; Theodore Shabad, *China's Changing Map* (New York: Praeger, 1956), p. 89.

TABLE 5.—*Freight turnover by modern means of transport*

[Million ton-miles]

Year	Railways	Motor-vehicles	Ships and barges	Total
Pre-1949 peak	25, 103	286	7, 972	33, 361
1949	11, 433	155	2, 678	14, 266
1950	24, 488	236	1, 802	26, 526
1951	32, 038	354	4, 480	36, 872
1952	37, 382	478	6, 593	44, 453
1953	48, 554	808	8, 432	55, 794
1954	57, 937	1, 205	11, 582	70, 724
1955	60, 987	1, 566	15, 186	77, 739
1956	74, 906	2, 169	17, 529	94, 664
1957	83, 630	2, 448	21, 369	107, 447
1958	115, 277	4, 325	27, 284	146, 885

Source: *Ten Great Years*, p. 148.

China's first two motor vehicle manufacturing plants with designed capacities of 30,000 and 60,000 vehicles respectively began construction during the First Five-Year Plan. The first plant was completed in 1957, producing only 4,000 units in that year. Further development of this industry, together with an ambitious road-building program and attainment of self-sufficiency in oil production, promise further gains in the share of freight transport handled by motor vehicles. Even so, railway transport continues to receive considerable emphasis and may be expected to retain its position of primary importance for the indefinite future.

As in the Soviet Union, the development of China's communications and transport facilities was characterized by attempts to maximize the utilization of both new and existing capital equipment and to increase operating efficiency. More thoroughly than the Soviet Union, China devised new techniques to utilize her "surplus labor" in conjunction with the technologically necessitated capital-intensive aspects of her transport development program.[34] This is one of the primary characteristics of Chinese development: the more than 10 million people devoting full time to short-distance transport in 1959, the participation of the rural labor force in construction, loading and unloading operations and the numerous innovations in short-distance transport depending on local initiative are probably historically unprecedented.

The strain on transport facilities which appeared at the end of the 1950's might have been alleviated to some extent by increasing the transport share of the Central Government budget in earlier years, though it is not clear in which direction this would have pushed the overall rate of economic growth. Moreover, as prime responsibility for this strain rests with the unplanned spurt in output in 1958 and 1959, coming often from newly built and out-of-the-way small-scale

[34] While China's less developed state at the start of her First Five-Year Plan, together with her higher population density, serves to explain this phenomenon in part, it would be an error to allow these factors to suffice as a total explanation. China's development is characterized by attempts, in large measure successful, to involve the total population in the process of modernization. The role of mass participation and local initiative in surmounting some of the constraints imposed by capital scarcity is reflected as much in the transport development program as elsewhere in the economy.

productive units, it is evident that there are limits to which the problem could have been reduced by prior anticipation, as far as long-distance transport planning is concerned. For short-distance transport, however, one can properly argue that the inadequacy of this sector to handle the production increases of the Great Leap Forward period (1958–60) might have been foreseen. This in turn would have implied setting less ambitious output targets, while placing an earlier emphasis on local transport, enabling it to develop commensurately with other productive activities and thereby leading to a more even development path.

Another criticism might be raised of Chinese planning in that less emphasis might have been placed on westward expansion, more on the improvement of eastern facilities, with their higher yields per unit of investment. On this point there are two considerations particularly worth bearing in mind. First, development in the East was actively promoted.[35] Second, *national* economic development as one aspect of national integration, together with the other economic and defense objectives of the Government, precluded postponement of the attempt to shift the economic center of gravity further westward.

Development Since 1960

While the absence of systematic data in the period since 1960 places obvious limitations on any attempt to evaluate recent developments in transport, sufficient information is available to make the principal changes fairly clear. The most important influence on transport development in recent years is the policy shift which gave priority to agriculture in national economic planning. Within agriculture, local transport was accurately perceived as a major bottleneck, and by 1962 the development of short-distance transport was emphasized within the transportation sector. One aspect of the problem is indicated in a *People's Daily* editorial of June 6, 1964: "Today in level and hilly areas engaged in subsidiary food production the amount of labor used for transport in the field represents about 35 percent of the total labor force. In mountain areas it is about 60 percent."[36] Perhaps more important, or in any event more accessible to immediate remedial action, was the weakness in transport between major railroad or shipping terminals and the communes or production teams in the countryside. China has laid great stress on overcoming the serious bottleneck in short-distance transport since 1962.[37]

G. William Skinner points out that during 1962–64 development of local transport facilities was emphasized and rubber-tired wheelbarrows, improved carts and bicycles were being mass produced for peasant use on the new highways and the better village roads.

By June 1964, the two southwestern Provinces of Szechuan and Kweichow completed a building program which brought almost every *hsien* into the highway

[35] In Shanghai, for example, the value of industrial output in 1959 was 24.54 billion yuan, according to official figures, nearly 7 times greater than in 1949 and 43.3 percent greater than in 1958: see *JPRS*, No. 3902.

[36] Translation in *JPRS*, No. 25638.

[37] "The present effort at building roads aims at the opening up of commercial routes to the villages to facilitate the transport of locally produced goods as part of the policy of priority given to agriculture. Better roads are being built by the provincial governments, but most of them are being built on local initiative. They are rarely fit for motor traffic; on the better roads horses, and oxcarts may travel; on others handcarts * * * can be pushed or pulled by man," *People's Daily*, June 11, 1963.

network. . . . The highway network of Kwangtung . . . which by August 1964 included a total of nearly 32,000 kilometers (19,884 miles), now links up over 85 percent of the province's rural communes.[38]

As of October 1964 the mileage of motor roads in Tsinghai was 9,598 miles, 32 times that of 1949. Most rural highways, linking county seats with rural communes and production teams, were built after 1958.[39]

The total highway mileage in Kweichow, one of China's hilliest areas, has doubled the level of 1957.[40] The emphasis on road construction has prevailed throughout the country.

Together with roadbuilding, considerable stress is being placed on increasing the output of motor vehicles. It is significant that among the industrial products whose 1964 output increased more than 20 percent over 1963 levels were petroleum and motor vehicles.[41] Moreover, China has been importing trucks and was conducting negotiations in 1965 with the French firm Berliet for the construction of a plant.[42] The fact that agricultural production is widely dispersed, seasonal, variable, and involves large numbers of relatively small shipments explains the suitability of trucks for shipping agricultural produce. At the same time they can serve in bringing consumer goods (important for maintaining incentives as well as for attaining a more equitable distribution of income between rural and urban areas), fertilizer and farm machinery and equipment to rural areas.

With agriculture replacing heavy industry in terms of national priorities, the relative importance of railroad transport has natually tended to diminish somewhat, although in absolute terms it continues to be by far the most important means of transport in the country. Railroads are particularly well suited for large, regular shipments over relatively long distances. Thus coal alone constitutes about 50 percent of total railroad freight volume.[43] Nevertheless, the railroads too are at present following the national policy of giving priority to agriculture. The basic freight rates for agricultural products have been set very low and increasing attention has been paid to handling freight originating at smaller, intermediate stations, more accessible to agricultural producing areas. The basic freight rate for chemical fertilizer (0.0150 yuan per ton-mile) has been set at 30 percent of that for other chemical industry products (0.0448 yuan per ton-mile) while the rate for agricultural machinery (0.0160 yuan per ton-mile) is 45 percent of the rate for industrial machinery (0.0333 yuan per ton-mile).[44]

New railroad construction has slowed markedly in recent years for a number of reasons. In the first place, railroad investment has a very high capital-output ratio and the immediate need to raise agricultural production, including an increased supply of consumer goods to raise incentives, has tended to circumscribe investments whose returns would materialize only over a relatively long span of years. Moreover, the principal new lines which are planned are in the northwest and

[38] G. William Skinner, "Marketing and Social Structure in Rural China," pt. III, *Journal of Asian Studies*, May 1965, p. 378.
[39] *JPRS*, No. 27895.
[40] *JPRS*, No. 25948.
[41] Translation of Jan. 6, 1965, *Red Flag* article in *JPRS*, 28892.
[42] Dick Wilson, "Peking's Trading Plans," *Far Eastern Economic Review*, May 20, 1965, p. 353.
[43] *Organizing Railway Transportation* (Peking: People's Railway Publishing House, 1964); translation in *JPRS*, No. 28854, p. 118.
[44] *Ibid.*, pp. 300–302.

southwest. As these are relatively underdeveloped regions, railroad construction there would necessarily mean building ahead of demand to a considerable extent, providing further reasons for postponement of the completion of the network planned for these areas. Secondly, the most urgently needed new lines were for the most part completed in the ambitious construction program of the 1950's. The Paochi-Chengtu Railway, for example, helped make the substantial agricultural surplus of Szechuan province available to the rest of the country. With the exception of Tibet, railway lines now penetrate every Province of China. Given the national economic situation, it has evidently proved expedient to lay greater emphasis on the strengthening of existing lines and improvement of operating efficiency, both of which are currently being carried out.[45]

Principal railways that are now under construction include the Lanchow-Tsinghai Railway, the Chengtu-Kunming Railway, the Szechuan-Kweichow Railway and the Kunming (Yunnan)–Kweiyang (Kweichow) Railway. The first starts out from the northwestern railway hub of Lanchow, has been completed as far westward as Haiyen and will ultimately reach the mineral-rich Tsaidam basin in Tsinghai. The latter three, linking the Provinces of Szechuan, Kweichow, and Yunnan, will considerably increase the economic integration of the southwest, the region that received the last attention during the 1950's, with the rest of the country. As has been noted above, however, the pace of construction has been very gradual: as of 1963 the total length of railway lines was somewhat over 19,884 miles[46] and the increase since then is not likely to have been very great.[47] As of 1963 the Lanchow-Sinkiang Railway had reached as far west as Urumchi. Although the initial Sino-Soviet agreement called for linking the line with the Soviet rail network by 1960, and the Soviet Union had constructed a 186-mile line from Aktogay to Druzhba on the Chinese border prior to 1962, this rail connection has not been completed. Due to the present strained relations between the two countries there appear to be no immediate plans for joining the two lines.[48]

The local railway program has also been largely discontinued. The deficiencies in quality and management noted above were undoubtedly basic factors, but the shift in national priorities may well have proved decisive. The local railways were built primarily to serve small- and medium-scale extractive industries. When food shortages increased the opportunity cost of agricultural labor, that is, when they increased the sacrifice involved in shifting agricultural labor to small-scale industrial activity, these small-scale units were for the most part shut down in order to increase the agricultural labor supply. As a prerequisite for their success, the local railways require a greater agricultural surplus than China has thus far been able to muster. It would not be surprising to see them resumed as agricultural productivity increases, though the increasing availability of trucks for rural transport is in any event likely to limit the scale of such a program.

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[45] It is worth while noting that even in the 1950's, periods of consolidation, such as 1957, were marked by a sharp drop in the mileage of new tracks laid, while the construction of new double-track lines expanded steadily (see table 2).

[46] *JPRS*, 27071.

[47] Special purpose lines have continued to be built. In 1963 the People's Liberation Army laid 378 miles of narrow gage forest railways and an additional 416 miles in 1964, *China News Analysis*, No. 543 (Dec. 4, 1964).

[48] *Central Asian Review*, No. 2 (1965), p. 174.

The development of water transport has continued to receive considerable emphasis. The dredging and improvement of inland waterways is an important aid to agriculture, while capital and maintenance costs for water transport are lower than for railroad transport.[49] Starting in 1962 coal and coke going from north China to Shanghai, Chekiang, and Fukien was routed through ports (Chinwangtao, Tientsin, Tsingtao, etc.) to relieve the burden on the Shanghai-Nanking Railway and parts of other railroads.[50] As of March 1964 the shipping capacity of the (coastal) shipping lines north of Shanghai had increased more than 100 percent over the 1957 level.[51] The Chinese merchant marine began in April 1961 with the voyage of a merchant vessel to Jakarta. By September 1964 Chinese ships had traveled to some 30 countries in Asia, Africa, and Europe.[52] Several giant seagoing steamers are presently under construction. Chankiang Port has continued to develop to "become the economic center of western Kwangtung and the concentration point for materials coming from nearby areas. . . . Following the gradual completion of the railway network in the greater southwest, the interior of Chankiang Port will be expanded many times." [53]

Civil air traffic has been developed very rapidly: 11 new civil airlines were opened in China in 1964, and by early 1965 more than 50 domestic airlines were serving 70 cities. Air passenger and freight carriage in the first three quarters of 1964 was 31 percent higher than that of the corresponding period in 1963.[54] There has been a great increase in airport construction since the modern Peking airport was built in 1958. In April 1964 expanded international airports were also completed at Shanghai and Canton.

In the past 5 years, transport development, except for road construction, has in general not been so expansive as in the 1950's. This is particularly true of the railroads. For the transport sector, as for much of the rest of the economy, the first half of the 1960's has been a period of consolidation: overcoming bottlenecks, improving technology, weak links and efficiency of operation. It should be kept in mind that this overall picture is a composite result of the fairly rapid development of means of transport whose share of total freight tonnage has been relatively small, while the railroads, which carry the dominant share of freight tonnage, have moved ahead relatively slowly.

Examination of the development of transport makes apparent its necessarily close association with the overall pattern of economic development. One can see how intense utilization of existing capital stock, together with the mobilization of large masses of people, either supporting the modern transport system in auxiliary roles or providing supplementary services in traditional transport, has contributed to the growth in freight turnover. We can see too how the

[49] Price incentives have been employed to shift freight from railroads to ships; 1958 regulations, for example, allowed a 15-percent railroad rate reduction for freight using joint waterland routes and provided for a 30-percent increase in cost for coal and coke shipped entirely over railroad lines between specified locations (*i.e.*, Peking to Shanghai) where alternative water routing was available: *Organizing Railway Transportation*, p. 133.

[50] *Ibid.*, p. 128. (It is significant to note, that even in 1962, a year of relatively low industrial production, the pressure on railroad transport facilities was considerable.)

[51] *JPRS*, No. 24999.

[52] *JPRS*, No. 27384.

[53] *JPRS*, No. 27301, p. 27.

[54] *JPRS*, No. 28891.

policies of national integration and the development of the interior have been fostered by the locational patterns, timing, and distribution of resources within the transport sector. Finally, the shift in emphasis to short-distance transport in the first half of the 1960's both reflects and is a measure of the shift in national priorities from industry to agriculture. Improvements in the existing transport network coupled with the vigorous measures taken to improve its weakest link, short-distance transport, have helped lay the basis for further economic development at a more evenly sustained rate than in the past.

THE ROLE OF DEVELOPMENT POLICIES AND ECONOMIC ORGANIZATION IN INNOVATION AND GROWTH: COMMUNIST CHINA*

By Edwin F. Jones

Introduction

Communist China's 17-year history of economic development and its plans for the future present a fascinating study in economic growth. Communist China has had a strong and revolutionary government with the inclination and ability to reshape social organization to meet its aims. In consequence, the problems faced by other societies in "breaking the crust of custom" and overcoming social resistance to innovation and change have not been major ones for China. Moreover, China has been able to mobilize a high proportion of its national product for investment, despite a low per capita income, providing a capacity to alter the material environment and solve material deficiencies.

But the economic end that China has sought has not been growth per se, but rather industrial and military strength. In its first decade, it hoped to achieve this end by neglecting agricultural investment and by concentrating resources in industrial and military development. This policy achieved very rapid economic growth, but was bankrupted in the Great Leap disaster by a massive and paralyzing imbalance in national output. The post-1960 recovery showed a recognition of the need to invest the necessary resources to secure an essential minimum of agricultural growth. China's Third Five-Year Plan (1966–70), as will be shown later, retained the goal of military development, and the supporting elevation of industrial technology, but at the price of a slowdown in general industrial and economic growth. However, with a society prepared and geared for rapid economic growth, this shift in strategy has resulted in serious social strains, which in large part underlie the political troubles of 1966 and raise a question as to whether this strategy can succeed.

Post-1960 Recovery

While Peking has released little data of late, the data it has released and the policies it describes permit a reconstruction—in broad terms admittedly—of its post-1960 recovery. Peking divides the post-1960 recovery into the "readjustment" of 1961–63 and the "upsurge" of 1964–65. The first secured an initial recovery of farm output, a reduction of the urban population from 130 million to 110 million, and a stabilization of the industrial decline. The subsequent period se-

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cured further farm growth and significant industrial recovery. Since the latter was achieved with no observable industrial hiring or expansion of the urban population, Peking's claims of a marked recovery in this period in urban labor productivity and in industrial profits and revenues seem credible.

To judge Peking's economic condition in 1965 as compared with 1957, the least year for which reliable data is available, we need an estimate of population growth. Independent projections have placed population growth between 1957 and 1965 at 18 percent, but Edgar Snow was given data in Peking suggesting that registration data had shown a growth of 16 percent, and that Peking regarded this data as defective owing to rural concealment of deaths to augment rations and as reflecting an actual population growth of 13 percent. What is at question here is whether population growth was set back by 30 million or by 60 million persons in the 1959–62 famine. Since Peking is in the best position to judge and has based its calculations on the smallest growth estimate, it will be used here.

Per capita levels of farm output in 1965 seem clearly below 1957 levels from the evidence of large grain imports and of a crop pattern which still favors grain over industrial crops as compared with 1957. Peking officials have claimed a grain output of 200 million tons in 1965, which is 8 percent over 1957 output, and suggests a similar or slightly smaller growth in total farm output. The great intervening changes in production inputs make it difficult to verify this claim. The farm area in 1965 seems to be 2–3 percent less than in 1957, although the loss may be in poorer land involving a 1–2 percent loss in output. Provincial data show that in the farming provinces the 1957 draught-animal population had been halved by 1961 and was still less than two-thirds of the 1957 level in 1965. At the same time, the rural labor force increased by 10–15 percent, and there were significant improvements in irrigation and the supply of chemical fertilizer. It may be suggested that an 8-percent increase in farm output between 1957 and 1965, involving a 5-percent decline in per capita farm output, is consistent with the indicated availability of farm products, is not ruled out by the supply of production inputs, and closely approximate Peking's calculations.

Peking has described the trend in industrial output as declining sharply from a peak rate achieved in 1960 to a low point in 1962, followed by a small increase in 1963 and then by a rapid recovery growth of about 15 percent annually in 1964–65. It is suggested here that the industrial output index, using 1957 as a base, rose to a peak rate of 200 in the first half of 1960, declined to 110 and 115 in 1962 and 1963 respectively, and recovered to 150 in 1965. This 1965 level seems compatible with an industrial labor force that appears to have regained 1957 levels of productivity and to be half again as large as in 1957, and is also consistent with indications of plant utilization at a level 25 percent below the 1960 peak rate. In 1960 industrial output was imbalanced and plant utilization overstrained. Post-1960 industrial investment has added little to capacity, having been directed at repair and major maintenance, making good the overexploitation of developed mining and timber resources, and developing certain strategic industries (petroleum and chemical fertilizer) which have been highly capital-intensive. In 1965 industrial plant ap-

peared in relatively full, but not strained, operation, but with the inefficient plants of 1960 remaining closed, capacity in the overexpanded sectors (steel, power, cement, rail transport) remaining underutilized, and the operation of highly advanced plant evidencing problems.

Investment, which comprised a little over 20 percent of the national product in 1957 and upward of 30 percent in 1960, plummeted in the post-1960 period, but seems to have recovered in 1965 to about the 1957 level and 20 percent of national product. It could be higher than this, since an industrial output of producers' goods half again as high as in 1957 is being accepted. However, there have been important changes in industrial and investment "mixes" that suggest the lower rate. Machinery and equipment, as opposed to construction, seem to comprise a higher proportion of capital construction in 1965 than in 1957, and imports of equipment and industrial raw materials were a substantially smaller proportion of industrial output in 1965, having been replaced by industrial output.

China's foreign trade had developed rapidly in the 1950's in the context of the Sino-Soviet alliance, raising the annual level of imports from $1.2 billion during 1952–54 to $1.5 billion during 1955–57 and nearly $2 billion during 1958–60. In the post-1960 recovery, annual imports shrank to $1.3 billion during 1961–64 with the reduction of agricultural exports and shift in trade directions. However, a rapid export recovery during 1964–65 and the retirement of the Soviet debt in 1964 permitted Peking to raise its 1965 imports to about $1.85 billion. During the 1950's nearly 90 percent of imports were in support of industry (machinery, industrial raw materials, etc.) while in the 1960's nearly half have been in support of agriculture (grain, sugar, chemical fertilizer), and even in 1965 imports in support of industry were only half the 1958–60 level and below the level at the start of Peking's planned development.

This review suggests that the aims of the post-1960 recovery were achieved, providing the material resources for a substantial Third Five-Year Plan. Let us now examine what that Plan was.

The Third Five-Year Plan

Early in the post-1960 recovery, Mao appears to have given the Planning Commission the political guidelines of establishing a stable, self-dependent, militarily secure China and of securing the commitment of the Party and society to the goal of establishing Peking as the center of world communism and of concentrating energies on the revolutionary struggle until the victory of world communism. The Commission was enlarged by the assignment to it of the Party's top economic, military, and ideological experts, and by 1963 its major programs were in evidence. These programs included farm and population policies designed to secure essential subsistence, a major military program with emphasis on advanced weapons, a 10-year (1963–72) industrial research program to support the military program and the autarkic aims of self-dependence, and a variety of political campaigns under the general rubrics of "the socialist education campaign" and "the training of revolutionary successors."

Premier Chou En-lai stated in 1963 that the achievement of the Third Five-Year Plan would consist of completing certain technical

and social "revolutions" which would prepare for but not in itself involve rapid economic growth. This theme has been repeated by a number of other leaders. Also, a number of emigrants, claiming access to party briefings, have given slightly varied accounts of the plan targets, which are said to seek an annual economic growth of 4 to 5 percent, based on a farm growth of 3 percent and an industrial growth of 5 to 7 percent. While the reliability of these reports is uncertain, they are not inconsistent with the press discussions of plan policies in the various sectors.

China's farm outlook has been analyzed by Chinese experts in the technical journals, and while the discussions show variations, there are points of general concensus. They agree that farm growth depends critically on the modernization process, involving the supply of industrial inputs to agriculture, and that there is now an area with about one-quarter of China's farm output where conditions are favorable (transport, marketing, peasant receptivity etc.) for securing high returns to inputs and where the modernization effort will be concentrated during the Third Five-Year Plan. In the 1970's modernization will be spread to further areas with presently about half of China's farm output where conditions are less favorable and where there will be an initial decline in returns to inputs. By the late 1970's, however, the modernization process will be sufficiently influencing China's farm output as to secure a significant rise in farm labor productivity, permitting a prospect of rapid urban growth. These accounts would suggest a farm growth rate of about 2 to 3 percent in the Third Five-Year Plan, involving a very high annual growth of 4 to 5 percent in the modernization area and 1 to 2 percent growth in the remaining farm areas. Growth in the latter area is based on a 2.5 percent annual increase in the rural labor force, applied with diminishing returns against local resources.

In industry, Po I-po stated in early 1964 Peking's intention to maintain the urban population at 110 million for the indefinite future (which is also indicated by the farm program). This aim suggests that Peking's Third Five-Year Plan may seek something like a two to three percent annual growth in the industrial labor force, based on reduction of urban unemployment and reorientation of the urban labor force, combined with a three to four percent annual growth in industrial labor productivity, thus securing a five to seven percent annual growth in industrial output.

The rate of growth of industrial plant should also be less than in 1957. If we use the artificial device of a 3:1 capital-output ratio to obtain a rough capitalized value of industrial plant, we find that industrial capital construction in 1957 was adding thirteen to fifteen percent to the value of industrial plant. Assuming no major increase in the investment rate under modest industrial growth, and allowing for reasonable increases in investment in agriculture, military programs, and industrial research, the proportion of industrial plant construction to the capitalized value of existing plant should be less than half that in 1957.

Chinese press discussion of industrial policies during the Third Five-Year Plan also suggest certain basic organizational changes. A good part of industrial capacity is to be reserved for experimentation and new product development. In addition, the vertical organization

of output in self-sufficient enterprises, involving little enterprise interchange of product, which secured the rapid industrial growth of the 1950's, is now regarded as restrictive and inefficient. During the Third Five-Year Plan, plant specialization and interchange of product is to be promoted, requiring an emphasis on standardization and quality control.

The press discussions emphasize that the promotion of this organizational change in industry, which will pay off in increased efficiency in the 1970's, requires the maintenance of adequate industrial inventories and an allowance of some industrial slack, for otherwise plant managers will resort to inventory hoarding and to internal parts production to insure meeting their targets. Thus, current industrial policy deliberately deemphasizes intensive plant utilization and attainment of quantitative output targets. Its rationale argues that, since a major increase in industrial employment is distant, the immediate emphasis must be on labor productivity, and also that plant specialization is essential for rapid technological growth, reducing the duplication of research effort that now occurs in the vertically integrated structures.

The ambivalent political and economic ends of foreign policy renders the role of foreign trade in the plan period rather uncertain. The recent rapid export growth can be expected to level off, but even so, imports should reach record levels, perhaps as much as $2.5 billion annually. With a moderate reduction of imports in support of agriculture, imports in support of industry could regain the 1958–60 level. This development would probably be welcomed by the industrial planners, for the effort to raise rapidly industrial technology, despite its autarkic aims, is likely to increase rather than diminish import requirements in the short run.

But Peking has a political image to protect, for it has been making a serious effort to persuade third world countries to reduce their economic ties with industrial countries. The requirements of this image seem currently to inhibit foreign trade policy. There has been a deliberate spreading of trade relations to avoid the appearance of dependence on any one country. There has been limited use of normal commercial credits and no attempt to secure medium- and long-term credits, although Peking's credit standing would warrant perhaps upward of $1 billion in such credits. While several large contracts have been explored, they have been dropped with such suddenness on drawing international attention and controversy as to suggest a political intervention in Peking in which trade departments were warned against creating an impression of undue dependence on foreign trade. Whether foreign trade could assume the role desired by industrial planners under these inhibitions is uncertain.

Political Problems

The purely economic tasks of the post-1960 recovery and the Third Five-Year Plan depended critically on the small corps of highly trained technicians, and it must be conceded that they have achieved certain concrete results. However, on the political and cultural tasks progress has been unsatisfactory, in part because they could not be pressed strongly with social instability so close to the surface, but

mainly because of the extreme social disorientation existing in the post-1960 society. Mao has become increasingly agitated over the flagging progress, reflected particularly in his interview with Edgar Snow at the end of 1954.

One of the major dislocations has been caused by China's education program, which has been so huge it has been largely irrelevant to economic progress. During the 1950's, the education system abnormally retained graduates at each level, either through advancement to higher levels or through return to lower levels as teachers. The numbers released to society included 14.7 million 6th grade graduates, who could not afford or could not qualify for further education and may be classed as educational rejects, and 3.3 million secondary and higher education graduates.

In consequence, the rapid growth of party, state, and state enterprise organizations did not depend on formal education, but drew primarily on the educational rejects, the lower strata of urban society, and rural migrants. It was not formal education, but-on-the-job training and spare-time literacy classes which were chiefly relevant to economic progress in the 1950's. The upper echelons of the new organizations were also structured in military fashion, in which those with technical skills were placed in staff positions and those with political standing and command experience, generally not involving academic qualifications, rose to administrative authority.

The system worked well through most of the 1950's. It may be suggested that, in the lower ranks, the high morale of workers elevated to higher social status was more important than academic training in securing improved productivity. Again, the economic tasks through 1957 were primarily ones of rehabilitation[1] and of following Soviet technical directions, which reduced the chances of major losses through faulty technical and economic decisions. The administrative structure, which emphasized the implementation of command decisions, was probably more effective in mobilizing economic growth than one which would have emphasized the examination and modification of these decisions by technical experts.

This organization performed valiantly but was badly defeated in the Great Leap effort of 1958–60 with its impossible goals, defective strategy, and critical requirement for technical and economic decisions. This demoralization was compounded in the post-1960 retrenchment. Although the seniority principle was followed, generally sending post-1958 entrants back to the countryside, the retained personnel knew that promotion prospects had vanished, while job security was no longer certain for those with defective qualifications.

Another disadvantaged group also appeared, the new educated generation. With the urban labor force stabilized at about 50 million, the education system began to pour out graduates for an intended urban labor force roughly twice that large. While education released to society 3.3 million secondary and higher education graduates in the 10 years to 1960, in the next 6 years it released roughly 23 million. A

[1] The extensive industrial foundations which had been built in the several decades before 1949 have often been overlooked because, for various reasons, they never attained more than a fraction of their production potential. In the First Five-Year Plan, 70 percent of the increase in industrial output was scheduled to come from existing, rehabilitated, and reconstructed plant, and although 1957 industrial output was far higher than in any pre-1949 year, 80 to 85 percent was based on the industrial foundations existing in 1949.

few have entered the urban labor force, increasing displacement of existing workers, but the bulk have been allocated to farm communes or to CCC-type organizations set up by national and local government, or have refused assignment and remained unemployed, supported by their parents and odd-job earnings. These solutions are regarded as stopgap by the students and their parents, and as a reflection of a massive social disorientation which now grips China.

The new student generation is politically dangerous. China's leaders intellectually articulated communism in their student days and early struggle, but their followers since then have had a more pragmatic than intellectual commitment. The Yenan supporters saw doctrine as an expression of agrarian discontent, and the post-1949 adherents have merely accepted the power of China as a validation of doctrine. The new generation is the first to show an intellectual rearticulation of doctrine through its schooling, and it is understandably more idealistic than that of the leaders. The leaders saw the promise of communism in its acquisition of power, with the further improvement of the quality of life too distant to be relevant except for propaganda purposes. The new generation tends to view Communist power as attained, and places more importance on improving the quality of life.

The new student generation has been indoctrinated to accept discipline, and one sees no general student uprising. But they are articulating a view of Chinese society which sees in the gross unemployment a betrayal of the Socialist revolution, regards much of the party hierarchy as hacks and ideological illiterates, and believes that the existing "establishment" has become a system of entrenched privilege which is indifferent to the plight of the students and hindering the development of China. While such a view exists it will be difficult to secure the national unity, let alone the revolutionary elan, that Mao seeks.

Developments in 1966

The signs suggest that Lin Piao, perhaps in an audacious grab for power, has persuaded Mao that his political objectives can only be secured in a vast new leveling of Chinese society which imposes a general austerity, roots out privilege, and energizes the bureaucracy through the threat of replacement with "activists" from the new student generation. The political moves and the Red Guard organization were a direct and general attack on the party hierarchy, and indeed a necessary one if Lin were to consolidate his authority and exert power.

But Lin has not succeeded in his first effort, perhaps because Mao in the end could not accede to a general liquidation of his old comrades, and Lin's chances of succeeding are fast fading as the vested interests of the party organize against him for self-preservation. The confused and desultory developments suggest that Mao either is unable or unwilling to give clear-cut direction to the drive.

The implication of this new drive was a return to the organizational principles of the 1950's, which would compromise many of the mechanisms and organizational changes embodied in the Third Five-Year Plan. It is thus understandable that the plan had dropped out of public sight since the end of 1965.

Yet even if Lin has failed, it seems unlikely that the Third Five-Year Plan will be resurrected and adopted. The events of 1966 will have left basic political changes. The party leadership, insecure and uncertain, will be newly conscious of the conflicting needs to placate Mao and to relieve domestic social strains. The leadership will probably not wish to be tied to the logical coherence of the plan, nor regard it as popular, with its conservative technical emphasis that enrages Mao and with its studied ignoring of the problems of the new student generation. An emphasis on compromise and on vacillating, *ad hoc*, and possibly contradictory policies seems likely for some time, in which actions may not match their stated purpose.

Where this course will take China will be interesting to follow. To placate Mao, foreign policy posture may become harder and more intransigent, perhaps at some cost to foreign economic relations although still avoiding serious military risks. In domestic policy, it is possible that the Third Five-Year Plan policies will continue to be followed, but less openly and thus less effectively, while attempting to assuage social strains with political "circuses." On the other hand, there could be shifts in investment policies to provide more basic solutions to domestic problems, withdrawing resources from the military and industrial research programs for the purpose of accelerating agricultural and industrial growth.

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