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Developing Statistics in China

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Abstract: Most notable in the brief historical review is a population count of 60 million in 2 A.D., and censuses in 1953 and 1964. A widespread statistical reporting system was organized after Liberation in 1949, but underwent abuse and vicissitudes during the 20 years following 1957. In 1978 the current period of development began under the leadership of the State Statistical Bureau (SSB), based on the "regular statistical forms," and increasingly on sample surveys. The 1982 Population Census of 1,000 million was a landmark for the SSB (assisted by United Nations agencies). Current sample surveys by the SSB include an Annual Survey of Births and Population, urban and rural household budget surveys, surveys of agricultural yields, and fertility surveys with the ISI. Fertility surveys of 1/1 000 in 1982 and 2/1 000 in 1988 were taken by the Family Planning Commission. Among others, note surveys of public opinion in 40 cities.

Key words: Population registers; population censuses; sample surveys.

1. Introduction

The title tries to describe what this brief article aims to cover, also what it omits. By "developing" I refer chiefly to the period since 1978. Section 2 contains a brief historical review of China's statistics prior to 1978. "Statistics" here refers to statistical data, their collection, analysis, and presentation. Section 3 deals with the great Population Census of 1982 and its two predecessors; also with the broad use of administrative reports, records, registers, which are so pervasive and important in the economic life of China. Section 4 presents brief descriptions of some major national sample surveys. I cannot cover "statistics" as a discipline in its broad aspects, but Section 6 presents remarks on the teaching of statistics today in China. No attempt is made to cover the growing application of statistics in experimental designs, clinical trials, medicine, and pharmaceuticals. Section 5 has some personal remarks on the special conditions that distinguish data collection in China. China, of course, denotes the People's Republic of China (PRC). Statistics in Taiwan (where I had also consulted) has had an entirely separate and vigorous development, with particularly close contacts with the U.S.A. since 1949.

This paper is a complete revision of "Developing Statistics in China: 1978–2000" (Kish, Huang, Zhang, and Mei (1986)), which received many favorable remarks (also a few that were adverse). The present version benefited greatly from wise and frank advice from friends in the PRC, from American experts, from referees, and

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it presents a more complex and balanced picture. I am grateful for their help but I accept full responsibility for this paper's present form.

I am not a specialist on China and this is not based on long historical research. I have read many books and articles on China since 1931 and benefited from four visits, altogether 19 weeks (from 1982 to 1988) in order to lecture and consult for four Chinese institutions and was sponsored by four international agencies. My broad generalizations condense material documented in the references. Also I continue to benefit greatly from scholars and students visiting my university. These remarks aim to help other statisticians to understand surveys and statistics in China in the next few years, until conditions change drastically. Consider this paper a journalistic essay rather than a scholarly document. It may still suffer from sins of both omissions and commissions, and I beg the editor to open his pages to letters of corrections for the latter.

2. Historical Background

1978 begins the current period of rapid development of statistics (and many other things) in China. After ten years of the Cultural Revolution, Mao Zedong died in 1976 and the Politburo and military commands together asked Deng Xiaoping back to power in 1977. The next year, in 1978, the State Statistical Bureau was re-established and its Director Li Chengrui (1983) wrote: "The Government of the People's Republic of China has adopted, since late 1978, a series of policies of readjusting and restructuring the national economy . . . . To fulfill the above mentioned task, the Chinese statistics departments have done their work in the following two ways: on the one hand, . . . through the regular statistical report forms . . . , on the other hand, . . . through sample surveys." Since 1979 China has participated in all five meetings of the International Statistical Institute. Contacts with western statistical institutes, universities, and organizations, also with the United Nations statistical agencies, have greatly increased, with many visits in both directions.

Changes had already begun by May 1981 when a delegation of the American Statistical Association visited China. Frankel (1981) wrote that "sample survey research as a discipline does not exist. [But] there are indications that some large scale sample surveys have been conducted . . . . The Chinese feel that for many reasons sample survey research should be of great help to them in achieving the degree of modernization that is expected in the year 2000."

By 2000 this unique period of rapid development can be expected to change the situation. China, with the size and quality of her labor force, will have good, mature statistical systems in many aspects. It will face several problems, as other systems do, but they will be different, new problems. And her relations with foreign statistics will be different, and more reciprocal. All countries have problems and uncertainties, and these, like hopes and possibilities, and other magnitudes, are greater in China than elsewhere.

Better statistics are considerd an important aspect of the "four modernizations," as promulgated in Decree No. 9, January 1, 1984, in the Statistical Law of the PRC (SSB (1984)). The new developments represent vast changes from tradition, about which Orleans (1974) wrote that "the Chinese themselves lack much of the statistical data we so desperately seek and their traditional nonchalance toward accuracy in statistics

persists among many of the people presently responsible for record-keeping . . . . The fact that the Chinese are well known for their talent in mathematics and other sciences should not be confused with their deficiencies in statistics." However, note that among statistics gathered were some population counts, beginning with one in 2 A.D. of 60 million people (Bannister (1987)). China perhaps included a quarter of the world's population all along, but now tries to maintain it near the present 1 billion and near 1.3 by the year 2000, while the world now is going from 5 to 6 billion and beyond. There appeared also some local studies of various kinds, and that by Fei (1939) is an outstanding example.

After World War II and Liberation in 1949, a few statisticians (along with some scientists) trained in the USA, other Western countries, and Tokyo, returned to (or remained in) the People's Republic of China. However, during three decades of the Cold War and the isolation of China from the USA and the West, there was little exchange across "the bamboo curtain." On the other hand, during the first five-year plan of 1953–1957, the vast technology transfer from the USSR (possibly the vastest in history) in many fields also included some statistics. A thorough nationwide statistical reporting system was set up for basic economic statistics, based on a hierarchical organization forwarding data from local units to about 2000 counties, then to 29 provincial centers, and finally to the SSB in Beijing. Methods, skills, training, and much of the personnel were developed then and they partially survived many vicissitudes and gaps to the beginning in 1978 of a new era.

In addition to this vast statistical reporting system, the technology transfer from the USSR also involved some academic learning, in China and in Moscow, of probability and mathematical statistics. Two negative aspects of those transfers are often mentioned today: the separation of those academic pursuits from applied statistics (as in the USSR and in much of Continental Europe) and the disregard of survey sampling. A Chinese colleague writes: "One reason behind the disregard of survey sampling before 1978 was blindness caused by ideology. A few statisticians studied sampling techniques in India in the 1950s, but such methods were soon rejected as 'bourgeois' methods. The argument was that we had a centrally planned economy and a highly organized society, therefore any needed data could be collected easily and completely from statistical reporting systems, which reflect the advantages of socialism. On the contrary, in capitalist countries the economy is privately owned, society is anarchic, and the 'inaccurate' sampling approach is the only choice for them." These ideological overtones of surveys and registers have also been heard elsewhere.

In 1960 came the sudden break with the USSR, when China underwent two decades of isolation and of self-development. With a great deal of improvisation in this period, China nevertheless achieved remarkable progress in some fields, such as primary and middle school education, vast improvements in public health, with increases of life expectation and reductions of infant mortality. China missed the worldwide post-War progress in statistics, and the system underwent severe disruptions and deterioration during the periods of the Great Leap Forward, 1958–60, and of the Cultural Revolution and of the following Gang of Four of 1966–76. However, the statistical reporting system functioned somehow and partially much of the time,

and some surveys were made during this period. Two censuses of the population were also completed successfully in 1953 and 1964, after a lapse of about a century, for 583 and 695 million people, compared to the 1,008 millions counted in 1982 (Banister (1987)).

Perhaps this brief, informal, and uncertain history can help us to avoid the practice (common in China, the USA, and elsewhere) of judging the kind and quality of China's current statistics against the best of today in the West. Remember that our surveys were also much less developed before 1949, and even today most of the surveys (in market research, education, etc.) are much worse than the best, even in the USA, Europe, and elsewhere.

3. Censuses and the Statistical Reporting System

The 1982 Population Census of China was a landmark for Chinese statistics. Around 1950 the world was wondering if China's population was less than 450 or more than 600 million, and that difference was greater than the whole population of the USA. But the total of 1,008 million counted in 1982 came from one of the most accurate censuses of the world (Coale (1984)) and many tables are available in Chinese (SSB (1985a)). That census was taken by 5 million trained enumerators and supervisors, with 10 million local assistants, to count a billion people in ten days. Perhaps too costly, some said in China. It was also a giant educational campaign for millions of census workers and for the whole nation, in teaching the values of accurate, objective, yet confidential national statistics. The 1982 Population Census was much improved (Li (1983)) over the censuses of 1953 and 1964 in several ways: (a) greater number of items (19), (b) improved collection methods and quality control, (c) better organization from center to provincial and local levels, (d) use of modern computers, and (e) data open to the public in China and the world, with foreign experts invited for both analysis and evaluation.

Assistance by the United Nations deserves special mention, and it had several aspects: consulting, funds for computers, training, and sending visiting consultants and lecturers. Several UN agencies were involved in these efforts: The Statistical Office, the Department of Technical Cooperation for Development, and the Family Planning Commission. A sample of that census may be purchased as the 1% Public User's Dataset from the China Statistics Archives, University of Illinois, Chicago, U.S.A. (Dr. Hong Chen).

The SSB is planning for another good Population Census in 1990, perhaps with a sample supplement for richer data. The 1982 census, combined with data from surveys and registers: "provides a sound basis for constructing an accurate and detailed history of the remarkable changes in fertility, mortality, and marriage that have occurred in China since the People's Republic was established . . . . When the survey data are combined and compared with the census data for 1953, 1964, and 1982 on numbers of persons by sex and single years of age, they pass a series of stringent tests of accuracy and consistency" (Coale (1984)).

No country can afford to obtain complex statistics from frequent censuses only, and Chinese statistics are mostly obtained "two ways: on the one hand . . . through the regular statistical reports . . . , on the other hand, . . . through sample surveys" (Li (1983), SSB (1984)). Of the two systems, the reporting systems have been developed earlier and better, since 1949, but sample

surveys are bound to become more widespread and important, I expect. Surveys and their advantages are described in Section 4, and we may now concentrate on the statistical reporting system and its results.

Li (1985) describes the principal role of the widespread statistical reporting system. "To obtain comprehensive and timely data, the Chinese statistics departments have strengthened and improved China's regular and all-round statistical reporting system, which was set up in the early 1950s but was seriously impaired for a period of time. This system covers five material production sectors, namely, industry, agriculture, construction, posts and telecommunications, and domestic and foreign trade. All enterprises of the country must complete and submit monthly, quarterly or annual statistical forms (or forms submitted by farming seasons in case of agriculture) in accordance with the stipulations of the state statistics system. These report forms are tabulated by statistics organs at all levels and national statistical figures produced. The monthly and quarterly statistical forms contain information on the gross and net output value, output and sales value of major products, as well as production costs, profits and productivity, and the annual forms contain information on the number of employees, fixed assets, circulating funds, production capacity and the results of the economic activities of the reporting year. In recent years, the statistical forms have also covered the production and sales of the consumer goods as well as the use of consumption funds."

Administrative registers and reports exist in all countries, but they are more pervasive and influential for China's planned economy and society than elsewhere. China also has special advantages in better educational and organizational capacities of her labor force since Liberation than most countries at her economic status (Section 5). The list of 22 "Principal Statistical Items Covered" (SSB (1984)) is most impressive and it includes all kinds of economic, financial, industrial, social, demographic, health, and educational items. "These forms constitute the chief means by which statistical data are obtained at the present time." Perhaps we outsiders can most readily obtain an overview from the *China Statistical Monthly* (CSICSC (1988)), which began in 1988 to publish monthly 150 pages of detailed tables of statistical data from China (also CSICSC (1989)).

The present state of statistical reports differs greatly from the troubles of statistics during the two decades before 1978. "In the 1950s our country learned from the Soviet Union about statistics work. The statistics work of the whole country was under centralized, unified leadership. The State's statistics system and methods were implemented and practiced uniformly throughout the country . . . statistical information was usually reliable, with the exception of that in agriculture." However, after 1958 ". . . statistics workers had to report whatever party and government leaders desired . . . . The total grain output of the whole country was only 400,000 million catties, but it was falsely reported from different localities to be 1,000,000 million catties . . . . Such blindness . . . brought about great disaster, which was clearly exposed in the statistics on population. The death rate rose from 1.08% in 1957 to 2.54% in 1960" (Sun Yefang (1981)). (1 catty = 1.10 lbs.)

"Mao's dislike of bureaucratic centralism and the desire for decentralization of the economy led to the actual dismantling of the Central Statistical Bureau, so that the leadership began to fly blind amid the

wishful and exaggerated reports of ambitious local managers. Soon they could have little idea of what was really going on . . . . Seldom has the willful pursuit of an ideal led to such disastrous results. Where 1958 had been a good crop year, 1959 had less helpful weather. The farmers marching about to win the revolution on the land had been unable to harvest all the crops, yet the statistics sent in from the provinces and their localities added up to an enormous increase in production, more than doubling of output. The result was that government requisitions continued high even while production was actually dropping. This led to an all-time first-class man-made famine" (Harding (1987)). The excess deaths in 1958–61 are estimated to total between 16 and 27 millions (Coale (1984)); others have estimated 30 millions (Banister (1987)).

However, we must note that statistics have improved vastly since 1978 and that falsification was not practiced by the central SSB even before then. A thorough, objective appraisal in 1975 notes "The general consensus is that while Chinese statistics suffer from many deficiencies, deliberate falsification is not practiced by the central authorities . . . . This conclusion, however, does not imply that deliberate falsification is not practiced by lower administrative echelons. On the contrary, falsification at lower levels was quite extensive in the 1950s . . . The First Five-Year Plan (1953–57) . . . may be viewed as a golden period for Chinese statistics, although in those years published Chinese data were by no means plentiful or of high quality by the standards of advanced countries. Being kept in statistical darkness for a decade, economic researchers on China in the 1960s were nearly desperate as they reached the point of no return. The gradual resumption of some statistical outflows from China since 1970 has opened new research possibilities" (Chen (1975), Li (1962)).

Since 1978 both the quality and quantity of statistical data have improved greatly and they are now being developed further. Nevertheless, erroneous statistical data from administrative units are common and worldwide problems, present in every country, every age, and in every field, in agriculture, industry, imports and exports, education, health, employment. Of course, there are vast differences in all these aspects between different kinds of records from the excellent (as in Scandinavian population registers) to the very bad. Generally speaking, collecting and presenting objective statistics can be beyond the abilities of administrative agencies who are charged with the successful pursuit of policies and programs. That is why independent and fearless statistical agencies are needed for statistical assessments. Furthermore, there also occur problems other than falsification (U.S. Department of Commerce (1980)): omissions and missing data; large measurement errors, because the reporters are not trained and motivated observers; data often lack the depth and richness that analysts need. Therefore China also uses censuses and sample surveys in a triad of collection methods, like other countries (Kish and Verma (1986)); and sample surveys are being used more frequently everywhere, and particularly in China.

4. Sample Surveys

A large and increasing number of sample surveys have been conducted in the PRC and it would be futile to try to present a comprehensive list. We shall not even discuss the many small and local surveys of variable quality, which are conducted by a large variety of local and provincial

institutions and universities. I present below the major, national surveys with which I am acquainted and these have been improving in quality since I first visited Beijing in 1982.

a. Annual Sample Survey of Population Change. These surveys of almost half a million (1/2000) have been conducted chiefly to estimate the yearly local birth rate and related vital statistics. They have been collected each January since 1983, obtaining detailed estimates for the years 1982–1988. The samples are selected in three stages: counties, townships, and residential areas (SSB(1984)). The surveys measure yearly the undercount of births in the yearly registers, amounting to one-eighth to one-fifth of the births, and rather consistently; the relative percentage discrepancies for 82 to 85 were 12.1, 18.9, 20.9, 23.5 (SSB (1985b), Sun Jingxin (1987)).

The discrepancy provides the motivation for these surveys, and it was discovered by the 1982 census and by the FPC sample (below). "Total births in 1981 were enumerated as 20.69 million, an increase of 3.24 compared with the 17.45 million recorded in the household registration of the same year . . . the enumerated birthrate of 1981 was 2.09%, 0.33% more than the registration figure of 1.76% . . . . Due to the misgivings of some residents about the birth control, and also because some local officials tended to make good reports on the achievements of the family planning, a number of births were registered as immigrants in 1981." (Li (1983)). It is remarkable that the State Statistical Bureau was able to convince the people to reveal those millions of hidden births to the Population Census of 1982; also that the SSB was willing and able to report it to China and to the world. They prove the value of good population censuses and of sample surveys. (The National 1/1000 Fertility Survey of 1982 also found and published the same discrepancy.) The Annual Sample Surveys may become a pioneering example of continued, large annual population surveys, sometimes called "microcensuses."

b. The 1987 Nationwide One-Percent Population Sample Survey (SSB (1987a)). "The reference time for the enumeration of the survey was set at zero hour of July 1, 1987. A three-stage stratified cluster sampling scheme was adopted for the survey, which covered a total population of 10,711,652 persons (including servicemen) in 1,045 counties and cities from the 29 provinces, autonomous regions and municipalities on the mainland of China." Instead of a simple, proportionate 1/100 selection, sampling fractions were higher in small provinces and lower in large provinces, for increased precisions in the smaller provinces; and all estimates across provinces have to be weighted. Therefore, the "one-percent" in the title, and statements about "Of the people covered in the survey" in the report may be misleading. However, equal probabilities were selected within the 29 provinces.

c. Urban and Rural Household Surveys of Family Budgets (SSB (1984, 1985c, d)). The SSB has set up rural and urban organizations with a total of 8,800 survey workers. The yearly urban samples have over 24,000 households and the rural samples over 60,000. The methods and sample sizes are still undergoing development and good descriptions did not seem available.

On top of other problems, the difficulties of household budget surveys conducted with panels impose severe restrictions on probability selections. They were begun in the

late 1950s, discontinued in the turbulent 1960s, and restarted in 1980.

d. Sample Surveys of Agricultural Yields (SSB (1984)). These were started in 1963, also discontinued and then restarted. The selection has five stages: counties, townships (communes), production teams, fields, and segments. Surveys are conducted in four seasons for different crops. These are large samples for which specialized workers are recruited and trained in technical study sessions.

e. The National 1/1000 Fertility Survey of 1982 by the Family Planning Commission. "The survey, in which 311,000 women from 15 to 67 years of age supplied detailed lifetime histories of marriage and child-bearing, has yielded an extraordinary accurate record of changing nuptiality and fertility in China since 1940. The results at the national level were the basis of a 1984 analysis of population change in China" (Coale (1984)) . . . . "This year computer tapes . . . were analyzed jointly by . . . the East-West Population Institute in Honolulu . . . . All eligible women were interviewed in each of 815 basic sampling units, which were production brigades in rural areas and neighborhoods in urban areas." (Coale and Freedman (1986)). These 815 units were selected by the FPC, with 1/1000 probability from a frame of the SSB. Datasets are available to scholars at the East-West Population Institute in Honolulu (Beijing College of Economics (1983)).

f. Fertility Surveys of the ISI/SSB. Fertility surveys with the essential questions of the World Fertility Surveys were collected in three provinces in 1985 and in ten more in 1987. These were conducted by an SSB staff under the able guidance of Dr. Vijay Verma of the International Statistical Institute's Research Centre (SSB (1986)).

g. Survey of Preprimary Education in 1988. A sample of four-year-old children was collected by the Central Institute of Educational Research, Beijing. This involved household interviews with 13,000 mothers in 10 provinces. The survey was guided, on behalf of the International Education Institute, from the High/Scope Foundation (Ypsilanti, MI, USA) as part of a project of comparable surveys in about 15 countries.

h. Survey of Real Household Income and Budget. This is a project of the Economics Institute of the Chinese Academy of Social Sciences (Zhao Renwei, deputy director), financed by the Ford Foundation. This institute was able to purchase national samples of about 20,000 urban and 60,000 rural households from surveys of the SSB, who will collect the complex data in 1989 for modest cost, which implies cooperation and subsidy. The bold aim of the project may be unprecedented: to estimate the "real" income of Chinese households, beyond mere cash income, when the value of subsidies in "income in kind" (rent, transportation, health, education, rationed foods and goods) amounts to several times the cash income. These data on real incomes will have drastic effects in narrowing the perceived differences in comparisons both within China and internationally.

i. Public Opinion Surveys. Samples of 2500 interviews from a national urban sample of 40 cities are collected in a five-stage sample from time to time since 1986. These surveys have been reported briefly in the Western press, and they seem to deal boldly with surprisingly and increasingly sensitive topics

(e.g., attitudes towards state policies on prices and wages). They are being collected by the Department of Public Opinion Polls, in the Economic System Reform Institute (Yang Guansan, deputy director).

Note that surveys a, b, c, d, and f are conducted by the SSB. Although they are and will continue to be the leaders in the field of surveys, the SSB cannot possibly and does not intend to meet all the needs for sample surveys that are springing up all over China. Sometimes the SSB may cooperate with sampling for other national institutions, as in e and h. But for some surveys, as in g and i, the samples may be selected by other institutions. With some I happened to have personal connections (e, g, h) or mere acquaintance (i). But there must be other national samples I am not acquainted with. For example, in 1988 I heard about two other large national surveys, a national sample of the handicapped and a large (2/1000) national fertility survey by the FPC. As yet few (if any) institutions have the capacity of mounting national samples of wide scope and high quality; but the future will bring some.

5. Special Conditions in the PRC

a. China is vast and unique in problems and in opportunities, in statistics as in all aspects. China is not "typical" of any class of countries but merits attention on her own, because she includes one-fifth of the human race, as she has done perhaps since her first census of 60 millions in 2 A.D. China is vast in several ways, with the largest and longest surviving national cultural tradition of 5,000 years. China led in many fields of science until a mere 500 years ago, when she slowed and Europe spurted ahead. The advances of the last 100 years in statistics, and especially since World War II, have created a gap that China needs and hopes to fill rapidly. Therefore, comparing China to the USA and the developed West is misleading. However, China also differs greatly from other countries at her level of economic development.

b. Because of her size and her history, China operates as a collection of 29 provincial governments in many matters including statistics. For example, the 1982 census was collected and financed by the provinces, under the central direction of the SSB. (Decentralized organizations also exist in other federated, especially in some multilingual, countries.) Provinces also maintain separate universities, educational systems, and other institutions. Decentralization also affects other aspects of life, with important consequences, advantages, and disadvantages. Difficulties of transportation and communication must be added to size and tradition among the causal factors.

c. The statistical reporting system collects, summarizes, and forwards data in hierarchical stages from the lowest units, to rural townships (or communes, or urban neighborhood groups), then to districts, then to over 200 counties, then to the 29 provinces, and finally to the SSB. The data are summed at each level, so that only summary (micro) data are forwarded rather than individual (micro) data. We do not know when and how this may be changed to the Western practice of forwarding individual (micro) data (tapes) to the central office. Similarly, the population's selection frame exists only at the local (village) level, where selection must be made, because central master samples are not yet prepared (they are in the USA, which also lacks central population frames of persons or of households).

d. The reporting system, the 1982 census of high quality, and the large sample surveys

are all indications of two related aspects of China: highly developed governmental organization and strong cooperation elicited from the population. Those statistical tasks are accomplished by vast mobilizations of huge labor forces of qualified office clerks and field workers. Such organization and mobilization are necessary for those vast statistical tasks; but they are not sufficient for good data, for which a population willing and able to cooperate is also needed. The failure of agricultural statistics after 1958, and the births missing from the current registers remind us of that need.

e. The 1982 census used five million enumerators, and the reporting system and the large sample surveys need many thousands of trained, educated workers. They are available, because of the rapid spread of elementary and middle school education since Liberation in 1949, and based on the ancient culture of widespread, deep respect for education. Senior high schools are now being spread and increased, but university education is still only for a minority and mostly in the cities. However, literate middle school graduates can be found widely for statistical reporting in "every village" I was told. And they can be hired and trained inexpensively; at least now. The availability of good and inexpensive office and field workers facilitates the collection of large bodies of data and of large samples. Good (not perfect) administrative registers and lists are also helpful. It is likely that in the future surveys will become smaller, even as they become more numerous, and varied, and technical.

One curious cultural feature is prized by demographic researchers: the Chinese know their years of births because they know the "animals" of their birth years in 12-year cycles.

6. Teaching Statistics in China

The relative isolation of China during the past century's growth of statistics was followed by her complete isolation since the births in 1949 of both the PRC and of modern survey sampling. There were in Chinese universities a few statisticians trained in universities either in the USA or in Moscow, plus a very few in Tokyo or Calcutta, but not nearly enough. After Liberation in 1949 the PRC had great success in moving toward universal elementary and middle school education, but university education lagged far behind. Then came the Cultural Revolution of 1966–76, during which universities were badly set back. All in all, it seems that there are few statisticians in the vigorous ages of 30–60.

However, a rapid development may be expected from the young statisticians now studying in China, in the USA, and elsewhere. "At present, China has 74 universities and colleges that have departments or disciplines of statistics, with a total enrollment of 10,600 students. This year, 1,500 students will graduate, and 900 with BA degrees. There are 35 universities and colleges offering master's programmes, with a total enrollment of 387 post-graduates." (Li (1987)).

In addition to professional education in universities, Li also describes "universal education . . . the popularising of basic statistical knowledge among people in other occupations." These include statistical courses in 222 secondary polytechnical schools, and the in-service training of the many thousands of workers with some statistical duties. Furthermore, the SSB in 1983 "co-sponsored a television course on the theory of socio-economic studies, with an official enrollment of 580,000 students, of whom 237,000 have graduated with

diploma." This is being continued and developed as a widespread China Statisticians Television Correspondence College for 305,000 people in 7,000 classes, with a staff of 1,000 and 6,000 teaching assistants. (Li (1987)).

The National Statistical Society of China, supported by the SSB, is active in many functions and publishes the bimonthly *Statistical Research*. The China Probability and Mathematical Society, supported by some top universities and the Academy of Science, lays emphasis mostly on mathematical statistics.

Among foreign languages English predominates in books and in lectures; these are frequently translated, but sometimes taken directly in English by entire classes. Notable exceptions are the contributions with Chinese lectures by good, ethnic Chinese statisticians from the USA, Canada, and East Asia; they often lecture in Chinese and donate their time in gestures of goodwill.

Furthermore, many Chinese are studying graduate statistics in the USA, and some elsewhere, some on Chinese, some on foreign fellowships. According to my limited information they are exceptionally talented and industrious, usually at the top of their classes. They demonstrate a great tradition of learning, of industry, and of a culture receptive to mathematics. They also testify to successful methods of selection in the USA and especially in the PRC.

However, I regret that Chinese students of statistics in the USA seem to be guided entirely toward mathematical statistics, to the neglect of applied statistics. Even the few who study sampling concentrate on its theory to the neglect of survey sampling. This concentration may further accentuate the existing wide separation of university statistics from applied fields, such as survey sampling, and from places of application, such as the other sciences within the universities, commerce, and industry, from the SSB, the Academies of Science and of Social Science, and institutions of government.

Narrowing that separation and strengthening the bonds between mathematical statistics and applications should become the most important tasks of the National Statistical Society – along with the task of maintaining the integrity of statistical reporting in the PRC.

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Postscript on June 29, 1989. The problems, as well as the opportunities and advances of China are and will be on scales that match her vast size. After ten years of rapid agricultural, industrial, and academic developments, came the vast disorders and suppressions of the past two months. After several other great disorders we should not have been surprised. I repeat from my 1986 paper that "many unforseen, unpleasant surprises before the year 2000 are possible indeed." But as an optimist, I expect continuing, if not monotonic, progress in the future, and that this will include the continued development of better statistics.

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