Medicine and Public Health in the People's Republic of China

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Published by:
John E. Fogarty International Center for Advanced Study in the Health Sciences
Building 38A, Room 609
National Institute of Health
Bethesda, MD 20205 USA

Single copies are available free of charge. Ask for DHEW publication number (NIH) 73-63.

Available from:
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A Publication of the
Geographic Health Studies
JOHN E. FOGARTY INTERNATIONAL CENTER
for Advanced Study in the Health Sciences
1973

Joseph R. Quinn, Ph. D.
Editor

U.S. Department of Health, Education, and Welfare
Public Health Service
National Institutes of Health

DHEW Publication No. (NIH) 73-67

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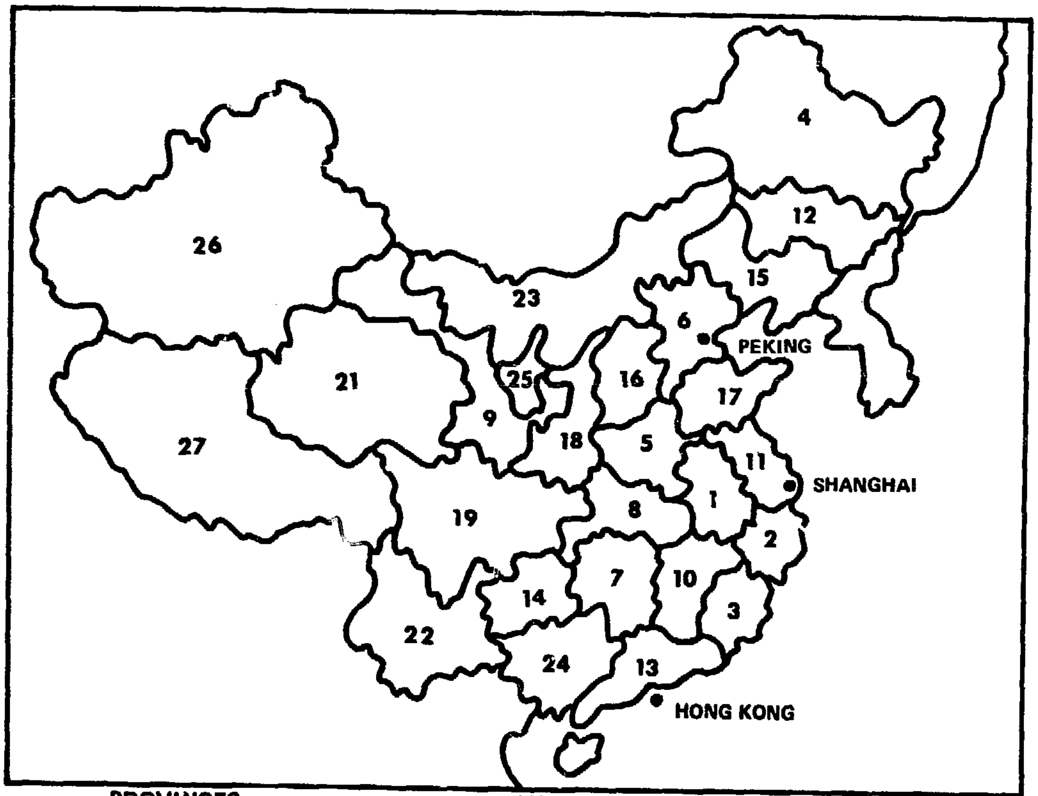
THE PEOPLE'S REPUBLIC OF CHINA: PROVINCES AND AUTONOMOUS REGIONS



PROVINCES:

1. Anhwei
2. Chekiang
3. Fukien
4. Heilungkiang
5. Honan
6. Hopei
7. Hunan
8. Hupei
9. Kansu
10. Kiangsi
11. Kiangsu
12. Kirin
13. Kwangtung
14. Kweichow
15. Liaoning
16. Shansi
17. Shantung
18. Shensi
19. Szechwan
21. Tsinghai
22. Yunnan

AUTONOMOUS REGIONS:

23. Inner Mongolia
24. Kwangsi-Chuang
25. Ningsia-Hui
26. Sinkiang-Uighur
27. Tibet-Chamdo

MUNICIPALITIES:

Peking
Shanghai

AREA:

People's Republic – 3,746,453 sq. mi.

POPULATION:

People's Republic – 750,000,000 (Est.)

PREFACE

Although disease, poverty and hunger know no national, political or geographic boundaries, attempts to solve these problems clearly are based upon different economic and political systems. Despite these obvious differences, there is general acceptance of the desirability of international cooperation in support of biomedical research and the development of means for improving the health of the people of all nations.

In 1969 the Fogarty International Center began a series of studies of research and health activities in other countries in relation to their political and economic structure. The first study dealt with Soviet programs in research and public health as they have evolved in the political structure established following the Bolshevik Revolution of November 1917.

In late 1970 the Fogarty International Center began a search for information about medical and public health activities in the People's Republic of China. A long silence has shrouded that nation, which has almost one-fourth of the world's population, an ancient and respected civilization, and a long and honorable medical tradition. During 1971 communication between the United States and Mainland China resumed after a hiatus of more than twenty years. For those who believe that the universal desire for health and relief from disease and suffering may be the strongest key to peace and international cooperation, it is significant and heartening to observe that physicians were among the first groups granted permission to visit the People's Republic of China.

There will be an increasing need to expand our knowledge and understanding of medical research activities in this important country. To that end, the Fogarty International Center enlisted the services of a number of persons whose past and recent experiences form the substance of this document. Despite the paucity of primary source material, hopefully this work will serve as a base upon which future information will accumulate.

Inquiries concerning this publication should be addressed to Dr. Joseph R. Quinn, Head, Geographic Health Studies Fogarty International Center, National Institutes of Health, Bethesda, Maryland 20014

Milo D. Leavitt, Jr., M.D.
Director
Fogarty International Center

INTRODUCTION

Although there are no exact official figures available on the population of the People's Republic of China, the best estimates place the figure at between 750 and 800 million. The implications for medicine and public health of such a large mass of humanity living within a land area comparable to that of the United States, which has an estimated population of 209 million, are very significant.

When the Government of the People's Republic of China came to power in 1949, it was necessary to organize a public health program on a national scale. Many infectious and chronic diseases were taking a toll of a significant segment of the populace. In order to save time the Soviet public health model was adopted with a centralized authority and direction, established within the Ministry of Health, with a hierarchy paralleled by the Chinese Communist Party. Western physicians and scientists at the Chinese medical schools began to leave the country and greater reliance for assistance was placed upon Soviet medicine and public health. A biomedical research establishment was also organized along the lines of the Soviet Ministry of Public Health and the Academy of Medical Sciences. During the 1950s this adaptation of the Soviet model was modified, but not to the extent that it was able to erase significantly the impact of traditional Chinese medicine upon the people.

When Soviet scientific and technical assistance was withdrawn in the late 1950s and early 1960s, as a result of the deterioration of international political relationships, the Peking Government was forced to become more self-sufficient, although it did continue relations with physicians and scientists of other countries.

The Great Leap Forward of 1958, initiation of the communes, and economic difficulties of the period, made the challenge even more significant. As the more important infectious and parasitic diseases were being brought under control, Chairman Mao Tse-Tung launched the Cultural Revolution in 1966. Although this upheaval has still not subsided completely, it has already had a significant impact upon medicine and public health in the country. Mao's exhortation to emphasize health service for the rural areas sent thousands of western practitioners to the countryside, modified the curriculums of medical schools, placed emphasis upon the subprofessional in the delivery of medical care and affected the conduct of research in institutions throughout the country.

In the desire to subordinate the role of the individual biomedical worker to society's needs as a whole, almost all professional publications ceased. The visit of foreign medical observers to the mainland was also halted when the Red Guards started their "cleansing" operation throughout the country. Consequently, current knowledge of the medical scene in the People's Republic of China is severely limited. In recent years scholars of Chinese medicine have had to rely more on the newspapers and radio broadcasts from the mainland for their information. Although a small number of American physicians and scientists were permitted to visit the PRC during 1971, time did not permit a detailed examination of the various aspects of medicine and public health throughout the entire country. Any review of the status of medicine under such circumstances must therefore be done with these limitations in mind.

Inasmuch as the audience for this document is intended to be those persons with a general interest in the subject of China medicine rather than the biomedical specialist, the lack of confirming evidence by on-site observation or experimentation was not considered a deterrent to the preparation of this document. The reader must also recognize that most of the more recent sources cited by the authors derive from the Chinese Ministry of Public Health and reflect the attempt by the PRC to obtain maximum publicity concerning Chinese accomplishments all of which is designed to encourage other countries to follow the PRC's social, economic, and political path. In order to preserve the substance of the authors' views, editing of the articles was purposely kept to a minimum. Lastly, a number of other medical subjects were considered for inclusion in the document, but an adequate amount of information was not available to permit the inclusion of such a subject in this report. The design of this study was limited therefore not only by the availability of source material but by competent reporters as well.

The presentation of this report is in three major segments, namely, Chinese Medicine Through the Ages, which includes those articles dealing with the historical development of certain health aspects of China; Health Care Organization and Administration, containing elements primarily of an administrative nature; and Health Problems, which deals with certain major questions facing health administrators of the People's Republic of China.

Dr. Ralph C. Croizier, Associate Professor of History, University of Rochester, Rochester, New York, is the author of the first article in the first major segment dealing with "Traditional Medicine as a Basis for Chinese Medical Practice". Dr. Croizier, who received his doctoral degree in Modern Chinese History from the University of California at Berkely, has devoted a considerable amount of his postdoctoral research efforts to the role of traditional medicine in the People's Republic of China. His book, *Traditional Medicine in Modern China,* published by Harvard University Press in 1968, which is frequently cited by scholars of China medicine, contains more detailed information on the subject.

"The Role of the Family" by Dr. Janet W. Salaff, Assistant Professor, Department of Sociology, University of Toronto, Ontario, Canada, examines the subject in terms of the sources of data on family life and population processes; the relationship of the family to the community; the internal organization of the family and the status of generations and sexes; the family as a repository of culture; and patient–practitioner relations and the role of the family. Much of her knowledge was acquired not only through the use of Chinese documentation but from recent Chinese emigres as well.

Another historical article in this segment is that by Dr. John Z. Bowers, President, Josiah Macy, Jr., Foundation, New York, N.Y., who has become one of the leading scholars of Oriental Medicine through his studies in the Far East and his research for numerous articles on the subject. Dr. Bowers traces Chinese surgery from ancient times to the period of acupuncture anesthesia, based on the historic Chinese tradition that the human body is a sacred treasure.

Dr. James Y. P. Chen, currently Director of Medical Research, California Medical Group, Los Angeles, California, is the author of two companion articles covering the two important aspects of traditional medicine, namely acupuncture and pharmacology. A 1941 graduate of Peking Union Medical College with postgraduate studies and research in pharmacology, Dr. Chen has maintained his interest in Chinese medicine and culture since he immigrated to the United States in 1945. He has contributed over 35 articles on the subject of pharmacology to periodicals and books. In view of the attention accorded to both subjects as a result of recent visits by American physicians and scientists, his articles are particularly timely. His article on acupuncture describes the history of acupuncture, the philosophical basis of Chinese traditional medicine, the meridians and acupuncture points, moxibustion and the current status of acupuncture and new developments in the People's Republic of China. In his article on pharmacology, Dr. Chen develops an historic review of Chinese materia medica, but deals primarily with pharmacological research and development of herbal and synthetic drugs.

The second major segment of this document deals with the present situation in the PRC and is titled "Health Care Organization and Administration".

Setting the framework for this segment is the article concerning Laws on Public Health by Dr. Tao-tai Hsia, who is Chief, Far Eastern Law Division, U.S. Library of Congress, and a lecturer on Communist Chinese Law at the George Washington University. Dr. Hsia, who obtained his LLB from National Cheng-chih University, Chungking, China, and his Doctor of Science of Law from Yale University Law School, has published a number of monographs and articles on various aspects of law and culture in the PRC. In his article Dr. Hsia discusses 54 documents relating to public health, which have been published by Peking in the *Collections of Laws and Decrees of the Central People's Government* and *Collection of Laws and Regulations of the People's Republic of China.* Dr. Hsia's description and discussion of the documents represents the major commitment to health by the Peking Government.

The second article in this segment of the publication, that by Miss Susan Rifkin, a China specialist, lecturer in international affairs and research fellow on rural health strategies at the University of Sussex, Sussex, England, is a continuation of Miss Rifkin's studies in the United States on science and health in the PRC. In her article Miss Rifkin traces the development of rural health care in China from the advent of the Government of the People's Republic in 1949 through the Great Leap Forward and the employment of modern and traditional health personnel.

One of the few American physicians to visit the PRC in recent years is Dr. Victor W. Sidel, Chief, Department of Social Medicine, Montefiore Hospital and Medical Center and Professor of Community Health, Albert Einstein College of Medicine, Bronx, N.Y., author of the article on "Medical Personnel and Their Training in the People's Republic of China". Of particular interest are Dr. Sidel's personal observations on the current situation regarding health manpower in the PRC and the training of the Barefoot Doctor.

Dr. Richard P. Suttmeier, Assistant Professor of Government, Hamilton College, Hamilton, New York, is the author of the article on The Chinese Academy of Medical Sciences. Dr. Suttmeier, who has written a number of articles on science in China, describes the key role played by the Academy in organizing, promoting, and coordinating biomedical research, including that on traditional Chinese medicine during the various periods of stress and strain of the past two decades.

The final segment of the book deals with those health problems most discernible from the literature and by recent visitors to the People's Republic of China.

Because of the enormity of the question, population dynamics is discussed in the first paper. Its author, Mr. Leo Orleans, a China Research Specialist at the U.S. Library of Congress, has been a regular contributor to a number of newspapers and journals concerning China, population, Asian affairs, etc. His article is adapted from his book titled *"Every Fifth Child: The Population of China"* which is scheduled for publication in 1972 by Eyre Metheuen, Ltd., London, and the Stanford University Press. Mr. Orleans' article includes a discussion of the important 1953 census, the subsequent population registers, policy levels in old China, family planning, reactions and results, and some future prospects.

This is followed by the presentation of "Nutrition" by Dr. Bacon F. Chow, Professor, Department of Biochemistry, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, and Dr. Samuel D. J. Yeh, Department of Medicine, Sloan-Kettering Cancer Institute, New York. Born in China and trained in the United States, both authors' knowledge of the Chinese language and literature, as well as their research in nutrition, make them particularly well qualified to deal with the subject

A third important problem facing the Peking Government since 1949 has been infectious and parasitic diseases, which is the subject of the article by Dr. Kun-yen Huang, Associate Professor of Microbiology, George Washington University School of Medicine, Washington, D. C. Dr. Huang, who was born in China, has co-authored numerous scientific articles of relevance to the subject. In his article Dr. Huang describes what he considers to be the ten most important infectious and parasitic diseases still prevalent in China. These are: tuberculosis, leprosy (Hansen's Disease), trachoma, Japanese B encephalitis, schistosomiasis, malaria, filariasis, clonorchiasis, paragonimiasis and ancylostomiasis.

In recent years the Peking Government has emphasized its determination to eliminate cancer in the country. Dr. Haitung King, a research sociologist with the National Cancer Institute, National Institutes of Health, is the author of an article on Cancer Research Organization and Preventive Programs. Dr. King was born in China and also received his undergraduate degree there. His graduate studies were done in the United States, where he has contributed many articles to the literature. The article in this document deals with the organization of cancer research, experimental tumors, the role of traditional anti-tumor medicine, the anti-cancer shock brigade model, and analysis of microscopically examined data, the cancer screening program and survey, programs for cancer registry and cancer education and therapy.

The concluding article of this segment concerning "Mental Diseases and Their Treatment" is primarily an account of Ruth Sidel's recent visit to the People's Republic of China with her husband, Dr. Victor W. Sidel, who is the author of the article "Medical Personnel and Their Training" mentioned above. Mrs. Sidel, who has been engaged in social work for many years and has examined social work and child care in several countries, examines the historical development of theory and treatment regarding mental diseases from ancient times to the present day. Of particular interest in this article are her observations on the current mental health scene in the PRC, including visits to hospitals in Peking and Shanghai.

In reviewing the articles in this document it must be kept in mind that the views of the individual authors do not necessarily represent the views of the National Institutes of Health, Department of Health, Education and Welfare or any other agency of the United States Government.

Lastly, the editor would like to acknowledge the assistance of numerous individuals at the National Library of Medicine and Library of Congress, who have made available the source material for many of the articles, and many persons who were kind enough to review the documents for various purposes including those at the National Institutes of Health and in the private sector. A special debt of gratitude is owed to the staff of the Fogarty International Center for their assistance with the preparation of the document within such a short period of time, including Mark S. Beaubien, M.D., Arthur H. Furnia, Ph.D., Mr. Masao Inouye, Lois Meng, Yvonne Daughters, Elsie Fulton, Annette Goldberg, Katherine Beck and Alma Barclay.

Joseph R. Quinn, Ph.D.

I. CHINESE MEDICINE THROUGH THE AGES

TRADITIONAL MEDICINE AS A BASIS FOR CHINESE MEDICAL PRACTICE

Ralph C. Croizier, Ph.D.

It is an historical truism that every revolutionary regime, no matter how radical its plans and passions, must work with what it has inherited from the past in building towards its vision of the future. This is most obvious in the material sphere. For example, both the Russian and Chinese Communist Parties found themselves ruling predominantly peasant populations with underdeveloped industry, poor communications systems and low levels of education at the starting point for their drive to build industrialized socialist societies. But the influence of the past is not limited to these obvious legacies. There are also its nonmaterial aspects—institutions, attitudes, and customs—inherited and still living, not just among the populace as objects of change, but also among the revolutionaries who wish to guide the process of change.

All this is just another way of saying that, while men need not remain captives of their past, they can never entirely escape its influence. The ramifications of this historical conundrum we can leave to the philosophers. It is our purpose here to show how China's medical past—the traditional system of medicine existent in China at the time of the revolution, its cultural and social position, and attitudes towards it among the populace and revolutionary leadership—have influenced the new medical system that has been constructed in the People's Republic of China.

First, to the material legacy in medicine that the Chinese Communists inherited in 1949. So far as modern scientific medical facilities and trained personnel went, it was totally inadequate to the health needs of the enormous population. Estimates of the number of modern trained physicians in China at the time of the revolution vary, but it probably was far short of the figure of 20,000 quoted by the Ministry of Health in Peking.[1] Even if that figure were accurate, it would leave a ration of only one physician for every 26,000 people in China. Similarly physical facilities—hospitals, clinics, medical colleges—were inadequate in quantity although some, notably the Rockefeller Foundation supported Peking Union Medical College, were of excellent quality. On top of this, there was a heavy concentration of these medical resources in a few major urban centers with most of the vast countryside almost entirely devoid of any kind of modern medical care.

But that near vacuum in modern medicine did not mean that the Chinese people entirely lacked medical care, for there was also the traditional Chinese system of medicine and its much more numerous practitioners. Estimates of the number of traditional doctors are even more tenuous, partly because of the lack of any definite standards for deciding who qualified as a physician. By 1955 the Peking government had registered 486,700 traditional-style physicians.[2] If every part-time herbalist, bonesetter, or acupuncturist were included, the number would undoubtedly be much higher.[3] At any rate, it was clear that the vast majority of the *de facto* health care for the population was being supplied by the traditional-style medicine and that it would be a long time, even just in terms of numbers, before the modern medical sector would be able to fill that role.

There were also the nonmaterial aspects in dealing with this legacy from the past in medicine. The vast majority of the Chinese people preferred the traditional practices and practitioners to their modern counterparts even when a choice was physically and financially possible. To be sure, modern medicine had gained considerable acceptance among the portions of the population exposed to it since its introduction to China about one hundred years previously. But even there it was usually a selective acceptance of areas such as surgery where the modern physician was demonstrably superior. For other complaints, traditional style doctors were often consulted, even by the educated and affluent.

Thus in establishing a new health care system for the people of China the new government had to consider both quantitative factors (which included the heavy economic cost of expanding the modern medical sector) and the attitudes of the population. Admittedly, this was a government that in many areas would not be too sensitive about challenging traditional preferences and attitudes, but in medicine it saw it possible to avoid a frontal assault on the old. The how and why of that strategy is the main subject of this paper. Before analyzing their medical policy, however, it may be useful to sketch in the main features of Chinese traditional medicine.

The first requirement is to distinguish traditional Chinese medicine from the "folk" or "primitive" medicine.[3] Folk medicine—popular ideas about the causes and treatment of disease usually with relatively simple remedies applied on a generally empirical basis often by non-professional practitioners—can be found in every traditional society, including China. But there is also in China what, following Robert Redfield, we might call the "great tradition" in medicine as opposed to the peasant level "little tradition" in folk medicine. Or, using another distinction, we might refer to the traditional Chinese medical "system", using medical system to mean a theoretically articulated body of ideas about disease causation and treatment contained in a written tradition and practiced by men whose knowledge of that tradition causes their society to recognize them as medical specialists. This great tradition, or medical system, might well be influenced by popular cosmological ideas shared by popular folk medicine, and it is also wrong to think of folk medicine as a random grab bag of empirical remedies and popular superstitions without any kind of general ideas, or systems, to it.[4] But the distinction is still valid, and useful, if we are to appreciate what medicine was in traditional China and what it has become in recent times. If the Chinese Communists had inherited only a folk medicine from the old society, their problems and possibilities in building a new medical system would have been far simpler than has actually been the case.

As for the character of this traditional medical system, it is generally comparable with the rational, but pre-scientific, medical systems of medieval Europe, classical Islam, or traditional India. Like them, Chinese traditional medicine has a predominantly rational theoretical basis contained in a large corpus of medical "classics" of great antiquity, and was practiced by a secular class of physicians distinct from the common folk medicine practitioners of the society.

The medical classics which laid down the basic principles of Chinese medical theory for the next two millenia mainly date from the Han dynasty (206 B.C.-A.D. 220). Of these the most important are the *Huang-ti Nei-ching (Yellow Emperor's Inner Classic)*, the *Shang-han Lun* (*Treatise on Fevers*), and the *Shen-nung Pen Ts'ao* (*Pharmacopoeia*). The books are very different in character.[5] The *Nei-ching* is a theoretical exposition of the basis for health and illness closely related to the cosmological ideas which were taking definitive shape in the Chinese philosophic period. The book is of unknown date or authorship, the present text probably being composed of several parts. Its attribution to the Yellow Emperor, legendary culture hero from the dim mists of mythical antiquity, served to give it a semi-sacred, "classical" status. Apart from the theoretical, or cosmological sections, it also contains the earliest known explanation of the distinctively Chinese therapy of acupuncture and the principles behind it.

The other two are more specific, less theoretical discussions more directly derivative from empirical experience. The *Shang-han Lun* is attributed to a definite historical person, Chang Chung-Ching, a famous physician of the Han period. It is a discussion of fevers and their treatment. The *Pen Ts'ao* is the earliest of a series of pharmacopoeia describing useful medicinal plants, animals and mineral substances with notes as to their application. It, too, has a semi-sacred aura from attributing it to Shen Nung, "The Divine Husband-man," a mythical ruler who supposedly taught agriculture to the Chinese people. But, unlike the *Nei-ching,* it was a much more practical text and thus over the centuries underwent many more additions as actual experience with herbs and drugs added to the materia medica used by Chinese physicians. This tradition culminated in the massive pharmacopoeia of the sixteenth century pharmacologist Li Shih-chen which till the present is still the basic reference work for Chinese herbalists.

Although the pharmaceutical tradition expanded, the *Nei-Ching,* and to a lesser extent the *Shang-han Lun,* remained less emendable because of their "classic" status in a traditional society where the authority of classical antiquity was especially strong. This meant that, while traditional Chinese medicine did not remain static after the Han, it did, like Galenic medicine in Europe, remain "backward looking" towards the sources of classical authority and continued to develop within the broad framework of theoretical ideas based on the cosmology of the classical period.

The basic idea behind these may be seen as a homeostatic concept of health and disease related to the cosmological ideas of Han philosophers. Just as equilibrium, or harmony, within an endless cycle of fluctuating changes is the basic principle of the natural order and of human society, so man (the microcosm to the macrocosm of the universe) is healthy when his basic life forces are in harmony and unhealthy when the harmony is disturbed. This is expressed in terms of the dual forces of the universe, *yin* and *yang,* and the flow through the body of that vital life force, *ch'i* (sometimes translated as "pneuma"). This *ch'i* circulates in accordance with the alteration of "the five productive phases" (wood, fire, earth, metal and water—usually rather misleadingly translated as "elements," which suggests stability rather than flux). Any disturbance, and this leaves room for a wide variety of physical and psychic causes, leads to illness.

From this came an acute sensitivity to environmental factors in pathology and a predisposition towards internal medicine in treatment. Thus, drug therapy and acupuncture, both designed to restore internal harmony, became the basic therapeutic techniques; surgery the most neglected. In diagnostics an elaborate symptomology was developed over the centuries placing great stress on the physician's close observation of external signs. The basic technique, however, was pulse lore which was directly linked to the theoretical assumptions about the five productive phases, *ch'i,* and the twelve meridians through which *ch'i* supposedly circulated.

To call the traditional medicine empirical because it did not develop the experimental and quantifying techniques of modern science is only partly true. Many of the practices may have been empirical in origin but, as with pulse diagnosis, they were incorporated into the prevailing theoretical assumptions of the medical classics. The explanation of why that theoretical framework was never shattered by expanding empirical knowledge is part of the question why the scientific revolution did not first occur in China, which at least up until the fifteenth century appeared better prepared for it, rather than in Europe. My own personal explanation of that very large historical question would, in common with Joseph Needham, the leading authority on Chinese science, place heavy emphasis on social factors.[6]

Social prestige and economic reward for physicians lay in their identifying as much as possible with the classically learned literati who constituted the social and political elite of traditional China. Hence, the reverence for their medical classics, and hence their disdain for any work of a manual nature which would identify them with artisans, instead of scholars. This not only retarded surgery—a messy business which medieval European physicians also left to lower class barber-surgeons—but also inhibited the whole development of the supportive physical and biological sciences which led the the development of modern scientific medicine in the West. The title that the upper class Chinese physician appropriated to himself *Ju-i,* "Confucian doctor," indicates his social aspirations to literati status. By itself medicine usually is supportive or adaptive to the prevailing social system. It should surprise no one that it was not the cutting edge of a scientific breakthrough in traditional China.

Yet, ironically, the social position of medicine was not very high in traditional China. For, no matter how hard he tried to adopt scholar's gowns and scholar's airs, the physician who practiced medicine for a living was still a specialist and a professional in a society with a deep bias toward the general and humanistic in learning. The really prestigious physician, the authentic "Confucian doctor," was no physician at all in the sense of being a full-time professional who supported himself by his medical knowledge. Rather, he was a gentleman and a scholar who, by reading the medical classics, had acquired the necessary knowledge, but only treated others more or less as an avocation out of purely humanitarian and philanthropic motives. The famous Sung dynasty philosopher Chu Hsi tellingly remarks of a famous physician:

> Sun Szu-mo was a noted doctor of literature of the T'ang dynasty, but as he practiced healing as a profession he was relegated to the class of artisan. What a pity![7]

The key phrase is, "as a profession." Scholars might practice medicine as a philanthropic hobby and be praised for it; but full-time medical specialists were artisans. The best or luckiest of them might achieve fame and fortune, but not as a class, or as a profession. As Huc remarked after his travels through nineteenth-century China:

> . . . the profession of medicine is considered an excellent conduit, or waste pipe, to carry off all the literary bachelors who cannot attain to the superior grades, or pretend to the mandarinate.[8]

The mandarinate, gentry status and government position, was the highest goal. Medicine as a profession was relegated to artisan status, even though the efforts of physicians to rise above that status by emulating their social betters had all the adverse consequences to the further development of medicine that we have already noted.

In sum, then, the traditional medical system was strongest in its therapeutics (especially herbal remedies) and diagnostics, but it was also locked into a theoretical and social system that gave it an overall unprogressive and unscientific character. Despite attention to many aspects of environmental hygiene, its lack of any germ theory of disease made it especially inadequate in dealing with epidemic diseases. No modernizing government in China could have found it totally adequate for the health needs of the nation, but there were large unresolved questions about how much of it could still be useful in the twentieth century.

But before using this legacy in traditional medicine the new Communist rulers of China had to come to terms with their own attitudes about it. This was not so easy, for since early in the twentieth century the traditional medicine had become involved in frequently acrimonious controversies between radicals and conservatives. As might be expected, Western influenced modernists had generally been quite hostile to the traditional medicine, seeing it as part of the incubus of unscientific tradition and superstition that must be removed before China could emerge as a modern nation. Conservatives, alarmed by the rapid inroads of Western inspired modernity into the traditional culture, reacted by identifying the traditional medicine as a valuable part of China's threatened cultural heritage. The very name adopted for the traditional medical system, *Chung-i,* "Chinese medicine," underlined the new feeling for it as a particular national possession. By the early nineteen-thirties defenders of the old system (albeit in an improved version) had sharpened the nationalistic connotations of its name by referring to it as *Kuo-i*, "National medicine." Despite the efforts of early scientific modernizers, especially modern trained Chinese physicians, to change this terminology, the terms *Chung-i*, "Chinese medicine," and its opposite *Hsi-i*, "Western medicine," remain in common usage and are now taken for granted in the Chinese People's Republic.

However, an earlier generation of Chinese radicals, including many of the founders of Chinese Communism, were not so cool about the semantic issue or the medical question. Sharing the cultural iconoclasm that characterized the radical movement that developed in China after World War I, they rejected the old medicine as a particularly noxious part of the old culture and society. It was all the more offensive to them because its preservation seemed a symbolic rejection of the science and modernity which they sought so desperately for China.[9]

But revolutionaries in power, even if only in control over limited and rather backward areas of the country, soon find that the responsibilities of governing interfere with nicely consistent ideological scruples. This is partly what happended to the Chinese Communists once they were in control of rural base areas, first in Kiangsi province and later in China's Northwest. There is little surviving evidence of medical policy in the Kiangsi Soviet of the early 1930s but what there is indicates that modern, "Western" medicine was the basis for what organized medical care they could provide for the army and the civilian population. There were, however, in the face of Nationalist government blockade, efforts made to utilize locally-grown native herbals. A decade later in the "liberated areas" of the Northwest this pragmatic self-reliance had grown into a conscious policy to use indigenous medical resources as much as was consistent with a modern "scientific orientation". This policy was legitimized at the highest level in Mao Tse-tung's famous 1944 speech to the Yenan Conference on Culture and Education where he urged modern-trained doctors to unite with and raise the scientific level of traditional practitioners in order to better serve the people.[10] But, despite later use of the speech to promote traditional medicine, there was no indication at the time that any kind of equal status was intended with modern medicine.

After 1949, when they faced the public health problems of the entire nation, the new Communist government continued this policy of organizing the traditional medical practitioners as auxiliaries to the modern medical forces. The paucity of the latter meant that a large part of actual medical care still had to be supplied by traditional medicine. The organizing and unifying of the two kinds of medicine under the direction of a Ministry of Health dominated by modern-style doctors seems mainly to have been aimed at controling and improving the numerous traditional practitioners by giving them some basic modern medical education while trying to train a sufficient number of modern physicians to replace them as soon as possible. In other words, traditional medicine was a stop gap until it could be replaced by something better.

To what extent this very second class status for traditional medicine was deliberate party policy and to what extent it was the interpretation of modern medicine-oriented directors in the Ministry of Health are still not entirely clear. There may well have been the same kind of tension between the political elite and the health professionals that had characterized medical policy under the preceding Nationalist government. But the Communist Party was much less willing to tolerate interference from particular groups in society even in their area of special competence. In 1954 the Chinese medical world was shaken by a vigorous Party-led campaign to raise the status of traditional medicine. This included denunciation of modern trained doctors and Ministry of Health leaders for despising and belittling "the medical legacy of the Motherland" and culminated in the purge of key Ministry personnel, notably Ho Ch'eng who had been the *de facto* Minister of Health in the first years of the People's Republic.

Apart from a great deal of glowing publicity for the positive aspects of traditional medicine, in concrete terms the new policy caused a significant shift in medical priorities. Traditional doctors were now brought into the modern hospitals and clinics with special wards being set up for acupuncture and herbal medicine. Modern doctors were urged to cooperate with and learn from their traditional colleagues. In fact, a whole campaign was mounted to have "Western (modern-style) doctors learn from Chinese doctors." For this purpose part-time courses in traditional medicine were set up in health units throughout the country, but the strongest indication of how seriously the Party took this injunction was the selection of 400 modern medical college graduates for an intensive three-year course in traditional medicine. When one remembers that at this time there could not have been much more than 20,000 modern trained doctors in China, it is obvious that the Party's announced goal of integrating the two medical systems was more than just a slogan. Those in charge of planning allocation of medical resources obviously thought there was a great deal of value in traditional medicine, and for more than just stop gap purposes.

Another indication of the new importance attached to traditional medicine was the opening of facilities for training new traditional-style doctors. For this purpose thirteen medical colleges for traditional medicine had been established by 1958 along with several hundred lower schools. But, as earlier reformers of traditional medicine had found, it was very difficult to systematize its lore and techniques into a regular curriculum. The traditional method of teaching had been through the master-disciple relationship and, although the new regime inveighed against the selfish and "feudal" aspects of treating medical knowledge as a private possession, it accommodated itself to "the apprentice method" in order to train more Chinese-style doctors. With official approval and encouragement over 50,000 students apprenticed themselves to distinguished traditional physicians. One aspect of educational policy towards traditional medicine was to have modern trained doctors study it in the hope of producing a new type of combined doctor, but the other aspect was to continue producing traditional style doctors alongside the graduates of modern medical colleges. The final goal was one medicine, and one track in medical education, but for the time being the two medicines and two tracks, old and new, were to be continued.

Thus in medical practice throughout China more attention and resources were given to traditional medicine. This included building some special hospitals and clinics for traditional medicine as well as creating special wards for it in existing hospitals. In 1955 there also was established a large and well-equipped Chinese Medicine Research Institute in Peking with a research staff of both modern and traditional doctors. Branches were set up in most provinces. Party directives carefully specified that their work should go beyond a mere analysis of the chemical properties of native pharmaceuticals. The entire body of traditional medical knowledge was to be considered and investigated, for "Chinese-style pharmaceuticals are inseparable from Chinese-style medicine." [11] In other words, traditional medicine was to be treated as a whole, its theory as well as its applied remedies investigated and reconciled with modern science. The announced goal was a true integration of the two systems of medicine, at the theoretical as well as the practical level—a higher medical synthesis from the joining of Western and Chinese medicine.

The reasons why medical policy took this sharp turn in favor of traditional medicine in the mid-1950s are still open to conjecture. However, several relevant factors are apparent. First, there was a general return to pride in China's own cultural accomplishments after the infatuation with Soviet styles and models in the first few years after the revolution. The renewed interest in and praise for "the medical legacy of the Motherland" coincided with a nationalistic upswing in fields as diverse as theater, painting, and architecture. The strong note of national pride running through the pronouncements on Chinese medicine was part of this. The fact that medicine was the only area in the whole scientific realm where Chinese could find something of present-day value in their own national tradition gave added force to this.

But cultural nationalism by itself seems an inadequate explanation. One has to ask the question why should Communist revolutionaries develop this nationalistic pride in certain aspects of Chinese cultural tradition at that particular time. General theories about revolutions always cooling down and tempering their rejection of the past are helpful.[12] But, in view of such reradicalizing movements in the Chinese revolution as the Great Leap Forward (1958) and the Cultural Revolution (1966), it is hard to see the Chinese Communists as any kind of restorationists. My own explanation of the psychological and historical factors that permitted Chinese Communist revolutionaries to come to terms with these aspects of the traditional culture is that, precisely because so much of that old culture and its societal matrix had been smashed by 1954, it was possible for a Communist leadership, feeling itself securely in power, to select and rehabilitate isolated fragments of the traditional culture as parts of the Chinese people's national heritage.[13] Medicine—because of the Confucian literati's disesteem for it as a tradesman's calling—has been relatively easy to identify with the healthy elements of the popular culture. When traditional medicine stood as part and symbol of a still living traditional society early in the twentieth century, revolutionaries had to hate it. With the old society destroyed, the revolution triumphant, that psychological compulsion was gone and other factors, nationalistic pride and practical needs, could influence their attitude.

The practical needs are obvious in the national sphere—shortage of modern medical personnel and facilities, limited economic resources, a vast population and many endemic diseases—to which we have already alluded. But there were also what might be called practical needs for the revolutionary leadership in the ideological sphere within China's modern medical profession. To put it simply, the modern medical personnel left over from the old society were desperately needed for building the new China, but on political or ideological grounds they were especially suspect because of the very close association modern medicine in China had had with the Western "imperialists". Not only had most of the leaders of China's modern medical profession been educated abroad, in the United States or Western Europe, but most of the leading hospitals and medical colleges in China had been missionary founded. Moreover, apart from this past contamination, the Party found that the independent professional status of the medical profession constituted a challenge to the Party's total leadership of the new society. The problem is not peculiar to medicine. It has existed wherever professional specialists have tried to assert a degree of autonomy from the Party's control by virtue of their special competence in a particular area. The common expression of this tension is in the terms "red" (political orthodoxy) and "expert" (technical competence).[14] Whether or not the Party leadership deliberately took traditional medicine as a means of knocking down the status pride of modern doctors, attitude towards traditional medicine did become an ideological question. Medical personnel who resisted the Party's directives to devote more attention and more resources to traditional medicine were guilty of ideological deviation. The decisive charge against Ho Ch'eng, the purged Deputy Minister of Health, was "refuting the ability of the Party in the supervision of scientific and technical work".[15] Since the mid-1950s traditional medicine has been a political as well as a medical question, and any overt criticism of it has understandably been muted.

This does not mean that there were no changes in policy towards traditional medicine over the next decade. In retrospect, it appears that what the Cultural Revolution identified as "the two lines"—the revolutionary, populist line of Mao Tse-tung and the revisionist line emphasizing technical and economic progress of Liu Shao-ch'i—were both present in the medical sphere and that their interaction produced many of the fluctuations regarding traditional medicine. Thus, praise and support for traditional medicine reached its acme during the revolutionary zeal of the Great Leap Forward, 1958–1959. The indigenous medical system, and especially its popular folkloristic features, fit very well into the depreciation of technical expertise at this time. After all, if an engineer could learn from a coolie, and an agronomist from an old peasant, why not have a modern medical specialist learn from a native herbalist? With the "mass line" in ascendancy, science was no esoteric monopoly of the highly educated few. Enormous numbers of home prescriptions were collected to prove the wealth of medical wisdom latent in the Chinese people and dubious modern doctors were exhorted to use traditional remedies in their own practice. For a brief period, research articles disappeared from the prestigious *Chinese Medical Journal* in favor of paeans of praise to traditional medicine and the Thought of Mao Tse-tung.

With the retreat from the more extreme policies of the Great Leap Forward, emphasis on traditional medicine also declined. By the early 1960s it no longer dominated medical journals or general publicity about China's medical accomplishments. Although courses in traditional medicine, especially herbals, remained in the curriculum at medical colleges, most medical education seemed to be along modern international lines. There were some triumphs for the official policy of combining Chinese and Western style medical treatment, notably in the resetting of fractured limbs with mobile splints.[16] But there was no theoretical breakthrough towards a medical synthesis. Modern doctors apparently practiced fairly standard modern scientific medicine while their traditional colleagues worked mainly along familiar traditional lines. As for the combined type doctors, they seem to have largely become traditional style practitioners. The two track medical situation was still in existence and modern medicine was the more important of the two.

But the lessened official enthusiasm for traditional medicine did not mean that it ceased to play an important role in providing health care for the nation. Admittedly, as the number of modern trained doctors rose the dependence on traditional medicine declined, but it remained a prominent feature (much commented on by Western visitors) in China's urban clinics and hospitals. Its most significant role, however, was apparently still in the countryside where "rural health centers" had been set up along with the communes in the Great Leap Forward. There it continued to provide the bulk of the medical care for the peasantry, while simultaneously absorbing some elements of modern medical practice. Although evidence is rather slim, there is some indication of considerable cooperation in the day-to-day practice of the two kinds of doctors staffing these centers. Usually this has helped the younger and more flexible Chinese-style doctors to absorb some of the ideas and techniques of modern medicine, while the modern doctors could pick up from their traditional colleagues some useful medical knowledge and even more useful knowledge about handling rural patients.

Apart from this interchange of knowledge, the integration in the rural health center has probably been of considerable adaptive value in bringing modern medical care to the villages. Coming in close association with familiar traditional practice, it has probably had to face less suspicion and resistance from culturally conservative peasants. Patients who might tend to avoid a foreign-style doctor could go to the Chinese branch of the clinic where they might obtain some modern medicine even from the traditional-style doctor or, if the case merited it, they could be turned over to the Western-style doctor. As Robert Worth concluded in his study of the rural health center in the mid-1960s: "The rural health center rode into being on the familiar figure of the village boy turned apprentice practitioner." [17] And, as students of medical anthropology are well aware, this smoothing of a major cultural transition has great advantages.

In sum, it appeared in the mid-1960s that traditional medicine would continue to play an important but auxiliary and, over the long run, transitional role in China's medical modernization. Then came the Great Proletarian Cultural Revolution.

As in every other area of Chinese government and society it profoundly shook the medical world and the policies being followed there. In its anti-traditional aspects, the campaign to destroy "the four olds," the Cultural Revolution could, and to a certain extent did, prove antagonistic to traditional medicine. Other parts of the traditional arts and culture certainly have not fared well in the last few years. But this anti-traditionalism was more than counterbalanced for traditional medicine by the affinity between its popular aspects, especially in their anti-expert connotations, and the Cultural Revolution's assualt on bureaucratic and technical elitism. In spirit, the Cultural Revolution was a direct descendant of the Great Leap Forward. Indeed recent accounts of the struggle between the two lines in medicine repeatedly refer to the innovations of the Great Leap Forward as expressions of the correct Maoist line.[18] Thus, white-frocked specialists separated from the masses were again under suspicion, and under attack. And with this assault on public health authorities and Western-style doctors came a new assault on modern medicine and a corresponding reemphasis on traditional medicine. But, as we shall see, there have been significant differences from the revival of traditional medicine in the 1950s.

The gathering storm of the Cultural Revolution actually affected the medical world almost a year before it broke in all its force on the political front. In 1965 Mao Tse-tung himself expressed serious dissatisfaction with the way medical policy was developing, and under the slogan "doctors to the countryside" he personally called for a major reordering of priorities. This began the rotating of medical personnel from urban hospitals and medical colleges into the countryside as mobile health teams. The point was repeatedly made that this would have positive ideological consequences for the doctors by exposing them to the rural masses as well as medical benefit for the peasants themselves.

By the summer of 1966, when the Cultural Revolution hit full stride, even this corrective therapy for physicians took a back seat to the training and publicizing of the "barefoot doctors." The overall role of the barefoot doctors in China's public health scheme is discussed elsewhere in this volume. Here we are only concerned with how their sudden appearance and the general populist thrust of the Cultural Revolution affected traditional medicine. As the picturesque name given them suggests, the barefoot doctors are not highly trained medical specialists. Rather, they are practitioners with little or no formal medical education recruited on the local level for part-time medical work in their own native villages.[19] This means they must rely heavily on local resources, both material and intellectual. In medicine, what is available at the village-level generally belongs to the traditional medicine. Acupuncture, which does not require expensive modern equipment, and locally grown herbs, therefore, seem to have been the chief stock-in-trade for the barefoot doctors. Though they do not practice purely traditional medicine and apparently have only minimal training in its theoretical principles, the inexpensiveness, availability and popularity of traditional medicine has brought it to the fore once again along with the barefoot doctors and rural medical cooperatives of the Cultural Revolution.

The rural medical cooperatives are the main institutional expression of the Cultural Revolution's drive for decentralization of bureaucratic structures like the Ministry of Health and emphasis on local self-reliance. Notice of them first appeared in the national press in late 1968.[20] Organized and financed by either the commune or the production brigade, they are local cooperative health systems bringing socialized medicine to the countryside for the first time. Members pay an annual subscription and then only nominal fees for treatment. Again, local self-reliance with minimal dependence upon country or urban hospitals is the keynote. In a sense they seem to have grown out of the rural health centers of the early 1960s, but appear to be more decentralized in organization and rely more heavily on traditional medicine in this practice. Evidence is still fragmentary, and there is an urgent need for direct observation, but Chinese news accounts suggest that a large majority of the patients treated in the countryside receive mainly traditional therapy. For example, Canton radio reported that as of 1970 "from 70 to 80 per cent of the cases dealt with by the clinics of the people's communes in Kwangtung (province) were treated with medicinal herbs and the new method of acupuncture".[21]

Thus, the medical policies of the Cultural Revolution brought traditional medicine back into prominence. Throughout the late 1960s the medical miracles extolled in the popular press (medical journals have been out of publication since 1966) were almost entirely concerned with acupuncture, herbs, and large doses of the "Thought of Mao Tse-tung." Particularly prominent were stories of the miracle-working effects of acupuncture when applied by a politically conscious practitioner (usually a People's Liberation Army medical corpsman) who had learned the art by practicing on himself. The scientific basis for all these claims is by no means clear, but the political or ideological function—belittling bourgeois specialists and extolling the creative power of ideologically inspired masses—was obvious. In a typical case story, an Army doctor patiently treats a child paralyzed by polio. The case closes triumphantly when "Liu Li-min was able to walk over to a portrait of Chairman Mao and, with tears welling up, said: 'The arch renegade Liu Shao-ch'i plagued me; it is our great leader Chairman Mao who has saved me. When I grow up, I'll serve the people heart and soul' ".[22] In the last couple of years, as some of the more extreme manifestations of the Cultural Revolution have died down, such enthusiastic testimonials have somewhat declined, although opposition to traditional medicine continues to be identified with the arch-renegade Liu Shao-ch'i and his revisionist clique.[23]

The position traditional medicine has assumed in the drastically revised, and apparently still not stabilized health system that has emerged out of the Cultural Revolution is far from clear. The curricula announced by the reorganized medical colleges all mention acupuncture and herbal remedies among the required courses "combining the Western school and the Chinese school of medicine".[24] Presumably the barefoot doctors, being taught at the village level or in rural hospitals, get even more of the traditional therapeutics. Similarly, recent reports of model hospitals (usually Army hospitals) stress combined treatment of diseases using both kinds of medicine[25]. One hospital near Peking reported that since its founding in 1969, 70 per cent of the cases have been given combined treatment.[26] Diseases specifically referred to include hepatitis, pulmonary tuberculosis, diarrhea, facial paralysis, acute kidney inflammation, tubercular pleurisy, ascariasis of the bile duct, phlebitis, severe burns, nephritis, setting of fractures (an old triumph for "combined therapy"), and the current showpiece of the Chinese medical world, acupuncture anesthesia.

One of the big unanswered questions about this revived prominence for traditional medicine is to what extent the original goal of 1955, when the Chinese Medicine Research Institute was set up, has been abandoned. Then, the theory as well as the techniques of traditional medicine were to be investigated and "scientificized" to produce a true medical synthesis, not just an appropriation of selected aspects of the traditional medical lore by modern "Western" medicine. The extreme emphasis on practical experience since the Cultural Revolution, and concomitant depreciation of formal research, gives the impression that the renewed emphasis on traditional medicine is concerned mainly with specific remedies or techniques and not with understanding or preserving traditional medicine as a theoretical system. Similarly, the publicity for it has not extolled the skill and wisdom of full trained, and often venerable, traditional style doctors as it did during the 1950s. Instead the heroes have been barefoot doctors or Army medical corpsmen who, instead of spending long years in assimilating all the principles behind practicing traditional medicine, have learned how to practice "improved" acupuncture or give certain herbals in the space of a few months. The medical populism and distrust of tradition so prominent in the Cultural Revolution have not been entirely kind to traditional medicine as an integral system of theory and practices. In a most stimulating paper delivered to the Wenner Gren Foundation's symposium "Toward the Comparative Study of Asian Medical Systems," Dr. Paul Unschuld suggested that the medicine emerging out of the Cultural Revolution was not traditional Chinese medicine at all.[27] Instead the Chinese Communists had found a way to keep its name and appearance while really training a new force of paramedical personnel who, as their standards of training improved, would become more and more modern medical practitioners.

Confirmation of such a view is something that only time, and much more direct observation of what is happening in China's medical world, will bring. For the present, one cannot emphasize too strongly that in traditional medicine, as well as so many other spheres, our knowledge of China is far too fragmentary for anything more than educated (and sometimes not so educated) guesses. This paper has emphasized nonmedical factors—political, ideological, and historical—in discussing traditional medicine as a basis for medical practice in Communist China. It is not intended to imply that more purely medical, or scientific, questions about Chinese traditional medicine are irrelevant. But other articles in this volume treat those questions in greater detail and it has seemed important here to make clear that traditional medicine has a long and complicated history of involvement in other than purely medical issues.

When American medical scientists have access to China, traditional medicine is likely to be one of the features of China's medical practice that will be most shown to them. It is essential that in appraising what they see, and are told, they have some understanding of the background issues that have influenced the position of traditional medicine in China today. Of course, they should take the traditional medicine seriously. To do otherwise would not only risk missing the opportunity of learning something that might be of real scientific value to international medicine, but would also be one of the surest methods imaginable to block further improvement in Chinese-American relations. Certainly medical scientists should maintain scientific objectivity but they must also realize that traditional medicine is one area where their Chinese hosts, and especially the Communist Party, are apt to be especially sensitive. After all, over the last two decades, traditional medicine has been a sensitive issue in China itself.

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THE ROLE OF THE FAMILY IN HEALTH CARE

Janet W. Salaff, Ph.D.

INTRODUCTION: HOW DOES THE ROLE OF THE FAMILY FIGURE IN HEALTH BEHAVIOR?

In their exploration of social and cultural factors related to health care sociologists have examined the role of the family from two main angles: as an agent in the etiology of disease, and as a unit in medical treatment.[1] The institution of the family provides a broad context in which the theories of the single vector or the germ theory of disease can be placed, thus significantly adding to our understanding of health and illness. An examination of the Chinese family—its position in the community, its internal organization and culture—should prove useful in comprehending disease causation, prevention, and cure in the People's Republic of China.

One main reason for concern over the part played by social factors in the contraction of disease is the apprehension that the prevalent and often fatal illnesses bringing people to medical facilities in North America are no longer chiefly epidemic and contagious diseases, but the chronic and mental illnesses that resist direct attack on the vector, or where the vector is unknown. These diseases often have social roots. The family as a social institution may "cause" illness in two ways.[2] As a system of interacting personalities, the family may create a stressful environment which renders members unfit to resist disease. Second, the family is an intervening variable, passing on culture and poor living circumstances (cultural determinants have been suggested for higher rates of some diseases among the poor).[3] Therefore, the role of the family is important in grasping the etiology of disease.

Second, the characteristics of the family have a bearing on the effectiveness of treatment. The family is a problem-solving system, yet some people search out services to cope with illnesses and others become resigned to low levels of health. Hence, many diseases of the poor remain "hidden" and do not receive treatment at all.[4] To overcome the inequities of medical care, the quality and organization of medical treatment is being scrutinized in North America, and the family has become a unit of treatment. In attempting to improve poor people's access to medical services, the O.E.O. began to train community health workers to serve in their own neighborhoods, where they would be quick to spot certain kinds of illness endemic to their area and successful in treating it.[5] It was also found that care improved when medical workers kept case records of and treated entire families.[6] If the culture of the area were taken into account, medical care could become more accessible geographically and psychologically to diverse social groups.

Questions related to the organization of medical care in China also bear on the role of the family. The accomplishments of two decades of attack on communicable and epidemic diseases[7] have shown that certain chronic and degenerative illnesses persist at higher rates among certain regions and classes. In China, too, a lively discussion is underway on the contribution of local culture to preventive and curative techniques. Prevention of illness is stressed, involving social institutions, for instance, in organizing community sanitation drives to prevent endemic parasites. Methods of organizing and financing medical care for the community are being debated. To what extent should medical workers enter into the overall context of peasant life or treat citizens in a narrow capacity as healer? An examination of the functions of the Chinese family in the community and the strength of family culture should shed light on the social context of illness and medical care.

Towards this end this discussion of the role of the family has been organized into five sections:

1) Sources of data on family life and population processes.

2) The relationship of the family to the community. To what extent is the family in rural and urban China still a unit that fills numerous functions which are not performed by the community? Or, has the family become an institution which is a buffer to the community; in this sense does it simply mediate outside services while the community performs manifold production and consumption activities?

3) Internal organization of the family and the status of generations and sexes. An analysis of the changing status of youth and women in the Chinese family should prove useful for a broader understanding of trends in health and welfare. The rising position of youth and women appears related to levels of health both as independent and dependent variables. The historical experience of European society has shown that declining infant and child mortality leads to a change in the status of youth.[8] When they no longer fear their children will die, parents can

afford psychologically to invest emotional commitment in them. The emergence of the period of youth as an important social status appears in turn to have contributed to improvement of health care. The professionalization of occupations, including the medical profession, has been connected with emphasis on learning as an attribute of youth, and decline of the monopoly of knowledge by the elders.

The status of women in the family has also had a bearing on social health and welfare. Bierman has observed that major changes in legislation of significance to maternal and child health both within the individual states of America and among the nations of the world have tended to follow the introduction of women suffrage.[9] Knutson hypothesized further that this was perhaps due to the stronger religious, esthetic, and social value orientations of women that were given political importance after suffrage. Their greater independence and higher educational levels have also been accompanied by improvements in child-rearing practices, with implications for the health of mother and child.[10] This section asks how does the Chinese family structure the social roles and statuses of its members by sex and age? To what extent has the prestige of youth and women increased?

4) The family as repository of culture. As one gateway to culture the family plays an important role in defining illness and mediating access of its members to such care that exists. Since "health" and "disease" are concepts which vary from culture to culture, the family passes on explanations of the causes and cures of what it defines as illness to members. Like other peasant societies,[11] the Chinese culture has a three-fold classification of illnesses and their cure: trivial every-day complaints may be treated by home remedies; "European diseases," such as measles and malaria, respond to Western scientific therapy; specifically "Chinese diseases" which are not likely to be understood or treated successfully by Western medicine may be treated by traditional doctors.[12] The search by family members for a cure will be mediated by the definition of the disease, and the family plays an important role in this regard. This section will deal with the family as repository of culture. Does the pre-Communist folk culture continue to dictate the behavior of peasants, perhaps underlying their more sophisticated veneer of modern vocabulary and dialectical thinking?

5) Patient-practitioner relations and the role of the family. The trend in Chinese society is to increase the role of the community in providing its own health care, reducing the part of the isolated family and of the professions. How does the family unit figure in the "therapeutic relationship"? To what extent does the family still influence its members to serve in the health professions?

SOURCES OF DATA ON FAMILY LIFE AND POPULATION PROCESSES

Information on the role of the family and its relationship to medical services can be obtained from four sources: press accounts of current health-related events, travellers' reports, data from medical research journals, and interviews with former mainland residents.

Press reports. The purpose of the Chinese press is didactic. Its main aim is not to report events, but to direct and exhort and to create confidence in current political movements. The selective coverage poses a key problem to the researcher trying to ascertain the reliability of press accounts. The focus is often on "models" to be emulated, and this means that average cases or failures in any social experiment are less likely to be discussed. Likewise, the differential responses of various social strata to campaigns are rarely compared.

The political climate in China may also lead to misreporting; this calls into question the validity of information received from the press. Purposeful falsification is more likely when the careers of local leaders depend on the outcome of events that are reported.

The chief method of checking both the reliability and validity of the press is to draw on a variety of sources reporting the same events. On some issues the press covers the responses of a variety of social groups and geographical areas. The discussion of the introduction of the Marriage Law in the early 1950s was one example. A shift in political climate, such as the Cultural Revolution, may spark criticism of past reports. Internal documents criticizing policies may occasionally come to light. Numerous useful studies on the Chinese family have therefore drawn on press reports. One of the best is that of C. K. Yang, *The Chinese Family in Communist Transition.*[13]

Travellers' tales. Press items can also be compared to travellers' tales, although this information must also be treated with caution, since the government often arranges the places to be visited by outsiders. Useful monographs dealing with family life have been written by foreign visitors or habitants of the PRC. William Hinton's study, *Fanshen,* provides a clear picture of peasant life in the liberated areas of northern China pre-1949. W. R. Geddes (*Peasant Life in Communist China*) restudied a village in the Yangtse River delta in 1956; it had previously been studied by Fei Hsiao-t'ung in the 1930s. The Myrdals in *Report from a Chinese Village* and *China, the Revolution Continued* discussed the lives of the habitants of a northern village visited in 1963 and again in 1967. Isabel and David Crook (*The First Years of Yangyi Commune*) are two European residents of China who restudied a village after several decades.

Only one of these works, that by Geddes, took a "census" of a cooperative; the Myrdals inventoried household expenditures. But the political atmosphere since 1962 has made it more difficult for visitors to collect data systematically from the local registration system, or from house to house surveys. Travellers' tales suggest ideas, but provide fragmentary evidence at best.

Population surveys and medical research journals. The greatest deficiency for the social scientist studying China is the lack of demographic data. The Chinese do not now participate in international data banks nor do they publish their census tabulations or registration data.[14] It may be argued that the government has not released population data because of their low quality. Just as likely, the officials are concerned with the political implications of publicizing population size, distribution, and composition. The 1964 "census" results have not been revealed, although the quality is probably higher than that of the 1953 census.

Specialized journals on medicine publish some biostatistical materials that can be used in studying demographic processes and disease rates. The U.S. National Library of Medicine has collected a series of regional and national medical journals from the PRC. Their publication ceased during the Cultural Revolution. I have suggested elsewhere that such surveys do provide reliable and valid data on epidemiology, and on adoption of contraceptive techniques.[15]

Interviews with former mainland citizens. This paper,[16] as well as other studies,[17] draws on interviews with recent émigrés from the mainland. Although most respondents were from southern China, both rural and urban areas and all social strata were represented. Both married and single people were interviewed. Emigration from China after 1964 was more difficult than during the previous three years, and the fact that respondents took this difficult course often affected their family relationships, a topic dealt with in this paper. Some postponed marriage until after the move, while others found that family demands on them were different than if they had planned to remain in China.

Why did they migrate? Any one migrant has several reasons for leaving China, but general patterns of decision-making emerged. Most wanted a higher standard of living or different career pattern than they thought available to them in China. Many also had a political stigma, which would have blocked advancement in their careers or political status.

Readers may suspect that the fact that informants were refugees and often political pariahs colored their information. I do not believe that this was the case. Refugees expressed as many different opinions toward the government depending on their past class background and their perceived economic prospects as did Overseas Chinese. While a minority were bitter, many others showed pride in the accomplishments of the PRC. Respondents were also willing to discuss sources of their attitudes toward the country left behind. Far more critical for a study of family relationships is the cultural prohibitions against frank discussion of actual family behavior and relationships. Visitors to the PRC. often bring back reports of family life from discussions with citizens; such reports often describe the cultural ideal of the family life, rather than descriptions of actual behavior. The problem is magnified when interviewing émigrés outside of their homeland; an extended stay doing participant observation may be the sole method of gaining deep understanding of family life in China.

THE FAMILY AND THE COMMUNITY

The Family as an Institution: Background

The nuclear family has not been eliminated, but from various sources of data it can be surmised that numerous reforms have weakened the family as an independent institution. The dynastic pattern of limited state rule at the village level had allowed families to assume political functions. After 1949, in contrast, the village was penetrated and reorganized along new lines. This brought about alterations in family structure and in the quality of relationships between generations and sexes.

In the areas in which it held power before 1949, the Chinese Communist Party instituted programs aimed at destroying the political power of the lineage. Two important reforms were carried out: land reform and implementation of the marriage law. Land reform handed out land deeds to every man, woman, and child, thus removing the property base from the family and lineage. Marriage reform was a necessary concomitant. Only if the family lost its power to arrange the marriages of the offspring and to charge high sums of money for a daughter's hand would women be free to assume land ownership. The Marriage Law of 1950 (the latest of several versions) established freedom of marriage and of divorce and gave equal rights in marriage to men and women. Marriage was founded in the interest of the two parties, not in the interests of their families. After these two reforms, the legal and economic basis of the joint household of the wealthy was destroyed. This was an important step in changing the political system.

To what extent is the Chinese family evolving along the path—"from patriarchy to companionship"—taken by North American families? The "companionship family" refers to a unit which takes charge of procreation, early socialization, consumption, and mediation between outside institutions and family members; it serves to provide an emotional haven from outside pressures for competition and achievement. This family type emerged with the mature industrial state in the West. China, however, is in the developmental phase of industrialization, in which society's resources are channeled into capital accumulation instead of social services and consumer goods. As a result, a dominant feature of the rural Chinese environment is the low level of social services when compared with the urban way of life.

The concept of the "transitional society" may be more useful for understanding the community which shaped the kinship institution in China. This type of society is characterized by rapid social and economic change and families with numerous children. Few extrafamilial services exist to supplement the family's functions. Thus, it performs a multitude of services in regard to: production; political activities and allocation of status; child care, socialization, and training; maintenance of health and welfare of family members; and care of the elderly. In the following pages it will be argued that the rural family, comprising the bulk of the population, remains a significant social and cultural institution in Chinese society, and it cannot be characterized as a companionship family.

FUNCTIONS OF THE FAMILY

Economic functions. In sociological terms the reforms of rural production in the first decade after liberation transformed the villagers from peasants to "rural proletarians".[18] After land reform was completed in 1952, land was collectivized (1955–1957). Today the peasants live in "people's communes", administrative and productive units owned collectively by the people, in contrast to state farms which are owned by the state. Communes provide the basic grain crops needed for the members' livelihood. Many also supply cash crops to the state. The populace is now more closely involved in a market economy. Alienated from land ownership, they view land as a means of production as would a factory worker; it is not a family possession. Members work the land in teams with other villagers of equal ability and strength, rather than with their own family members. Now the family no longer forms a single production unit.

Yet the transformation from farm to rural factory labor has not been complete. Peasants do not receive a uniform predictable wage; they are not unionized. The wage of the individual is calculated in work points allotted on the basis of days worked, and the amount of strength and skill the job requires. But income also depends on the productivity of the land and the year's harvest. The income of the peasant farmer is low, ranging from 127 yuan* to 330 per capita per year.[19] In contrast, the average factory worker's wage is 50 yuan per month or 600 yuan annually. The family cannot predict its income from the collective from year to year. This is not to say that rural families verge on starvation. However, the sources of their incomes remain uncertain and varied; they depend on the collective for grain and on their own tiny vegetable plots or household handicrafts and livestock and poultry for food and cash.

In the past the household head (*chia-chang*) controlled and managed the family property. Restrained by the 1950 Marriage Law, the patriarch's right to control his family's economic future still continues in custom to some extent. An average peasant family requires the earning of at least two adult members. Although they earn their income as individuals, all members of the household must contribute their income to the family purse. In interviews of former peasant families, it was found that young adults still handed over all their earning to one household "manager". Usually, the eldest woman, the wife of the grandfather, manages the expenditures and income of the family, giving her considerable power over the occupational choices of the offspring. If the labor of all children cannot be spared, family meetings may be held to decide which has the opportunity to continue school.[20] The occupational future or the marriage prospects of the boys or girls may be discussed because it is a factor in the economic situation of the family. Political education sponsored by the Communist Party has countered the single-minded concern for offspring to achieve. Nevertheless, parents insist that their children achieve in school in order to raise the position of the entire household. No longer prescribed by family law, a collectively managed household economy is nonetheless critical for the rural family's survival.

The household is a production and consumption unit. Families still perform the essential role of maintaining and rearing workers for production; this has not been taken over by the community. Without outside agencies to perform household work and to provide labor-saving devices for the home, upkeep of the household is time consuming. The women do the marketing and prepare the food. The absence of refrigeration and packaged food means the housewife must spend time daily and each season in producing, salting, and putting away vegetables. Canteens can be found in urban factories; in rural areas mess halls exist only at harvest time. Housework is performed by each family. Mothers sew some of the clothes, although cheap work clothes and shoes can be purchased. The sewing machine is a prized possession. Thus the

*One yuan = 42¢ U.S.

rural family remains a production unit manufacturing rather than purchasing much of what it consumes.

Changes in the collective economic structure have affected the family's range of decisionmaking. Money can be borrowed from the commune bank for necessities, and villagers need not depend on personal relations or money-lenders. The family head cannot pass on his job to his offspring, nor can he decide the precise jobs his child will take; but he will teach his children an orientation to succeed. He cannot reinvest any surplus profit earned by his son's labor or from the sale of private produce. Neither will the family be driven into starvation should members of the household fall ill, or should the family enter the stages of family formation which have a high ratio of dependent to productive members, such as numerous small children and aged adults to workers. In such cases, the commune may help out with a small welfare subsidy. Despite these changes as a rule the peasant family cannot earn enough to survive the continued disability or death of its main breadwinner. Kinship ties in rural China remain closer and more supportive than in the cities because the limits of the farm economy, which are felt less severely in urban centers, require the family's filling important production and economic functions.

Political-legal functions. The traditional Chinese family, not the individual, was the basic political unit for all social classes in Confucian China. The families in the village aggregated into lineages (popularly called clans), which drew up laws. They held court and used social pressure to gain adherence to these laws which were largely moral injunctions to the family members to behave properly. Only if the elders failed to control the kinsmen would the relatively small number of imperial officials at the county seat take over, an occurrence which all parties tried to avoid. The state ruled passively; minimal compliance and payment of taxes was all it demanded from its citizens. Even among the poor, family members were held responsible for one anothers' debts and crimes.

Under socialism the individual is to be incorporated gradually into collective life. As one form of a collective, the family is accorded some political functions, the most important of which are political analysis, mobilization, and the assumption of collective political responsibility.

Since family members share the same social class, no generation gap is expected in values and attitudes of younger and older household members. Contradictions are recognized within the family as emerging from different social outlooks resulting from patterns of life experience. Offspring of proletarian and poor and lower-middle peasant parents must educate their elders respectfully into the proper political views. Youth thus have an obligation to discuss and resolve political differences with their parents, following the new standards of Mao thought. An upsurge of Mao Tse-tung thought study classes held in the family reflects the belief that even family problems are amenable to political analysis. Mao's thought is a flexible yet general measure against which the contradictions in the family can be analyzed.[21] The youth need not break with their proletarian family members, but should win them over through discussion and analysis.

Taught that the collective's property is more important than that of the family, the young people partake in mobilizing family members to work for the collective without remuneration.[22] This can be seen in such mundane activities as raising an extra pig for the collective without charge, working overtime or serving as a cadre with low pay in place of doing handicraft work at home, or using spare time to clean up sanitation ditches during "patriotic public health campaigns".

Family members share collective political responsibility. In contrast to the Soviet view that spouses are not liable for each other's political attitudes,[23] in China a husband must assume responsibility for his wife's political participation and children assume this responsibility in regard to their parents.[24] An individual also bears the political status or label of his family. The family class label such as "poor peasant", "middle peasant", "landlord" status was set during land reform, based on the family's relationship to the ownership of the means of production at the time.[25] This label is inherited and cannot be changed. The pariah son of a formerly exploiting social class can be educated into new attitudes, but he may have to prove them by opposing parental misdeeds and leaving the family.[26] This is a difficult act, since the family depends on their offspring's labor for survival. The need to draw a clear line between a person's parents and his own political views requires frequent reexamination of his political attitudes. The youth remain vulnerable to their family's political background and in tension with them at the same time. The collective family responsibility may be related to the low level of economic development where one's occupational position remains identified with that of one's parents.

The Large Family System

The large number of functions performed by the rural family results from the "large family system" which, as described by Bossard and Boll, refers to a nuclear or stem family with numerous offspring in industrial society,[27] not the joint household composed of several nuclear units of traditional China. The former sizeable family required an extensive division of labor to perform its many tasks, such as clothes making, food preserving, child care, and babysitting, that in smaller urban families might be performed by outsiders. A considerable proportion of Chinese families now have such large family systems. A survey taken in China in 1959 found the average number of children ever born to women aged 45 to 49 was 5.3 for urban families and 7.3 for rural families; women aged 35–39 had borne an average of 4.9 and 6.2 children respectively.[28] This is a result of the family and community expectations which structured incentives for childbearing, encouraging families to bear many offspring; because of past high mortality only a few were expected to survive.

Since infant and child mortality has dropped sharply, it can be predicted that the numerous children borne in the 1950s would survive. Fertility decline generally lags behind mortality decline. Some time may elapse before fertility drops to meet mortality levels, a process known to demographers as "the demographic transition". Although the second generation born under the new regime may well lower their family size in contrast to their parents,[29] their own families of orientation (their parents and siblings) are generally large.

Large households require the youths' active participation in their upkeep. They must be willing to perform many of the tasks their mothers might have done in a smaller home. Housework, care of younger siblings, care of the ill, and farm tasks are responsibilities for the children. Siblings of distant ages take on parent and child roles, and those of adjacent ages are close friends. Large families also share numerous rituals and extensive family histories. Such a family feels crises severely. When members are ill, they spread illness. If the breadwinner dies the family and relatives step in to help or otherwise the others are plunged into poverty. The commune provides only a modicum of welfare services. The large family system is a product of the "transitional society" in which birth rates remain high although mortality has declined, and family ties are strong out of necessity for common survival.

Childbirth, Child Care, Early Socialization, and Education

As in other Socialist societies, the Chinese leadership stresses that children belong to the nation, not to the family. A future goal is to remove socialization of offspring from the family sphere. Short of that, parents are urged to raise their offspring to serve the interests of the nation, not the family. The importance of children to Chinese society is stressed at their birth. "One pregnancy, one live birth; one live birth, one healthy child" is the slogan.

Before 1949 the low status of young women was reflected in high infant and maternal mortality rates.[30] The women's health was poor. The high incidence of osteomalacia among women in North China may have resulted from differential eating patterns and work habits of the sexes; [31] as a result childbirth was dangerous. High levels of infant mortality resulted from the common notion that childbirth was defiling. The pregnant woman was considered unclean; she could not pass through the neighbors' front portals for fear of offending the gods guarding it.[32] Childbirth took place in cowsheds and pigsties since the fetal blood defiled.[33] A woman in labor was commonly referred to as having "one foot in the grave and one foot out," and midwifery was a low status occupation.

The improved position of young women in China is reflected in superior conditions of childbirth. "Old style" midwives have been retrained, and activists recruited to replace those who boycott training classes. By 1956 it was estimated that trained health workers oversaw 60 per cent of rural births, greatly reducing infant and maternal mortality.[34] During the Great Leap Forward in 1958, the collective took over childbirth. Brigades constructed "happy nursing homes". Included in their services were: grain and oil subsidies brought to the women; child-care during delivery; pick up and return of the women from prenatal examinations and childbirth; recreational and political education for women while in the clinic. The mother was expected to leave her child at the children's home until it was of age for nursery school. Such attempts at collective childbirth quickly collapsed, and birth returned to the home in rural areas and to neighborhood clinics in urban centers.[36]

Should less expensive community social services for child care become available, family control over socialization of offspring could be reduced. During the Great Leap, a time when women were encouraged to work the fields, day care centers were built in numerous rural and urban communes. These did not survive, due to their cost and the paucity of trained women with leisure to run them. Mothers were concerned about the rapidity with which illness spread through the nursery, and the times set for fetching children conflicted with the dinner hour. Despite such inconveniences, women regard such centers favorably; there, their children "learn many good things" that they cannot learn at home, such as reading, nursery rhymes, and games. If centers were widely available at low cost they would be utilized by rural working women as they are now by urban factory wives.

Nurseries and early child care seem to be provided mainly in well-to-do model communes located on the outskirts of large urban centers, such as the Red Flag commune in the Peking suburbs. Poorer communities organize rudimentary child-watching services during harvest and sowing. At other times, child care services remain limited to the private arrangements made by each family. Mothers call on in-laws, kinsmen, or neighbors to watch the children; older offspring care for the younger. Such child care arrangements incur obligations which the women themselves must repay. Thus, child care consumes much of their time. It is often reported that "few mothers with children have the opportunity to work in the fields."[37] In urban areas, child care is organized by unions at the factories; rudimentary services may also be set up at residential street committees at low cost.

The family trains the children but families control education to a lesser extent than in the past. Literate parents teach their children to write characters before they go to school. Since illiterate parents cannot do this, class differences in achievement are perpetuated. Except for modern mechanized tasks, such as driving tractors or operating sewing machines, even occupational training remains in the family. The master-apprentice relationship based on the father-son model persisted long after liberation. Fathers versed in ancient skills such as herbal medicine would induct their sons or another young man into the family secrets. This information was guarded through personal relationships and was not disseminated through the formal educational system. During the Cultural Revolution the master-apprentice relationship was criticized. The community now collects and codifies indigenous peasant knowledge of matters ranging from weather forecasting to herbal medicines. Where fathers still monopolize indigenous skills as a personal possession attempts have been made to bring the older teachers into cooperatives so that occupational training can become the responsibility of the collective. The half-work half-study middle schools that ran from 1958 to 1960 and agro-technical middle school courses that began during the Cultural Revolution train all children in the same agricultural and industrial tasks. This has reduced occupational training down in the family sphere.

The Impact of Illness, Aging and Death on Family Roles

The numerous functions performed by the family include care for the ill and elderly. The performance of these tasks in the family means that local culture has an impact on the definition of health and treatment of illness. In China, as in America in the past, the wife cares for ill members of the family at home—primarily through "folk wisdom". Medical remedies and suggestions are often acquired from older women who are available to help when family illness occurs. Still a repository of folk lore regarding the origin and cure of illness, the Chinese women decides who will treat the family members. Will the illness come under the bailiwick of the herbalist, the Chinese acupuncturist, the neighborhood clinic, or can she cure it herself with a recipe of herbal tea? The woman makes basic decisions regarding the health care of family members: she is not merely a mediator between outside expert and patient as is her Western middle-class counterpart.[38]

Care for the elderly has been largely removed from the middle-class

Western home where the "age revolution" caused by the decline in mortality of young adults and the concomitant extension of life and availability of life and burial insurance have also made death less socially visible.[39] In an underdeveloped society such as China, aging and death is socially present, and the burden of care for the aged falls on the family. In the past, Chinese parents bore numerous children, confident that their sons would care for them in their old age. Robert Marsh interviewed Taiwanese of Taipei and found that the majority of older parents expected care from their adult offspring.[40]

In the PRC., abundant welfare or insurance is not available to substitute for that previously provided by offspring. The collectives provide two sorts of funds to support the elderly—welfare pensions and old-age homes. Urban parents depend on labor union insurance. None of these offers a substitute for the status provided by mutual help of the offspring.

Rural welfare funds are limited. Only one per cent of the commune funds was invested in welfare in 1960.[41] Although the amount may have been increased since then, only those applicants of approved political background, such as widows of soldiers and martyrs, qualify for substantial support. Another kind of community social assistance was introduced in 1958 when communes built "happy homes for the aged". Old age homes are self-supporting; the elderly do handicraft work and vegetable gardening. If they have children, they might just as well help around their own homes, such as doing child care, instead of going to the old age home. In most cases people without adult sons and daughters able to support them enter the homes. Old age homes, therefore, are not substitutes for the status that parents and children gain through caring for the older generation. Such services do have an impact on rural family structure, however. Widows and widowers who might otherwise have remarried to obtain personal care can now avoid it if assured community assistance.

In urban China workers and employees are entitled to retirement insurance, the amount depending on the specific regulations of the union located where they work. The worker's position and length of employment are taken into account.[42] Parents supported by a worker will receive pensions if the offspring is disabled or dies.

The change in the frequency of death as an occurrence and in the population at risk of death has had an impact on family roles. The improvement of health conditions has reduced the proportion of children who have lost one or both parents. Further, one can expect a larger proportion of families with three generations under one roof. The extension of life means that more families have grandparents or great grandparents present.[43] As a result, elderly people have become more involved in family life. Household size may even increase somewhat. This may not be a marked increase despite mortality decline, however. Thomas Burch has shown that in contemporary developing nations where mortality has declined household size has been influenced by *fertility* rather than by vertical or lateral extension of families.[44]

The numerous roles and tasks performed by the Chinese family in rural areas persisted due to the lack of extrafamilial institutions to take them on. However, over the decades, the family has been modified. Although the larger number of tasks still performed may make it appear that the family has changed little, these changes can be elaborated by examining the shift in power and status in family relationships.

INTERNAL ORGANIZATIONS OF THE FAMILY AND THE STATUS OF YOUTH AND WOMEN

The Status of Youth in the Family

The traditional Chinese family subordinates youth to the aged. The power hierarchy was manifested in the adult sons' obligation to contribute their income to the household. Control by parents over youth was also perpetuated through blind marriage. The absence of free choice in marriage meant that the conjugal bond between husband and wife was usually weak, while the relations p a man had to his parents was much stronger. The attempt to alter this type of family is consistent with the state policies regarding the subordination of the interests of the lineage to political and social requirements of the work place.

The extent of parental control over youth can be assessed in part by measuring the emergence of the conjugal family with the husband/wife bond as the main link. This is a measure of the decline of contractualism in marriage which reflects basic changes in the family because it indicates that the couple itself can make such an important decision when they live patrilocally. Five major types of marriage can be isolated in China today. They range from the still urban-centered "free marriage"—in which two people meet, form a relationship, and decide to marry—to three other forms of arranged marriage. In one, the future spouses are introduced formally by the parents, but get to know each other and agree to the match independently before it occurs. In the last ten years this type has increased in prevalence, but its frequency is equal to the type of arranged marriage in which parents obtain the consent of the future spouses but no effort is exerted to build a relationship between the couple prior to the ceremony. Then there is the blind marriage which is now rare. A fifth and final form of marriage is one in which one or both partners is a "pariah," with a political disfigurement on his or her record; they often settle for socially inferior mates because they lack bargaining power.

The "freely" arranged marriage like that in the West predominates in urban centers and among cadres in rural areas, but among peasant families the new form of mate selection is not yet institutionalized. Arranged marriage and blind marriage occur because the young people lack extensively organized heterosexual peer groups. Also, the bride must be able to fit into the patrilocal household on marriage. Therefore the personality "fit" of the couple is considered less important than shared similar social characteristics; these social characteristics can be determined by the parents as well as the youth. Gradually, similarity of political thoughts is becoming more important among the educated youth than submissiveness of the wife in the parental home. Even in forms of arranged marriage with prior knowledge and acceptance by the couple, which comprise the large proportion of rural marriage, the young people feel that they have had their say in mate selection. They know that their parents lacked the right to veto their own mates.

Parental control has weakened over the adult offspring's family formation. However, both before and after marriage, the young men and women are subordinated to the demands of family life. Adult offspring still contribute their money and energy to maintain the families of orientation and assume responsibility for maintaining younger siblings. Open youth rebellion is not positively sanctioned. Sons and daughters feel great guilt if they seek to break from the home. Even the youth who does not live at home and holds a salaried job undertakes to support his families. One result of his continued obligation to contribute to the famly income is that the household head makes important decisions about his future career. An elder son or daughter with numerous siblings may be held back from school so as to work the land or care for siblings. Young people contribute to their families' social mobility through educational achievement and nonfarming occupations. The power of the youth in their families of orientation is thus uneven, extending to some areas and not to others.

The Status of Youth in the Community

The commune occupational structure and administrative system stresses political education and education for mechanization, elevating the status of youth in the society. Most important are the introduction of new youth peer groups which, as Eisenstadt hypothesized, train the youth for social roles which they cannot learn in their families.[45]

Young men and women compete with older men for political posts in production teams and brigades. Literacy, knowledge of accounting methods, skills in simple agricultural mechanization give the youth importance in village productive life. The age of village cadres tends to be under thirty, although to become a higher level official one must be promoted through the ranks.[46]

Youth peer groups formed around the village school, the sports teams, and the youth "cultural clubs". Mao Tse-tung thought propaganda teams further organized groups of young political activists with status, but without pay. Many of these positions are highly valued in the community. The peer groups do not provide a counter value system to that of the regime. Even the Red Guards who appeared to be rebelling against the society were attempting to enforce the societal political values, rather than oppose them.[47] Most important the peer groups provide social support for the youth to follow the new social values of the collective, although their parents may want them to act otherwise. They are important, for instance, in providing a place where young people can meet future mates and avoid arranged marriage.

In sum, parents cannot control their offspring as completely as in the past. Since working class boys and girls are judged independently in the occupational sphere on their merits, not on their parents' achievements, they can turn to the community for support against their elders if they need to. The educational system now underlines new values of serving the community for low pay. Serving as barefoot doctors and veterinarians is one example. In school the youth are provided with peer group support to enable them to oppose their parents should they be reluctant to let them serve the society. New attitudes cannot be inculcated successfully without such peer group assistance.

The Status of Women

Equal before the law, with an equal right to employment and to the same wages for the same work, the ideology of liberation of women has penetrated village and town and is believed by the young people—but the ideology masks discrepancies in reality. When these occur, the "service to society" ethic tends to make it difficult for women to pursue claims to specific compensatory treatment. In contrast to the Western emphasis on individualism and achievement on the basis of individual abilities, the Chinese focus on serving the state and subordinating self prohibits women's organizing to advance their particular position.

The bases for continued relative subordination of women in the family and community are related to the stage of Socialist production: the absence of appliances and services to lighten housework, large family size, and lagging sex-role definitions regarding the obligation to care for the home and family. First, factory wages are the same for equal jobs, but access to jobs is not random and is sex linked. In cooperative handicrafts and agricultural production the wage regulation "to each according to his ability" reduces women's pay packet below that of their husbands. Because of the limited support services and definition of child care as primarily women's responsibility, the women are tied to home chores. As the Myrdals (*Report from a Chinese Village*) described, the burden of village women in the home has not been alleviated greatly. Because of this, it has been difficult for them to rise in the political hierarchy after marriage; with small children they lack the opportunity to continue political education and community service. Since heavy labor and political service to the community are the source of greatest community prestige and power, women as a group may be considered to hold lower status than men. On marriage the rural married women's affines often compel her to renounce non-agricultural employment. Factory jobs and political leadership activities may be given up. The girls can continue to work in agriculture after marriage, where they remain supervised by their in-laws. All four rural working women respondents gave up their jobs or left normal school upon marriage. In contrast, only one of the many urban working women interviewed did so. These other urbanites remained in their factory and white-collar professional jobs. Other nonworking rural informants remarked that affines considered it unfitting for them as married women to serve in political posts where they would come into contact with young male leaders. The families feared that the young men "played around with girls" and that they would lose face before the gossip.

Nevertheless, sex role differentiation has declined in formal organizations. The school system and mass media emphasize that boys and girls are to be equal revolutionaries and workers. There is little emphasis on feminity or masculinity in the socialization process. Toys for boys and girls, where they exist, do not differ. Clothes are often identical. Occasionally, urban women enter "men's jobs" (as defined in the West), such as welding or working on the docks, but the majority apparently assume the more "feminine" nurturant roles of primary school teachers and nurses.

The implications of the changes that have occurred in the status of women are important in assessing their health and welfare. Their improved position at liberation led to the creation of a branch of the Women's Association in each commune. One woman holds an official position in the commune revolutionary committee and in each factory that employs women to represent their interests. This woman's duty is to stress health and birth control. As the collective has gained greater control over child rearing techniques and the level of education of women has improved, young mothers have begun to follow the directives of the women's journal regarding socialization of their children. They have greater say over the rearing of their offspring than do their affines and can begin to introduce new ideas of diet and nutrition, such as milk for the children. When criticized by the elders, the younger educated women have recourse to authority because they have learned child training in school.[48]

P. Bart has described the *changing* status of women over the life cycle as important in understanding their position in the community.[49] The young woman lacked the position of the aged mother-in-law. As the aging woman lost her sex and reproductive roles, there was a concomitant rise in her religious interests and functions; at menopause certain restrictions on her behavior and activities no longer had to be observed. The relative status of young Chinese women will change vis-a-vis older women with the decline of religiosity and the traditional culture, increased education, and the shifting focus of the hierarchy of relationships in the family, from the filial bond to the youth, as reflected in decline of parental control over arranged marriage.

The Family as Repository of Culture

As a unit that fills numerous functions in China, the family can still be considered one of the channels to cultural change. Despite the introduction of formal organizations to transmit new culture and values, the family persists as a carrier of culture. This is so for two reasons. The family preserves local tradition in areas that the political leaders choose not to oppose, even if the traditional values contradict those of the broader society. Secondly, the family is a nomic structure, which creates meaning for its members, and in this sense, it is difficult to replace.[50] An example of each can be given.

The traditional Confucian tradition opposed local folk culture at the same time that it coexisted with it. Not being monotheistic, Confucianism tolerated the local culture while attempting to absorb or control it. In the village Confucian precepts were redefined into lineage maxim-like rules, understandable by the common folk.[51] In the Socialist state folk culture is countered chiefly where it contradicts prime foci of the state, especially in the areas of production, but it is only weakly opposed in many other areas of life. Popular concern over *feng-shui* and grave location may be opposed when it interferes with cropping plans, but worship is more likely to be permitted when it is carried out within the confines of the home. It is likely that the folk definitions of illness and cure have been proscribed where they are dangerous, such as superstitions regarding childbirth, but tolerated where they cause little harm, such as popular views of "womb fever," as described by Marjorie Topley.[52] One would anticipate that the family still perpetuates folk views of disease and cure which coexist with acceptance of more widely recognized "scientific views" of the etiology of illness.

Where the folk culture stressed social mobility it was not in opposition to the industrial state. Folk religion justified striving for wealth and achievement in the social order, and theories of *feng-shui* rationalized failure to achieve. Through the early 1960s individualistic achievement-orientation was consistent with Socialist ideology. McClelland's analysis of primary-school primers of the mid-1950s, and John Lewis' study of cadre training manuals in that period both concluded that the Chinese educational system rewarded high achievement motivation.[53] The achievement goals stressed in the family were consistent with those of the formal organizational structure until these organizational goals were changed in the mid-1960s to stress collective rather than achievement orientation.

The family culture was consonant with the broader folk emphasis of achievement. The meaning of the individual's life was related to the unity of the entire family unit. The family was based on the filial bond, and the young person's identity was related to his or her ability to succeed in its name. Parents defined "health" and wellbeing of family members in these terms. The adolescent search for identity was not a recognized stage of maturation. Thus, youth subordinated their personal desires to those of the family, frequently suffering mental strain which was not recognized or validated by the culture. The effectiveness of the internalization of family and societal values to achieve was documented by a psychiatrist who tested fifteen Shanghainese and Cantonese middle school students with T.A.T.s in 1961.[54] He interviewed them regarding their occupational goals: "To achieve a vocation as a scientist or specialized worker" many replied. Did they have any worries? "None." But they demonstrated signs of nail biting and facial tics, and the dreams which were reported reflected anxiety about success in their studies and vocation.

The subordination of the youth to the family unit continued through the mid-1960s. In the last few years as "service to the people" has been placed ahead of individual achievement, the young people would no longer find continuity between family culture and the values and norms of the wider society. Subordination to the culture of the community and state is to supersede that to the family. As youth are more and more highly educated, the impact of the family as the unit which provides meaning to their lives should be reduced.

The Patient-Practitioner Relationship and the Role of the Family

The central role played by the family in the lives of its members makes it a critical element in the patient-practitioner relationship. Talcott Parsons has described the doctor-patient relationship as a therapeutic, one-to-one relationship in which the patient is a deviant, to be socialized back into good health.[55] Although it may be applicable to developed societies, this model does not fit China's developing environment in which the doctor-patient relationship is not isolated from the community context which includes kinship. Wilson has suggested the term "community-as-patient," a concept which makes the community a key factor in both generating illness, and curing it.[56]

The Community as Patient

In China's rural and urban neighborhoods, treatment of disease does not necessarily or primarily result from a patient's seeking out the doctor and willingly undergoing treatment in his hands. The locale's definition of the illnesses requiring care may well differ from that given priority by the government medical service. The latter's role frequently includes demonstrating to the citizens the need to take action against diseases having low salience in the community. Therefore, the community is necessarily involved in disease prevention and cure.

Early on, the PRC. attempted to reduce infectious and contagious diseases by organizing residents to locate the carriers of diseases. In attempting to eliminate syphilis, medical practitioners trained local opinion leaders to convince the residents to report symptoms of which families were ashamed.[57] Ultimately, kinsmen brought their relatives in for treatment. Community cooperation and organization were essential for detection and cure on a large scale, and, in fact, eliminated syphilis as a major contagious disease.

The current government priority to improve the people's health focuses on the prevention of debilitating diseases, in particular parasitic diseases. Prevention requires teaching the community methods of handling lifestock, especially sheep, storing fertilizer, and hygiene in regard to food preparation and dress. Families can become obstacles to health improvement, preferring less troublesome methods of collecting nightsoil or planting rice seedlings than those suggested by agronomists with a health orientation. It is necessary to train the families in preventative health care, educating them in updated agricultural methods.

Success of cure also rests on the ability of health workers to alter the local definitions of disease. Since some local perceptions of illness include magical and religious causes, the healing process involves folk doctors and religious figures to excoriate disease. One common method of countering the folk definition of health has been Party-led family and community discussions on the inefficacy of "witch-doctors." At the same time pharmacologists absorb useful elements of the indigenous medical cornucopia. Medical workers thereby enter directly into village and cultural life, treating the community—as well as the individual members—as patient.

The Community as Practitioner

A specialized number of community figures are primarily responsible for health action in the village, but the number of doctors remains sparse. In part a product of the low level of economic development and paucity of medical services, but also resulting from the social structure, medical workers have become social healers in a broad sense, and the community itself is involved in providing lay medical care.

The figure of the healer is prestigious in any society, and he draws his charisma from being an agent of social control. In a Socialist society the doctor is prevented from using his authority to implement his own values if they vary from those of the body politic. In China he is viewed as a political figure who is responsible for change in social values and especially those related to health behavior. The physician is no longer a professional, who sets and enforces the standards of his work, but he has become a civil servant, who owes his position to the government and community. This can be seen in the implementation of the slogan "serve the people" and in the doctor's dual role as medical and political healer.

As part of the anti-professional move in medicine, the doctor is to be voluntaristic, to be dedicated and a member of the elect, acting beyond the call of duty as a routine part of his work. As Schatzman suggested, voluntarism can be combined with professional practice; however, it is not usually taught in the West because it counters hospital efficiency and routine.[58] The voluntarism expected of Chinese medical workers is related to the low level of health services, which impels each trained medical worker to perform many activities but it is also an attempt by the community to set the goals for the professionals. Consequently the village medical worker, and to a certain extent the hospital-based physician, treats the patient as a total person. Health care adopts attributes of a *family relationship*. The model medical worker in the press is one who stays up nights to treat the sick, even performing the patient's housework while caring for him. Called upon to help one member of the family, the doctor frequently treats the rest of the household as well. The caring posture means that the doctor is viewed by the community as acting in its interests. The medical workers become political figures, frequently advocating social change. For one example, the barefoot doctor promotes birth control, bringing up the topic whether or not it has been requested by the patient.

The community is involved in the selection of medical workers, curtailing the power of the profession to determine its membership and diminishing the role of the family in placing its members in prestigious occupations. Until recently, one's family background influenced access to professional jobs. Political leadership positions and a high level of education of a household facilitated attainment of higher education including medical training for the children. Through the 1960s doctors came from families of intellectuals, professionals, or cadres, who had the ability to socialize their offspring to pass competitive entrance examinations or who had personal connections to ensure entry. After the Cultural Revolution, revised procedures for admission to medical college required in-service training and the approval of the community.[59] Political leaders have gained greater control over the type of people who become medical personnel and the standards of the vocation, reducing the role of the professionals and of their families in perpetuating their social position. Stratification according to social position has been reduced somewhat, but that by sex and age continues. Where community and family stereotypes of medical workers coincide, they are retained. Specialists are likely to be male, whereas volunteer, paramedical personnel are somewhat more likely to be female, a continuation of their nurturing role in the family.

Having gained leverage over the practice and training of specialized medical workers, the community also practices lay care. This is one method by which health workers can be increased in numbers. Free clinics in Western urban centers maintain that the majority of the community residents can be trained to treat most of their common complaints,[60] many neighborhood clinics taking a leaf from the Chinese practice of training residents which appears to be consistent with this view. Further, in underdeveloped countries with limited resources for care and cure, the most reasonable method of ensuring good medical treatment is to focus on the illnesses that have the probability of affecting the majority. This goal can better be achieved if the residents enter into the system of medical treatment themselves. The family volunteers its services in medical care. Unpaid housewives have organized urban neighborhood clinics, and some are trained in record-taking, freeing others for specialized skills. Some housewives have even been trained to detect common complaints, such as infection of the middle ear and measles.[61] Rural medical workers are drawn from local families. As "barefoot doctors" they continue productive labor in the fields, retaining their "lay connections" with local families.[62] Even in China, however, the political impact of giving the local residents greater control over their own medical services may be limited. Apart from the short-term intensive hygiene campaigns, most clinics have apparently not established mechanisms for involving patients in their own medical care other than by their becoming workers in the clinic. The trend of patient-practitioner relationship in China, nevertheless, remains that of reducing the role the family plays as an isolated unit and increasing that of the community in medical behavior.

Conclusion

The concept of the transitional society has been introduced to explain the economic context in which rural families perform numerous roles and activities. Extra-familial organizations have not been sufficient to replace family economic, political, educational and welfare functions. Nevertheless, the family has been brought into closer relationship with the community than before liberation. The ways that the family relates to the community have also changed somewhat over the past two decades. At present the important role of the family in the community and in the lives of its members suggests that family behavior figures in the etiology of disease and in health care. Further research and observation of the family in the Chinese setting, with an eye to discovering its relation to health behavior, should prove fruitful.

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Independent Variable	*Intervening Variable*	*Dependent Variable*
Physical and social stress	Life style (Including family support)	Illness or pathology

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SURGERY PAST AND PRESENT

John Z. Bowers, M.D.

China was the last major country to accept western principles and practices of surgery. The absence of surgery was based in part on the enduring historic Chinese tradition that the human body is a sacred treasure which must not be marred—as by a surgical incision. The liver and heart were held to be most precious and a Chinese lover embracing his sweetheart would whisper as terms of endearment, "My heart and my liver" (Wallnofer and von Rottauscher 1965, p. 77).

Reverence for the human body is an essential root of the Chinese culture, dating from the dawn of Chinese civilization. It also relates in part to Confucian doctrine, the practice of ancestor worship and filial piety.

Therefore, the Chinese traditional system of medicine, *Chung-i*, did not include surgery in its therapeutic armamentarium—which was based on acupuncture, moxibustion, and an enormous materia medica.

None of the ancient medical treatises with their voluminous chapters on internal medicine include significant discussions of surgery. The classic text of Chinese medicine, *Huang Ti Nei Ching Su Wen* (*Yellow Emperor's Textbook of Internal Medicine*), published in the late Chou or early Han dynasty, mentions surgery only as a last resort or in the curettement of ulcers. Geographic and cultural isolation also kept China aloof from surgical progress in Europe.

A set of Chinese "surgical" instruments in the collection of the late Dr. Eugene Opie includes delicate lances, forceps, and probes, which could only be used for the most superficial procedures. Although all practitioners were accorded low social rank, the level of the surgeon was comparable to that of a beggar or prostitute and was inferior to that of the medieval barber-surgeons of Europe.

There are a few references to surgeons and surgery in the early history of medicine in China. Pien Ch'iao, who practiced in the second century B.C., is said to have used anesthetic agents and to have performed cardiac transplants in living patients. Hua Tu (Hua Yuan-hua, also Hua T'o), who lived at the end of the Han dynasty (115–205 A. D.), is described as an early practitioner of surgery. From a formula that he may have obtained from two hermits hidden in a mountain cave, Hua Tu prepared an anesthetic mixture, *Ma Fu Shuan* ("Ma," hemp or narcotic; "Fu," aromatic; and "Shuan," powder), which he administered as an anesthetic with wine. (It was probably Indian Hemp.) When the patient became drunk and unconscious, Hua Tu is reported to have performed laparotomy for various gastric intestinal disorders and other surgery. One of his patients complained of intense abdominal pain accompanied by loss of eyebrows and whiskers. Hua Tu made a diagnosis of necrosis of the spleen, performed a partial splenectomy, and the patient recovered in 100 days.

Hua Tu's most renowned patient was General Kwan who developed osteomyelitis of the humerus after being wounded by an arrow. After administering Ma Fu Shuan, Hua Tu had the half-drunken general play chess with one of his adjutants while Hua scraped the necrotic bone. Hua Tu is said to have died in prison and all of his manuscripts were destroyed before his death. Datura, Rhododendron Sinense, and Jasmine Simbac were used by other surgeons for anesthesia.

Ma Shi-Huang is cited in legend as a veterinary surgeon who treated ponies and dragons. Ma was so popular with his "dragon clientele" that they kidnapped him and he disappeared from medical history.

Another surgeon, Yu Fu, according to legend, "opened the abdomen, washed the stomach and cleansed the intestines" (Liang, 1934, p. 2). But these fragments of medical history were largely legendary.

Dr. Gillan, who accompanied Lord Macartney's mission to China, 1793–94, reported that surgery did not "exist" in China. Instead he found that the Chinese excelled in "cutting of corns and nails;" in cleansing the ears; in applying medicinal plasters.

Castration was the only accepted surgical procedure. Originally a form of punishment, it was later performed to prepare servants for the Imperial courts. The penis, scrotum, and testes were amputated with one sweep of a sickle-shaped knife and the eunuchs appointed to the court were inspected twice a year by the representatives of the emperor to assure that there had been no regeneration.

The development of Western surgery in China goes back to Dr. Peter Parker, a graduate of Yale Medical School, who came to China as a medical missionary. On November 9, 1835, Parker opened the Canton Ophthalmic Hospital at 7 Green Pea Street, Canton, famed with sailors around the world as "Hog Alley," for its saloons and brothels. Parker operated on hundreds of cases of cataract that flocked to his hospital. Parker's speed as a surgeon was remarkable; he is reported to have removed a pendulous sarcoma of the lips three feet in length and two feet across in twelve seconds. He was the first surgeon in China to use sulfuric ether as an anesthetic and the first to perform mastectomy.

Other missionary surgeons who followed Parker expressed their surprise and pleasure at the number of patients who came to them for medical and surgical care. However, if a part of the body were removed, it was given to the patient or his family so that it could be placed in his coffin at the time of death.

It was not until November 22, 1913, that an official edict granted permission for autopsies. This favorable turn was occasioned by a devastating epidemic of pneumonic plague in Manchuria in which 60,000 persons died. Half of the practitioners of Chinese traditional medicine, who had no understanding of the communicability of the disease, died from the plague. On the other hand, only 2 per cent of the practitioners trained in Western medicine and who understood communicability succumbed.

Peking Union Medical College and Training in Surgery

The first program in academic surgery in China was established at the Peking Union Medical College (PUMC), founded and supported by The Rockefeller Foundation through its China Medical Board (CMB).

The problems of medicine and health in China had been an early interest of Mr. John D. Rockefeller, inspired in part by his principal advisor on philanthropy, Reverend Frederick T. Gates. In 1909, at Gates' suggestion, Mr. Rockefeller financed the Oriental Educational Commission to evaluate educational, social, and religious conditions in the Far East. The members of the commission were Ernest De Witt Burton and Thomas Crowder Chamberlin, professors of theology at the University of Chicago. They reported that there were less than 400 students studying Western medicine in China—one medical student for each million people. The leading medical school at that time and prior to establishment of PUMC was the Union Medical College in Peking supported by three British and three American missionary societies. Based on their report, Gates judged that the time was not propitious for a university development program in China because of insistence on governmental control and anti-foreignism.

With the establishment of The Rockefeller Foundation in the spring of 1913, Gates pressed for a program in medical education in China. One of his principal supporters was Charles W. Eliot, president emeritus of Harvard who in 1912 had studied problems in China on a mission for the Carnegie Endowment for International Peace. Eliot considered that the introduction of objective, inductive reasoning was essential to the advancement of China from her medieval state. He also decided that "There is no better subject than medicine in which to teach the universal inductive method" (Eliot 1914, p. 2).

The First China Medical Commission (H. P. Judson of the University of Chicago, Francis W. Peabody of Harvard, and Roger S. Greene, U.S. Consul in China), sponsored by The Rockefeller Foundation, spent part of the spring and summer of 1914, four months in all, in China. They described tuberculosis, hookworm, and syphilis as the most widespread diseases; medical care was abysmal. Essentially all of the nurses were men.

The commission's leading recommendation was that The Rockefeller Foundation should undertake a program in medical education in China based at the Union Medical College in Peking. In June, 1915, the CMB purchased the Union Medical College.

A Second China Medical Commission led by Wallace Buttrick, director of the CMB, with Simon Flexner and William H. Welch, visited China in the fall of 1915. Their principal recommendation was that the college should develop a standard equal to the best in the West; that teaching should be in English; and that the school should develop its own premedical program.

The premedical school opened in September, 1917, and the first medical students were enrolled in the fall of 1919. Three-quarters of the original faculty were from the United States.

The first head of surgery was Adrian Taylor, a graduate of the University of Virginia in 1905. After serving for ten years as a Southern Baptist missionary at Yangchow, Taylor was awarded a postgraduate fellowship by the CMB for study at Harvard. Taylor then completed the surgical residency program at Hopkins under William Steward Halsted and returned to Peking in 1920. He was joined by Jerome P. Webster, who assumed responsibility for developing a surgical residency modeled on the Hopkins program. The first assistant residents, three in number, entered the program in 1927.

Another early member of the department, Frank L. Meleney, M.D., from Columbia University College of Physicians and Surgeons, began his studies on surgical bacteriology at PUMC.

A Chinese associate in the Department of Surgery, J. Heng Liu, a graduate of Harvard, was the first Minister of Health for the Nationalist Government.

In addition to general surgery there were residency programs in ophthalmology; ear, nose, and throat; and orthopedics.

The most illustrious patient to enter the surgical service at PUMC was Dr. Sun Yat-sen. He came up to Peking in 1925, a dying man, and after the ministrations of native practitioners were ineffective, was admitted to PUMC. His family most reluctantly agreed to surgery and a laparotomy and biopsy revealed carcinomatosis originating in the liver. He died at home soon after the operation. With even greater reluctance his family agreed to an inspection of the abdomen, post-mortem, and a sliver of the tumor was removed to verify the diagnosis. The funeral service was held in the auditorium of PUMC and the hearse was the PUMC van draped in black.

Years later the Japanese tried to precipitate a crisis in Sino-American relations by claiming that the pathologists at PUMC had broken their agreement with Sun Yat-sen's family and removed abdominal viscera. A careful inspection of the pathology department was fruitless but to "save face" the Japanese staged a mock ceremony with a funeral urn claimed to contain the organs that had been "stolen" by PUMC.

Surgery Today

The Chinese place great emphasis on their accomplishments in restorative surgery, especially in the reattachment of extremities that have been amputed by trauma. We suspect that this goes back in part to their historic reverence for an intact human body.

The first reattachment that received world-wide attention occurred on January 2, 1963, when a factory worker in Shanghai severed his right hand above the wrist. The operation required seven hours and the post-operative care included hourly temperature readings with an electric skin thermometer. Three years later he was visited by a British surgeon (J. S. Horn) and found to have only a slight limitation in wrist movements and the skin was not quite as sensitive as on the other hand—but he had become a first-rate ping-pong player!

This successful operation stimulated the training of teams in the major industrial centers to perform similar procedures. Special stainless steel surgical needles, synthetic fibers of small diameter with great tensile strength and operating microscopes were fabricated for use by these teams.

By holding the amputated part at a temperature just above freezing the American dictum of a six-hour maximum interval between the injury and restorative surgery has been significantly prolonged. Special attention is paid to venous anastamosis; it is usually advisable to shorten the bone to prevent tension on the suture line.

The successful removal of enormous ovarian cysts previously considered inoperable is a major claim for the "new surgery" in China. The popular atlas *Medical Workers Serving the People Wholeheartedly* (1971) features a dramatic sequence of more than twenty pictures of the successful removal of an abdominal tumor (ovarian cyst) weighing 90 *jin* (45 kgs.). Before surgery "she could not walk or lie down, but knelt on the bed day and night." The Chinese doctors determined that the tumor was not malignant. Special anesthetic apparatus was fabricated. The operation required twelve hours and the patient received 7,500 cc. of blood.

Visitors to China have also studied the Chinese programs for treating severe burns based on a team approach. They have been impressed with the mobilization of both material and human resources to save the life of an ordinary worker. Comparison of mortality rates in the United States and those reported from China suggest that the all-out team approach as used in China may give better results than methods used in the United States.

No discussion of surgery in China would be complete without reference to the Canadian thoracic surgeon, Norman Bethune. While serving in the field during the Spanish Civil War, Bethune developed the first mobile blood transfusion service in the world. He joined Mao Tse-tung's army medical corps in 1938 and died of sepsis in the field. In China Bethune was described as "The White-one Sent." He has been literally deified by Mao and many young surgeons have tried to emulate Bethune's burning zeal and spirit of self-sacrifice:

> "Comrade Bethune's spirit, his utter devotion to others without any thought of self, was shown in his boundless sense of responsibility, in his work, and his boundless warmheartedness towards all comrades and the people. Every Communist must learn from him" (Mao, December 21, 1939, Vol. II, pp. 337–38).

On June 26, 1965, Mao Tse-tung decreed: "In medicine and public health put the stress on the rural areas." Doctors, nurses, and auxiliaries moved out of the great cities to establish hospitals and training programs in the countryside. At first their surgery was restricted to minor operations in the homes of the peasants. But when it became evident that surgical infection was not a major problem, the scope of this "cottage surgery" was extended to major operations.

With the massive movement of hospitals and personnel from the cities to make-shift rural facilities, surgical training programs have changed significantly.

Residency training programs seem to place special emphasis on traumatology and on orthopedics. There are also postgraduate courses of one year duration for doctors and nurses.

When representatives of the American press visited China in 1971 they were struck by the strong emphasis placed on accomplishments in surgery. Their schedules called for more time in surgical theaters than in temples and other tourist attractions. Renal transplants seem to be a special surgical showpiece for visitors.

Surgical Missionaries

The surgical accomplishments of Chinese medical and surgical teams in Tibet and in Africa have been heralded widely. A surgical team in Somalia performed heroic operations under the most difficult and demanding circumstances: splenectomy in portal cirrhosis and repair of vesico-vaginal fistula. They also trained Somali medical assistants to perform hemorrhoidectomy and hernioplasty.

Barefoot Doctors

The training program of the barefoot doctors places an early emphasis on emergency procedures. The *China Pictorial* in 1969 reports that after just a little over two months of training those studying surgery are able to perform debridement and suture of wounds as well as surgery for lipoma and appendicitis. The curriculum includes a section on emergency treatment with the reduction and immobilization of fractures.

On the other hand their training also includes the memorization of the "three constantly read articles" by Chairman Mao: "Serve the People," "In Memory of Norman Bethune," and "The Foolish Old Man Who Removed the Mountains."

Neurosurgery

Features of Western and Russian neurosurgery are said to be combined in China. In the treatment of hydrocephalus the Russian procedure of omento-dural anastamosis is popular. Continuous ventricular drainage is continued for as long as one week after surgery for gliomas.

Cerebro-vascular accidents are the more frequent acute circulatory problems in China. Surgical intervention is used when the hemorrhage is localized or progressive but cases with ventricular hemorrhage are not operated on.

In the summer of 1962, Wilder Penfield, the world renowned neurosurgeon and professor of neurosurgery, visited China and reported: "it is fair to say that clinical brain surgery in China's best medical centers is as good as it is anywhere in the world" (Penfield 1963, p. 1157).

Treatment of Fractures

For a millenium the Chinese have treated fractures through indigenous techniques based on gradual reduction and partial immobilization. The joints above and below the fracture are not immobilized. Instead of a single manipulation under anesthesia, the broken ends of bone are gradually brought into alignment by digital pressure. Partial immobilization is achieved by applying short splints around the site of the fracture.

The patient is encouraged to exercise the injured limb to avoid muscle wastage.

A British visitor to Peking in 1970 fractured his wrist while climbing the Great Wall and received what he described as excellent care at the Chinese Anti-Imperialist—formerly PUMC and now the Capital—Hospital. The main request from the orthopedists who attended him was for Western surgical journals.

Accomplishments in medicine and public health are major propaganda instruments for the Chinese government—to a degree that is probably unequalled in history. While surgery was actively disdained in China for many centuries, today it shares with acupuncture anesthesia the pedestal in Chinese medicine. (The claims for success with acupuncture as a therapeutic agent in surgical diseases and as an anesthetic are considered in another article; see J. Chen.)

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ACUPUNCTURE

James Y. P. Chen, M.D.

I. INTRODUCTION

Acupuncture is an ancient Chinese art of healing by inserting fine needles in the body at certain well-defined points. By definition, the Chinese term for acupuncture, *chen chiu,* includes not only the use of *chen* or needles, but also *chiu* of moxibustion, which may be interpreted to be a form of healing by applying burning *moxa,* (*Artemisia vulgaris*) on the skin. The basic Chinese medical and philosophical concepts, namely, the meridians, the acupuncture points and the doctrines of Yin-Yang and the Five Elements, are so alien to Western medicine that this system of therapy has generally been deemed unscientific and dismissed as mere superstition, witchcraft, placebo or even hypnosis.

The idea that a fine needle pricking the skin in the middle of the back of the knee can in a few minutes relieve a long-standing low-back pain, that one painlessly pierced at a point on the back of the hand near the base of the thumb (between the thumb and the index finger) can relieve toothache or even induce anesthesia for tonsillectomy (Fig. 1), or that one placed in the skin about three inches below the kneecap just outside the tibia can relieve stomach ache, cure gastritis, combat general fatigue and, at the same time, conserve robust health, may sound fantastic to the Western mind. Nonetheless, the experience of those knowledgeable in acupuncture either as a doctor, patient, or objective observer seems to confirm some, at least, of these claims.

Today, in the People's Republic of China, Chinese herbal medicine and acupuncture are undergoing extensive clinical use and research. Western trained physicians and traditional doctors are obligated to work together and combine their efforts in teaching, research, and patient care.[1,2,3]

FIGURE 1. Use of acupuncture between index finger and thumb before tonsillectomy.

The current upsurge of interest in acupuncture in this country is generated by increasing reports from scientifically-trained Western observers visiting China. Of particular significance are those reports on the amazing effectiveness of acupuncture anesthesia witnessed by the first American scientists and physicians admitted to that country in twenty years. In the light of these new developments, traditional Chinese therapeutic acupuncture needs to be re-evaluated and its relationship to modern Western medical science put in proper perspective.

Acupuncture is a very complex subject to interpret and study, especially for those without a knowledge of the Chinese language and culture. The purpose of this paper is to attempt to familiarize the reade with the essence of this traditional Chinese system of treatment as well as its current status and new developments in modern China.

II. A BRIEF HISTORY OF ACUPUNCTURE

The oldest known document on Chinese medicine is *Huang Ti Nei Ching Su Wen,* or *The Yellow Emperor's Classic of Internal Medicine.*[4] Written about 200 B.C., this classic is a collection of dialogue between the Yellow Emperor and his court physician, Chi Po, stressing the medical importance of Yin and Yang, acupuncture, moxibustion, and other ancient medical practices. The earliest acupuncture needles were fashioned of stone. Later, porcelain needles were introduced but were subsequently replaced by metal needles. The development of acupuncture received major impetus during the T'ang (618–907 A.D.) and the Sung (960–1276 A.D.) dynasties. It was during this period that the first illustrated acupuncture document with anatomical drawings was evolved,[5] and the first bronze human stature with marked points was cast. Moxibustion at this time was already a well developed art which led ultimately to its use in close association with acupuncture. During this period, 11 organs of the body and their respective meridian lines had been designated: the heart, liver, spleen, lungs, kidneys, stomach, gall bladder, large intestine, a small intestine, bladder, and the tri-heaters (triple warmer). A twelfth was later added, that of the pericardium (heart constrictor). During the Yuan Dynasty (1280–1368 A.D.), two more meridians were added; the *Je Mei,* Meridian of Conception Vessel and the *Tu Mei,* Meridian of the Governing Vessel.[6]

The principles and concepts of the various specialties embodied in traditional medicine, including acupuncture, remained unchallenged throughout its period of development until the beginning of the twentieth century. At this time, the introduction of scientific Western medicine in China led to severe criticisms of traditional medical practices as false and dominated by superstition. This attitude was prevalent among the modernists and the new Western-trained intellectuals and professionals. Nevertheless, despite censure, acupuncture continued to enjoy acceptance for its value and effectiveness in mass healing and treatment during national emergencies and wars and during peacetime in other countries such as Japan, Korea and Vietnam. Following the establishment of the People's Republic of China, traditional medicine was restored to its former national esteem by decree, obligating both traditional and Western-trained practitioners to work side by side and integrate their talents.

A. Worldwide Spread of Acupuncture Practice

Acupuncture and moxibustion are not only encouraged and popularized in mainland China, but also in other oriental countries.

More recently, acupuncture spread to Western Europe and Latin America. While it was primarily moxibustion that spread to East Asia, particularly Japan, only acupuncture took hold in Europe. Acupuncture was first introduced to France in 1929 through the translations of the French sinologist, the late George Soulie de Morant, French Consul in Shanghai from 1907 to 1927. There are at present about 600 French M.D. acupuncturists, according to Dr. Jean-Claude Tymowski, President of the International Society of Acupuncture.[7] Acupuncture consultations are held widely in Paris hospitals, municipal dispensaries and elsewhere. Germany, Austria, England, Belgium, Brazil, Switzerland, Italy and Argentina also have associations under the patronage of the International Acupuncture Society.[8] In recent years, acupuncture also attracted the attention of Soviet doctors. In 1956, the USSR sent several doctors to China to study acupuncture. In 1959, these Russian physicians published a translation of the *Textbook of Modern Acupuncture and Moxibustion* (*Hsin Chen Chiu Hsueh*), authored by Dr. Chu Lien.[9a] Reports from the USSR indicate that a number of cases of trigeminal neuralgia have been cured with acupuncture.[10]

In the United States, acupuncture was regarded with only a passing curiosity, being sustained primarily by non-licensed practitioners of the oriental communities. It was not until very recently that the admittance of Western physicians to China spurred a new excitement and interest in this ancient Chinese practice—especially in the remarkable claims for acupuncture anesthesia.

III. PHILOSOPHICAL BASIS OF CHINESE TRADITIONAL MEDICINE

A. Ch'i, the Energy of Life, and the Principle of Yin-Yang

According to the ancient Chinese treatise, *Su Wen*, "the Yin and the Yang are contained within the Ch'i, the basic principle of the entire universe. They create all matter and its mutations. The Ch'i is the beginning and the end, life and death, and it is found within the Temples of the Gods. If you wish to cure disease, you must find the basic cause."

Chinese medical and philosophical teaching is based on the conception that, in a healthy body, there should be a free and uninterrupted flow of Ch'i which, starting from the lungs, flows through the meridians in a certain order. This is best illustrated in a chart in Mann's new book.[11a] Vital energy is governed by the interplay of two opposing forces, the *Yin* (negative) and the *Yang* (positive). Disease results from their imbalance. Yin represents night, cold, dark, female, and the interior of the body; whereas Yang denotes day, heat, light, male, and the exterior of the body. Likewise, the 12 basic organs and meridians through which either the Yin or Yang energy flows are divided into the Yin solid (Tsang) organs which "store but do not transmit" and the Yang hollow (Fu) organs which "transform but do not retain" as follows:

Yin	*Yang*
Liver	Gall Bladder
Heart	Small Intestine
Spleen (Pancreas)	Stomach
Lung	Large Intestine
Kidney	Bladder
Pericardium (Heart-Constrictor)	Tri-Heaters (Triple Warmer)*

These two opposites are never absolute or static. One is constantly changing into the other. There is always some Yin in the Yang and some Yang in the Yin.

B. The Doctrine of the Five Elements

Like the principle of Yin and Yang, the doctrine of the Five Elements also provided deep roots from which sprang basic Chinese medical concepts and terminology used in relation to diagnosis and treatment of disease. In fact, according to very ancient Chinese tradition, all the phenomena of nature, including harmony between Man and Universe, can be related to the Five Elements: Wood, Fire, Earth, Metal and Water. These elements can exist in a helpful relationship to each other or they can work against one another. The interplay of these five forces is illustrated in the chart of a pentagonal cycle (Fig. 2) with the elements succeeding each other in a clockwise rotation, as represented by the outer lines. This is the *shen* or the *creative* cycle for each element succeeding it, as the mother (*Mu*) engenders her son (*Tse*). The inner dotted lines in the form of a star represent *Ko* or *destructive* cycle. These relationships may be explained by the fact that *Wood* burns to create a *Fire*; the ashes left behind from the burned wood create *Earth*; from which *Metal* may be created; which, if heated, becomes molten like *Water*, which would nourish and create *Wood*.[11b]

Likewise, the structure of the destructive cycle is developed from similar reasoning. Thus: *Wood* destroys *Earth* by covering it; *Earth* destroys *Water* by damming it; *Water* destroys *Fire* by extinguishing it; *Metal* destroys *Wood* by cutting it.

*This is a translation of the Chinese expression, referring to the intersection of the three meridians running across the chest.

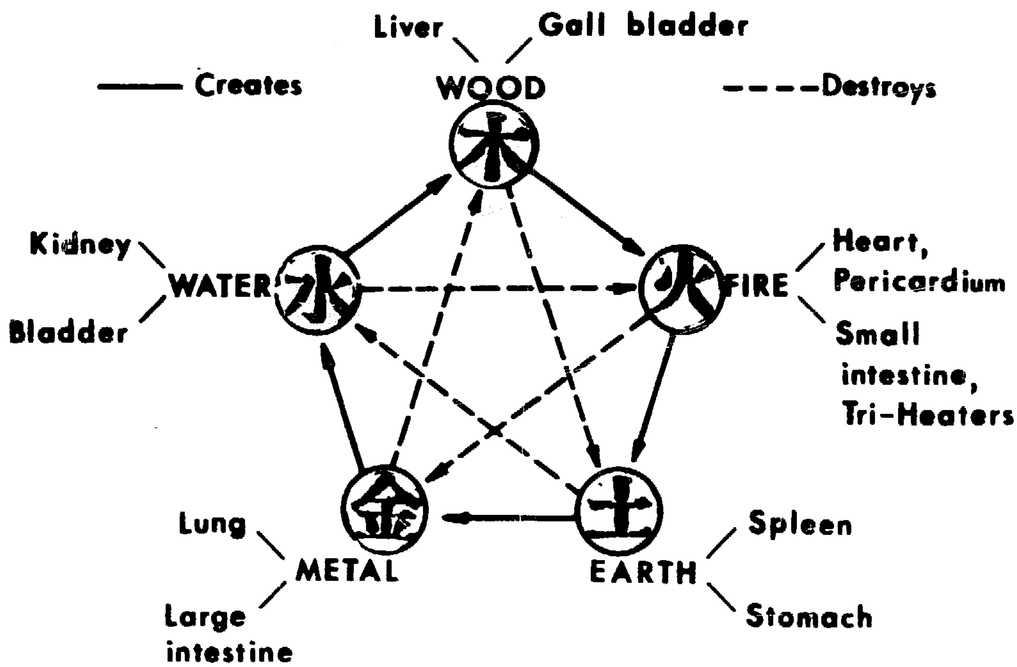

FIGURE 2. Chart of Pentagonal Cycle

In the actual practice of acupuncture, this law of the Five Elements as related to the Yin and Yang organs is applied as follows:

	Yin		*Yang*
Wood corresponds to the	Liver	and	Gall Bladder
Fire corresponds to the	Heart	and	Small Intestine
Earth corresponds to the	Spleen	and	Stomach
Metal corresponds to the	Lung	and	Large Intestine
Water corresponds to the	Kidney	and	Bladder
Fire corresponds to the	Pericardium	and	Tri-heaters

Primitive as it may sound this concept properly applied by experienced acupuncturists has been achieving seemingly remarkable medical results as witnessed most recently by U.S. visitors to the People's Republic of China. Felix Mann, the well-known British M.D. acupuncturist, expresses in scholarly fashion in the new edition of his book: "This law may seem to Western minds like the fanciful application of philosophical law. Nevertheless, it operates whether one wishes it or not, provided the conditions of its working are complied with." [11c]

1. The Five Elements and Acupuncture Points

On each meridian there are specific points corresponding to the Five Elements. Those acupuncture points which lie in between the finger tips and the elbow and between the tips of the toes and knees have been found most important and frequently used, as shown in

Table 1. Practically all diseases can be treated by appropriate use of these points in accordance with the doctrine of the Five Elements.

The arrangement of the Five Elements on the limbs is fundamental to that of the points of tonification and sedation. According to the Mother-Son rule, the point of tonification of the meridian and the element to be tonified is a "mother" (i.e., preceding) point. Likewise, the point of sedation of the meridian and element to be sedated is a "son" (i.e., following) point.[11d]

For example: (a) In the case of low-back pain, the bladder or kidney meridian is involved because, according to the Chinese, the back is related to the bladder and kidney. Pain signifies overactivity and, therefore, should be sedated. The kidney meridian belongs to the element water which should be sedated. By the Mother-Son rule, water is sedated or destroyed by the element earth, therefore, the earth point of the bladder meridian, B54 (*Wei Chung*), is the spot to be used; (b) If the patient is suffering from palpitation of the heart or tachycardia, the heart is overactive and, therefore, should be sedated. The heart meridian is a fire meridian. Fire is sedated by earth, so the earth point of the heart meridian, H7 (*Shen Men*), would be used; (c) In the case of stomach ulcer, usually indicating hyperactivity of the stomach, the stomach meridian, which belongs to the element earth, should be sedated. Earth is destroyed or sedated by wood, so the wood point of the stomach meridian itself, S43 (*Hsien Ku*), should be tonified to sedate earth (stomach). Likewise, the liver (wood) is opposed to the stomach, according to the law of the Five Elements; therefore, its wood point, Liv 1 (*Ta Tun*), should be tonified to destroy the element earth.

IV. THE MERIDIANS AND ACUPUNCTURE POINTS

The theory of traditional Chinese medicine maintains that inside the body there is a network of channels which are identified with the internal organs and the limbs and which connect the different parts of the body. This network is known as the *Ching Lo* or Meridians. The trunk lines which run vertically are called *Ching Mai* and the branches that run horizontally are called *Mai Lo*. Numerous spots or *hsüeh* in the body are distributed along the *Ching Mai.*

There are some 500–800 acupuncture points or spots as shown by various Chinese and Japanese charts. Exactly 669 points are listed in Dr. Chu Lien's *Hsin Chen Chiu Hsueh,* a standard textbook on acupuncture [6] used in present-day China. Many new points have been discovered in China in recent years. Also, master acupuncturists usually have a number of "secret points." The names of these points, in Chinese, were taken from astronomy, anatomy, geography, physiology, etc. In France, Germany or England the points are numbered along the line of

Table 1. ***THE FIVE ELEMENTS***

YIN MERIDIANS:						
Organ	***Element***	***Wood***	***Fire***	***Earth***	***Metal***	***Water***
Lung	Metal	Shao Shang L11	Yu Chi L10	T'ai Yuan L9	Ching Chu L8	Ch'ih Chih L5
Heart	Fire	Shao Ch'ung H9	Shao Fu H8	Shen Men H7	Ling Tao H4	Shao Hai H3
Pericardium	Fire	Chung Ch'ung P9	Lao Kung P8	Ta Ling P7	Chien Shih P5	Chu Chih P3
Liver	Wood	Ta Tun Liv1	Hsing Chien Liv2	Tai Ch'ung Liv3	Chung Feng Liv4	Ch'u Ch'uan Liv8
Spleen	Earth	Yin Pai Sp1	Ta Tu Sp2	Tai Pai Sp3	Shang Ch'iu Sp5	Yin Ling Ch'uan Sp9
Kidney	Water	Yung Ch'uan K1	Jan Ku K2	T'ai Ch'i K3	Fu Liu K7	Yin Ku K10
YANG MERIDIANS:		***Metal***	***Water***	***Wood***	***Fire***	***Earth***
Large intestine	Metal	Shang Yang Li1	Erh Chien Li2	San Chien Li3	Yang Ch'i Li5	Ch'u Chih Li11
Small intestine	Fire	Shao Chih Si1	Ch'ien Ku Si2	Hou Ch'i Si3	Yang Ku Si5	Hsiao Hai Si8
Tri-heaters	Fire	Kuan Ch'ung T1	Yeh Men T2	Chung Chu T3	Chih Kou T6	T'ien Ching T10
Gall Bladder	Wood	Ch'iao Yin G44	Hsieh Ch'i G44	Lin Ch'i G41	Yang Fu G38	Yang Ling Ch'uan G34
Stomach	Earth	Li Tui S45	Nei Ting S44	Hsien Ku S43	Chieh Ch'i S41	(Tsu) San Li S36
Bladder	Water	Chih Yin B67	T'ung Ku B66	Shu Ku B65	Kun Lun B60	Wei Chung B54

a particular meridian. For example: Li 4 represents the fourth point on the Large Intestine Meridian, or its equivalent, *Ho Ku* in Chinese.

The primary meridians are further subdivided into classes which relate to their courses of travel and the organs which they influence. These may simply be represented by the following categories:

The three Yin Meridians of the arms, called the *San Shou Yin Ching,* running from the breast to the hand, are those of the lungs, heart, and the heart-constrictor (pericardium);

The three Yang Meridians of the arms, called the *San Shou Yang Ching,* that run from the hand to the face, are those of the large intestine, small intestine, and the tri-heaters;

The three Yang Meridians of the legs, called the *San Tsu Yang Ching,* that run from the face to the foot, are those of the stomach, bladder and the gall-bladder;

The three Yin Meridians of the legs, called the *San Tsu Yin Ching,* that run from the foot to the breast, are those of the spleen, kidneys and the liver.

Limitation of space does not permit a detailed description of the complex meridians, their organic relationships and the profusion of acupuncture points described along each meridian. The length of each meridian and the number of significant points along each course vary widely. For example, the Meridian of the Bladder is the longest and possesses 67 points. Starting at the face, this meridian winds around the head and neck and courses down the spinal column to the coccyx. From this point it ascends to the outside of the shoulder blades and descends again parallel to its original descent pathway, reaching the posterior surface of the legs and terminating at the fifth toe. The Meridian of the Heart has only nine points. It commences at the armpit, descends along the anterior surface of the arm and terminates at the little finger.

A. Rules of Acupuncture

From centuries of experience, the Chinese have established certain general rules concerning the choice of points to be used for the treatment of various illnesses. Some of these have been put in rhymes or songs to facilitate learning. The most popular one translated literally into English is shown in Fig. 3. The rhyme advises that, for diseases of the stomach and abdomen, the point of *Tsu San Li* should be used; for lumbo-dorsal ailments, *Wei Chung*; for women's diseases, *San Yin Chiao,* etc.

In actual practice, the acupuncturist will generally combine a spot with some other sensitive spots near the source of illness. For example, in headaches, the *T'ai Yang* spot on the head is combined with the *Ho Ku* spot on the hand. In most cases, one main spot is combined with several secondary ones. Sometimes one spot is sufficient, but a suitable combination of different spots reportedly produces an even stronger effect.

The proper application of the acupuncture technique requires attaining dexterity in needle manipulation to produce a stimulating (tonification) effect or a tranquilizing (sedation) effect at the points of insertion. Certain illnesses require a tonifying of the points while others may call for sedation.

The Chinese Law of *Pu Hsieh* governs the relations between tonification and sedation; *Pu* representing tonification and *Hsieh* representing sedation. The recommended technique for tonification is to rotate the head of the needle by pushing the thumb forward while drawing the index finger back (clockwise) whereas, in sedation, the head of the needle is rotated by pushing the index finger forward while drawing the thumb back (counter clockwise). Several other techniques such as "expiration-inspiration," "fast-slow," "upstream-downstream" can also be used to produce the tonification-sedation effect.

肚	腹	三	里	留
STOMACH	ABDOMEN	SAN	LI	STAY
腰	背	委	中	求
LUMBO —	DORSAL	WEI	CHUNG	REQUEST
頭	項	尋	列	缺
HEAD	NECK	SEEK	LIEH	CH'UEH
面	口	合	谷	收
FACE	MOUTH	HO	KU	COLLECT
婦	女	三	陰	交
WOMAN		SAN	YIN	CHIAO
胸	腔	內	關	謀
CHEST	CAVITY	NEI	KUAN	PLOT

FIGURE 3. General rule for choice of points put into rhyme.

The most important rules of acupuncture as summarized by Dr. Chu Lien are as follows:

1. Insertion of the needle into those points located symmetrically on, and common to, both left and right halves of the body. For example, for stomach ailments use *Tsu San Li* (S 36) bilaterally.

2. Insertion of the needle at points with a similar effect on both the upper and lower extremities, such as combining *Ho Ku* (Li 4) with *Tai Ch'ung* (Liv 3) for weakness of upper and lower limbs.

3. Simultaneous stimulation of the front of the body and the back. In this connection, mention should be made of a combination of superficial and deep acupuncture whereby points on the front part of the body and on the back, for example, are punctured at the same time, but to varying depths: for example, combine *Tsu San Li* (S 36) with *San Yin Chiao* (Sp 6) to regulate functions of internal organs.

4. Simultaneous "internal" and "external" treatment of a Yin point and a Yang point at the same time. For instance, combine *Nei Kuan* (P 6) with *Wai Kuan* (T 5) for stimulation of the whole arm. Example: Combine *Ch'u Chih* (Li 11) and *Ho Ku* (Li 4) with *Yang Hsiang* (Li 20) for treating nose ailments.

5. A combination of direct and indirect stimulation; that is, simultaneous stimulation of a point near the seat of a disease and one remote from it.

6. Simultaneous stimulation of points along the spinal column and on the extremities.

7. In the case of varying symptoms, simultaneous stimulation at various points. Example, for low-back pain and indigestion, use *Huan T'iao* (G 30)an d *Tsu San Li* (S 36), etc.

8. "General strengthening." This is based on simultaneous stimulation of the points treated for tonification purposes and those which "belong" to the illness in question.

9. Treatment in accordance with the "corresponding and changing time." This implies a change in the choice of points of tonification or sedation during the period of treatment.[6b, 9b]

B. Pulse Diagnosis

Pulse diagnosis plays an important role in acupuncture treatment since the condition of specific organs must be determined by feeling the pulse. An experienced Chinese traditional practitioner takes the pulse not only to determine heart rate, but he is reputed to be able to ascertain whether internal organs relating to a known or suspected illness are in good or bad "health." The radial artery is traditionally the primary artery used in pulse taking. It is reported that many years of practice traditionally are required before pulse diagnosis may be performed proficiently.

C. Acupuncture Needles and Techniques

Currently, stainless steel needles are most commonly used, although needles made of silver and gold are still quite popular in France.

In practice, three types of needles are employed (Fig. 4): the *hao-chen* needles for insertion; the seven-star or five-star dermal *pi fu chen* needles for light tapping in the area of acupuncture point or on children; the *san ling chen* triangular needle for releasing blood.

Needles for insertion are used in different lengths and thicknesses, depending on the desired type of insertion and depth and intensity of stimulation.

The needles can be inserted at three main angles: a 90-degree angle at the point of insertion is used for most points; a 12 to 15-degree insertion is used for some points on the face, head, and neck; and a 45-degree insertion is used mostly for points on the chest.

The depth of insertion, usually ranging from 3 to 10 millimeters, depends on the location of the points. In certain cases, needles of 6 to 7 inches are used for deep muscular insertion.

Insertion of the needle can be carried out in a number of ways. For example, when short needles are used, the acupuncturist can press his thumb on the skin near the point of insertion and then insert the needle alongside it. With long needles, using the thumb and the index finger (or the index and middle finger) of his left hand, the doctor presses down the skin in such a way that the point is located between the top sections of each finger. The needle is then guided down between the fingers.

Varying degrees of stimulation can be obtained by different ways of insertion. For example, the needle can simply be pierced in. The most common way is the rotated insertion, in which the needle is twirled in with the thumb and index finger of the right hand as the needle is pressed down. This method usually produces greater stimulation.

According to old Chinese medical guidelines, there are many spots or areas where the use of needles or moxibustion techniques are prohibited. These areas generally are those in which arteries, veins or important organs are located.

V. MOXIBUSTION

As previously mentioned, moxibustion is integrally related to acupuncture by the latter's definition in Chinese. Very briefly, we may say that moxibustion is more frequently used for chronic illnesses in intensifying the effect of acupuncture. Moxa, a medicinal herb (*Artemisia vulgaris*), is known as *ai* (pronounced "eye") in Chinese. There are 4 types of moxibustion: direct, indirect, post-acupuncture and combined. The dry powdered herb usually is made into the shape of a small ball or cone which will then be placed on the actual point of treatment. The cone is then lit and is allowed to remain on the skin until the burning sensation becomes intolerable to the patient. Moxa may also be used in cigar form, lit, and held above the point where

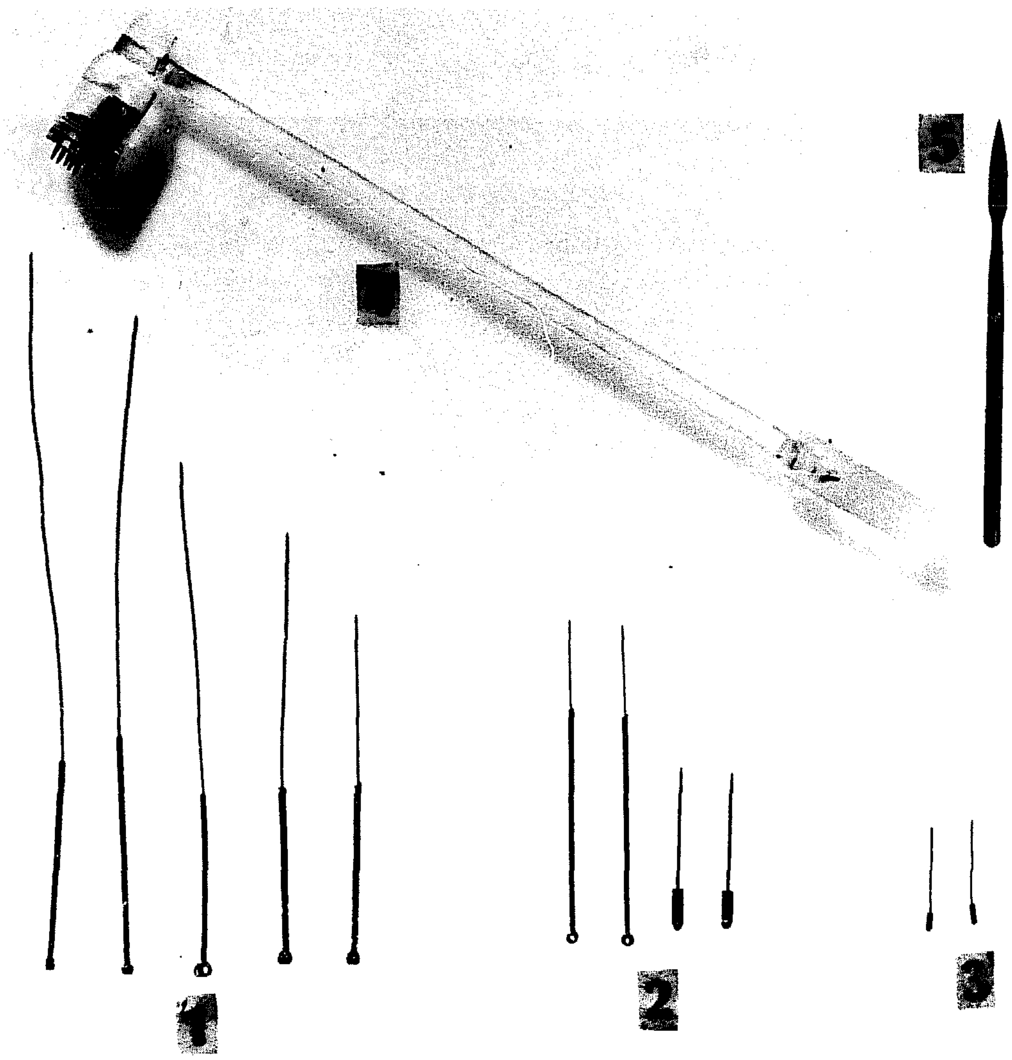

FIGURE 4. Acupuncture Needles, 1) 2) and 3) needles for insertion—various lengths; 4) Dermal needles with hammer; 5) Triangular needle.

treatment is to be applied. To reduce the heat intensity, insulation such as a slice of fresh ginger or garlic is sometimes placed between the skin and the burning moxa.

VI. CURRENT STATUS OF ACUPUNCTURE AND NEW DEVELOPMENTS IN CHINA

During the Great Leap Forward in 1958, Chairman Mao made the call: "Chinese medicine and pharmacology are a great treasure house. Efforts should be made to explore them and raise them to a higher level." Chairman Mao also urged that Western medicine be integrated fully with Chinese medicine. Vigorous pursuit of this national policy has led to substantial reorientation and reform of the entire system of Chinese medical practice and teaching.

A. Significant Changes

Significant changes were observed by Western scientists and doctors, notably Dimond,[12] Sidel,[13] White, Rosen, and Horn,[14] during their recent visit to China. It is estimated that 90 percent of medical care in China is dispensed through the traditional system. The Western-trained Chinese physicians are required to learn the full range of traditional medicine including acupuncture and pulse diagnosis (Fig. 5). The traditional physician has a major role in the outpatient clinic and is now able to order x-ray and laboratory tests.

Efforts were made to place acupuncture and other old traditional medical practices on a more scientific base through self-evaluation, research, and melding with Western concepts and approaches. Older theories and rules not verified through practical experience have been relegated to secondary orders of significance or importance. For example, in diagnosis and prognosis, greater emphasis is placed on effective acupuncture points and their relationship to the autonomic nervous system, and less on the theoretical aspects of Yin-Yang, the meridians, and the Five Elements.

The development of acupunctural anesthesia led naturally to its adoption and application to Western surgical technique and related diagnostic instrumentation and equipment. Though sometimes crude by comparison to U.S. standards, the scientific hardware available is nevertheless adequate and effective. Also conspicously evident is the full recognition of Western concepts of medical hygiene and sanitation as demonstrated by the sterilization of acupuncture needles and the maintenance of a sterile environment where required in medical treatment. In medical teaching, modern anatomical charts (Fig. 6), figures (Fig.

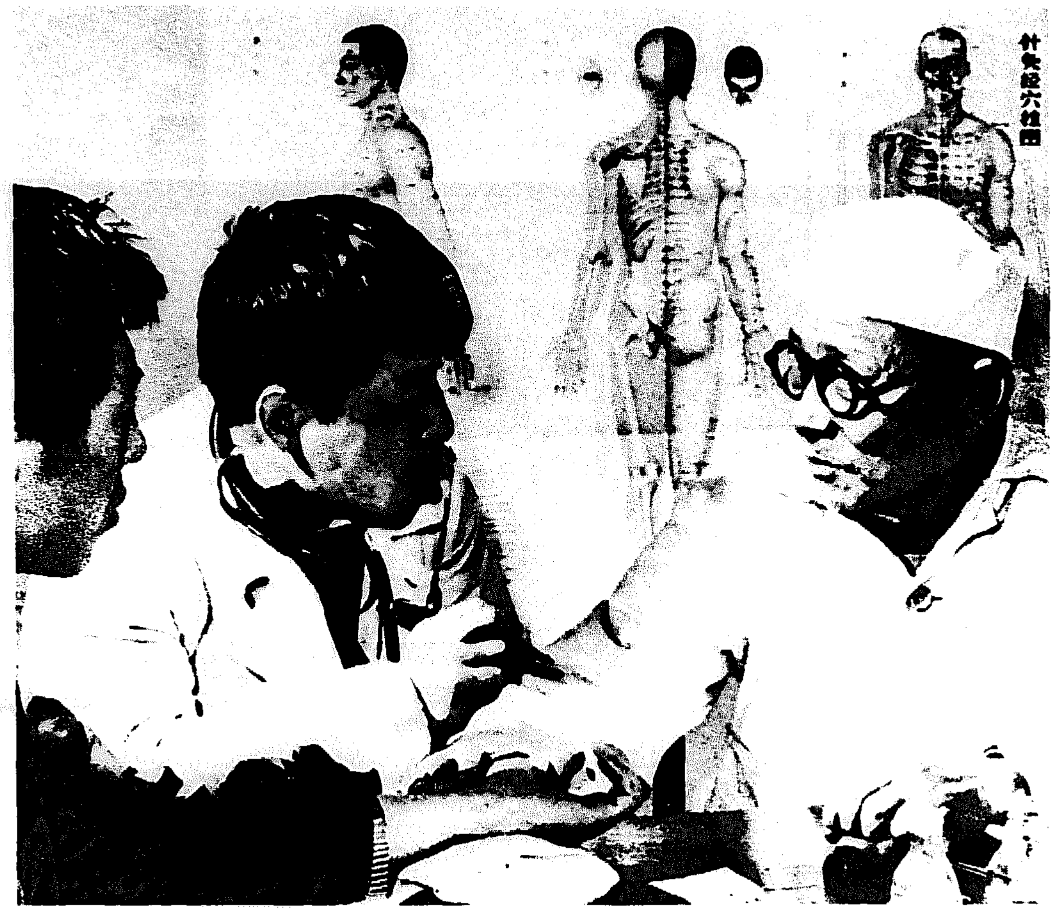

FIGURE 5. An old doctor of traditional Chinese medicine teaching the doctors of Western medicine how to feel the pulse ("Medical Workers Serving the People Wholeheartedly," Foreign Languages Press, Peking, 1971).

7) and models (Fig. 8) and textbooks with modern terms are used in furthering the development of acupuncture.

Western researchers and doctors have achieved some advances in bridging the gap between old and new, theoretic and pragmatic, philosophic and scientific, and between literary and technologic. Perhaps the most outstanding scientist with a Western background and one primarily responsible for the evolution of acupuncture in China to its current level is Dr. Chu Lien. Her *Hsin Chen Chiu Hsueh* or *Textbook of Modern Acupuncture and Moxibustion* (1957) is a standard textbook on acupuncture used throughout China today. This noted work, which has been translated into Russian, provides many new ideas and reappraisals of practical techniques.

During the past 20 years, modern research efforts in China, the Soviet Union and Europe to date have not provided conclusive scientific proof of the anatomical existence of the traditional meridians and points, although many inferences were deduced during investigations. By means of highly sensitive electropotentiometers, scientific researchers in China have claimed that the electrical potentials of skin resistance along the meridians are constant and lower than the fluctuating values obtained elsewhere in the body. These measurements have reportedly confirmed that connective tissue is looser in the vicinity of the traditional acupuncture points.[9c]

Professor Kim Bong Han of North Korea reported his discovery of a special conducting system of "Bong Han corpuscles," "Bong Han ducts" and "Bong Han fluid" circulating in the ducts. This system was reportedly found to correspond to the course of acupuncture meridians. However, this finding could not be confirmed by Chinese investigators and was disputed by Kellner (International Conference on Acupuncture in Vienna) as being artifacts in the preparation of histological slides.[11e]

It is generally agreed that some sort of neural pathway is involved in the action of acupuncture, especially in view of the studies demonstrating the existence of the cutaneo-visceral reflex. Modern Chinese investigators, particularly Wang Hsueh-tai and Chu Lien, regard acupuncture and moxibustion as stimulation therapy.[9d]

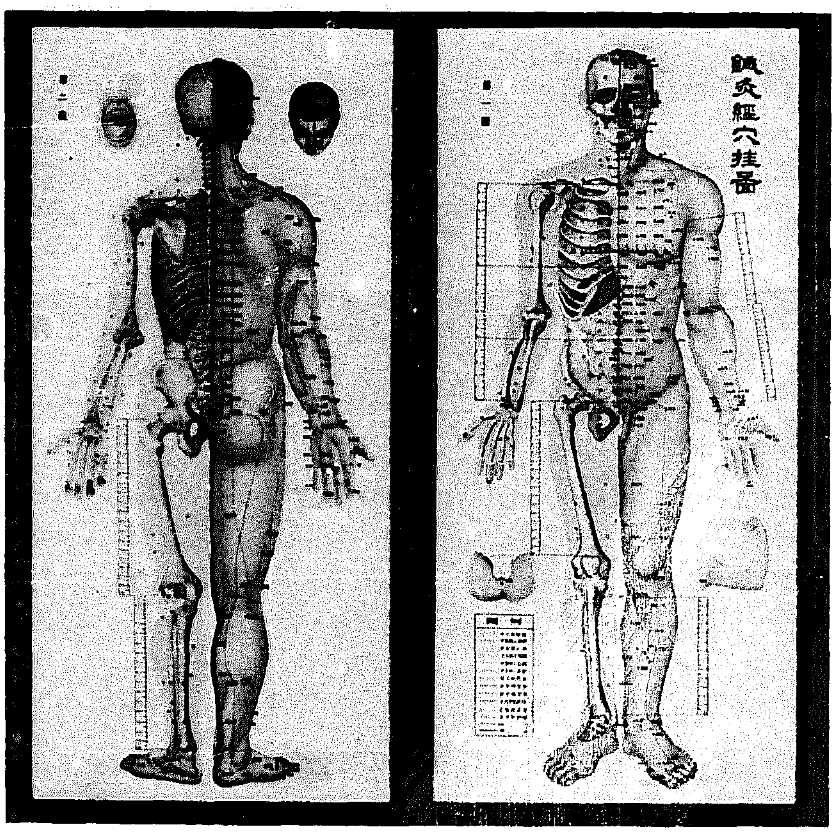

FIGURE 6. Modern Acupuncture Charts

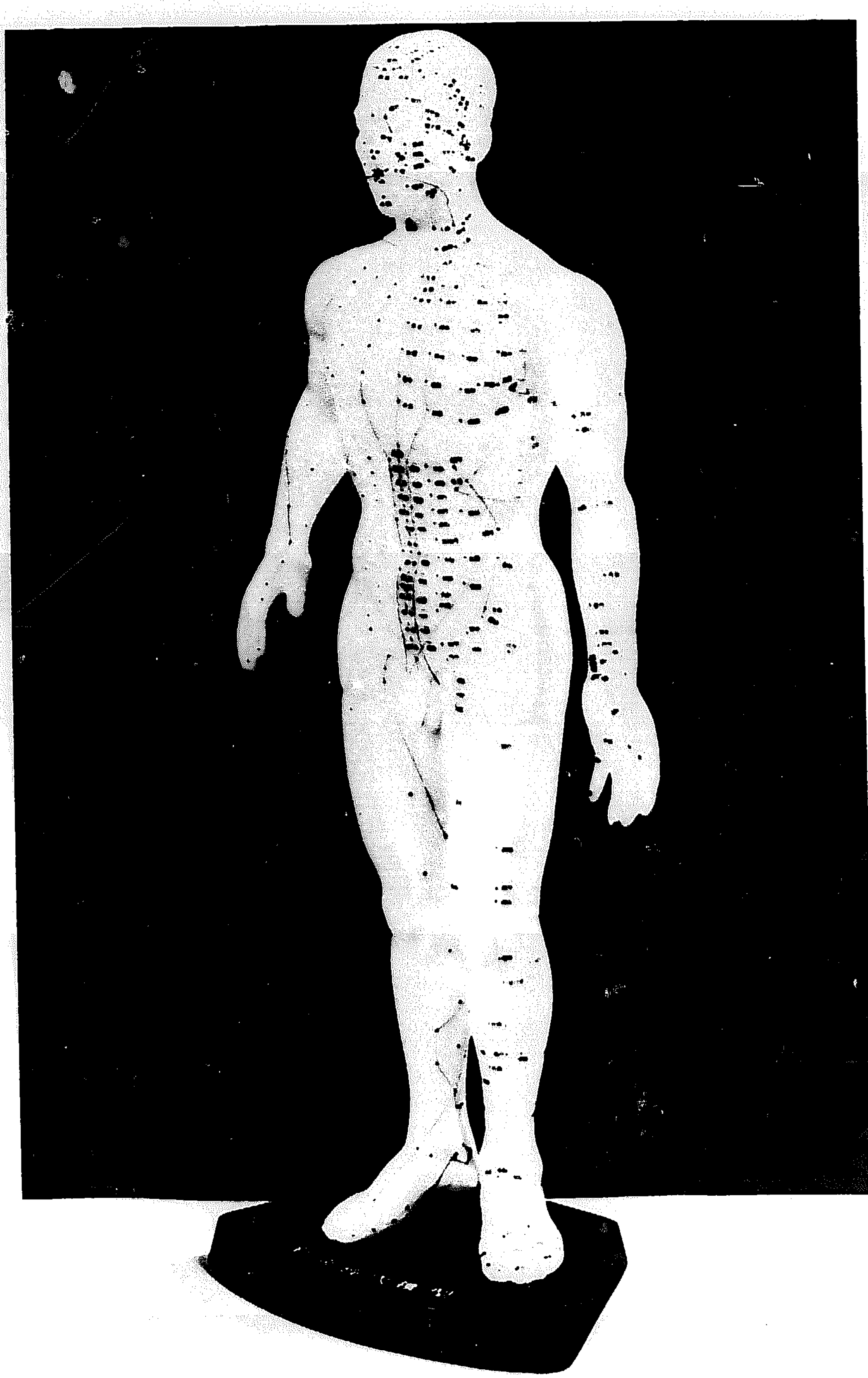

FIGURE 7. Plastic Acupuncture Mannikin

B. New Developments

1. Acupuncture Anesthesia

The recent development of acupuncture anesthesia in China could be an outstanding achievement which may be attributable directly to the combined efforts of traditional Chinese and Western medical practitioners.

In the late 1950's Chinese medical workers in Sian, Shanghai and the provinces of Shansi and Hopei reviewed their experience with acupuncture to control the pain of toothache, sore throat, and pain following tooth extraction or tonsillectomy. Then they tried acupuncture to replace drugs to induce anesthesia in these minor operations and were reportedly successful. Summing up this experience, they worked out the technique of acupuncture anesthesia. Later, they started a mass movement to use acupuncture anesthesia in clinical practice and undertake scientific studies of it. The technique developed was gradually improved and the variety of points that could be used increased. Originally, needles were inserted into the body and limbs. Then medical workers in Nanking obtained anesthetic effects by placing needles into points on the ear. Successes were achieved with points on the nose at Huaiyin, Kiangsu province, and points in the face in Shanghai. In administering acupuncture anesthesia, one or more needles are inserted at certain points on the patient's limbs, ears, nose or face. Following a period of stimulation and induction, anesthesia is produced for operation on the head, chest, abdomen or limbs (Fig. 9). This new method, used

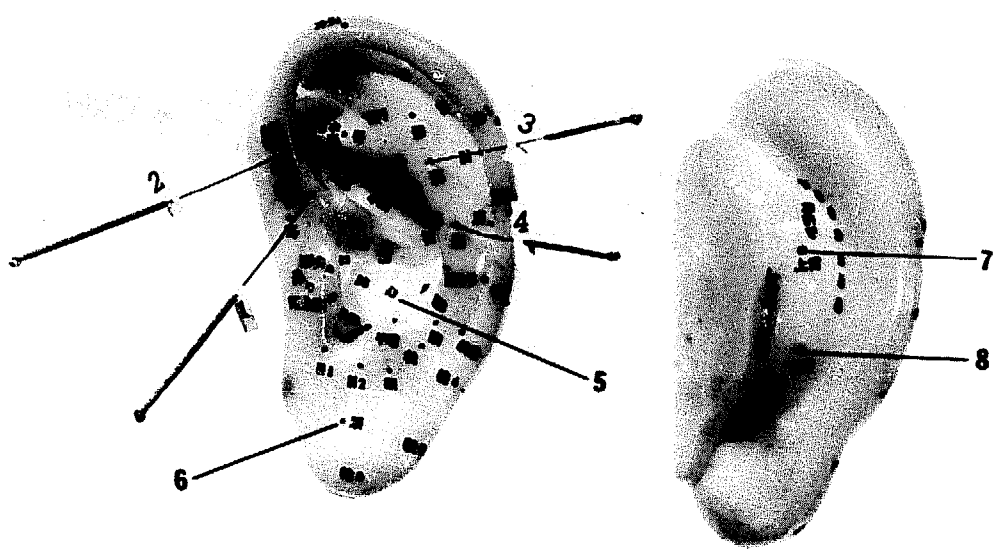

FIGURE 8. Plastic Ear Model showing acupuncture spots relating to various parts of the body, e.g., 1, Rectum; 2, External Genital Organs; 3, Abdomen; 4, Chest; 5, Heart; 6, Eyes, etc.

in a large number of cases, has apparently proved effective, safe, simple and economical. As of the end of 1970, acupuncture anesthesia was administered to more than 40,000 patients.[13] In the course of clinical practice, the techniques have become simpler and more effective. The needles may be moved mechanically by hand or activated electrically. At a national conference on acupuncture anesthesia in Shanghai in May, 1970, some improved techniques were discussed and a more extensive use of these methods was promoted.[14]

According to recent reports from Chinese literature, there are certain essential factors or prerequisites for successful induction and maintenance of acupuncture anesthesia: [15, 16]

(a) Choice of spots. Basically, the spots are selected according to the old classic principle of "following the *ching* (meridian) to pick the spots." To be effective, the needle or needles must be applied at a point

FIGURE 9. At the No. 3 Teaching Hospital of the Peking Medical College, an operation was performed under acupuncture anesthesia on a patient suffering from cancer of the cardia and lower esophagus. Medical workers inserted three needles at points on the left ear and left forearm, and by steady stimulation induced analgesia. The surgeon smoothly performed a transthoracic resection of a tumor of the lower esophagus and greater curvature of the stomach, splenectomy and gastroesophagostomy. Throughout the operation the patient was fully conscious and breathed easily. His blood pressure remained constant. (*China Pictorial,* 1971, 11. Peking, China).

or a few points along the *ching* which supposedly runs through the ailing part or organ of the body. In anesthesia, the same principle applies.

(b) It is of utmost importance to attain *te ch'i* (acquiring a life-giving or dynamic force) in acupuncture treatment because it is a manifestation of the functioning of *ching lo* (meridians). This means that before the needle can yield any result after its application, the patient must feel sore, distended, heavy and numb over the site of needle placement, and, at the same time, the acupuncturist must feel the sensation that the needle in his hand seems to have been slightly "sucked in." As recorded in the classic *Nei Ching*, "to make the needle effective the important thing is *te ch'i*."

c) From experience, it has been found that a sufficient period for induction is essential—at least 20 minutes.

(d) To maintain acupuncture anesthesia, it is essential to preserve the sense of *te ch'i* by continuous manipulation of the needle.

(e) *Te ch'i* induced by the needle is believed to be indicative of a normal functional state of the nervous system as shown by various experiments. It has been observed in patients suffering from hemiplegia that the administration of acupuncture on their legs failed to induce *te ch'i*. Likewise, if the nerves deep in the needle insertion spots are temporarily desensitized by local anesthetic, the spots would lose their sensitivity.

Anatomical research in the structure of the spots also shows that the veins pass directly underneath half of the more than 300 acupuncture spots in the human body, while in the other half the nerves are within a radius of half a centimeter.[17]

Although most of the phenomena relating to acupuncture can be explained today in some connection with neural pathways, this does not mean that the theory of *ching lo* should be discarded altogether. For example, Army medical workers in Kwanchow found that needles inserted on one side of the patient's body induced analgesia on the other side of his body in a chest operation. Since no logical neural basis can be attributed to this phenomenon, the *ching lo* theory would appear to offer a possible explanation.

If indeed there is substance to the reports, in many ways acupuncture anesthesia could be superior to any of the conventional anesthetics. The most apparent advantage, of course, is that it is very inexpensive and very simple to handle. The method can now be used by a small team equipped with nothing but a few needles. Many medical orderlies and barefoot doctors in the villages have mastered the skill of such anesthetization. This would be particularly valuable for rural and mountainous areas and under war conditions.

With acupuncture anesthesia, the patient remains in a sober state throughout the operation. Aside from being insensitive to pain, his physiological functions run normally. This enables him to better cooperate with the surgeon and the latter to know more precisely how the patient's condition and operation are progressing. For instance, during the operation to correct squinting, when anesthesia has been induced by acupuncture, the patient's eyeball can function normally. The surgeon is able therefore to ascertain the result of the operation then and there without having to wait, as when an anesthetic is administered, for the subsidence of the effects of the anesthetic drug. Another obvious advantage is that undergoing heart surgery or a pneumonectomy with acupuncture anesthesia, the patient can, as required by the surgeon, carry out abdominal breathing to facilitate the operation and to relieve himself of discomforts which usually accompany such operations.

For cases where the patients cannot tolerate general anesthesia, especially in heart surgery, the advantage of the new method would be all the more obvious. One important difference between general anesthetics and acupuncture is that where the former renders inactive the patient's brain and central nervous system during the operation, the latter activates them so that they can regulate the physiological functions of the patient undergoing an operation. This explains certain unusual phenomena connected with the blood pressure of patients under acupuncture anesthesia. Recent literature from China also showed that the acupuncture method can be used safely in emergency operations where the patients have been suffering from chronic hypertension or hypotension with feeble pulse.

Based on recent extensive clinical observations and research in acupuncture anesthesia, the Peking Acupunctural Anaesthesia Co-ordinating Group have found that *Chinglo* (Meridian) and the nervous system, in large measure, correspond to each other. The traditional Chinese medical treatises maintain that *Chinglo* probably includes the nerves, blood vessels, the endocrine system and some of their functions. However, the theory of *Chinglo* concerning the connections between various parts of the body cannot be explained entirely by our present knowledge of neuro-anatomy and neuro-physiology. For instance, they have found that when pain is induced with thermal stimulation of certain parts of the limbs, sensitivity to pain appears in corresponding areas of the ears. This shows that the points on the ears have certain specific connections with other parts of the body. Therefore, they consider that *Chinglo* includes not only nerves and blood vessels, but may also involve certain connecting pathways and activities inside the human body, and the laws governing them are still unknown. However, certain demonstrable physiological changes induced by acupuncture have been observed. For instance, needling certain points on the body of a normal person or animal caused an increase in white blood count and enhanced phagocytosis. Also, needling of the *tsu san-li* point (external side of leg just below the knee) increased intestinal peristalsis in fluoroscopic studies of both human and animal.

Using modern scientific methods, the Chinese scientists and medical personnel have ascertained the following two main physiological effects of acupuncture anesthesia: (1) the analgesic effect, and (2) the regulatory effect.

Concerning the analgesic effect, extensive clinical practice has reportedly shown that needling certain points on the body is very effective for suppressing pain. Toothaches, headaches, low back pains and pains in the chest and adbomen could be suppressed immediately by needling certain points. The regulating effect is considered to be the more important effect of acupuncture anesthesia. This effect restores abnormal functions of the body to their normal condition. Clinically, the Chinese investigators often have reported that needling the same point has corrected both diarrhea and constipation, and brings a rapid or slow heart rate back to normal.

It is the opinion of the Peking Acupunctural Anaesthesia Coordinating Group that the effect of needling in preventing and suppressing pain and its regulating effect are interrelated and act on each other, and it is "precisley these effects that help increase the patient's endurance to withstand the operative procedure and reduce his sensitivity to pain. When this kind of anesthetization is used, the patient, apart from feeling little or no pain, it reportedly fully conscious during an operation and can withstand its attendant trauma. This is why the relatively small stimulation produced by needling can overwhelm the much stronger stimulation resulting from surgical trauma."

From modern scientific experiments on animals, Chinese researchers have recently suggested the role played by the brain in acupuncture anesthesia. When pain stimulus was applied on certain parts of an animal's body, characteristic electroencephalographic changes in a certain part of the cerebral cortex were observed. While simulating the process of performing an operation with acupuncture anesthesia, first needling the points and then applying pain stimulus, the researchers noticed that electroencephalographic changes in the cerebral cortex caused by needling certain points could completely suppress or markedly weaken these changes induced by the pain stimulus. Such effects varied when different points were needled. The Chinese think the principle of acupuncture anesthesia may be related to cerebral cortex involvement. Experiments have also proved that similar phenomena also occur at various subcortical levels of the central nervous system. "Therefore, the effects of acupuncture anesthesia are in effect related to the different levels of the central nervous system, with possible participation of other factors, such as humoral factors."*

2. Treatment of Blindness and Deaf-Mutism

According to traditional teaching and practice, certain points around the eye and the ear are forbidden to deep needle insertion. However, with "revolutionary spirit," PLA medical workers reportedly have broken through many "forbidden zones" by deep needling and developed more effective techniques for the blind and deaf-mutes, as well as for the residual-effects of infantile paralysis. Also, many new points have been found for curing these defects. Recent reports from China indicate that in 1970 they treated 1,380 patients suffering from different kinds of eye defects and in 90 percent of the cases obtained good results. Among them, 111 patients who had been blind from several to forty years reportedly regained their eyesight by this new acupuncture therapy (Fig. 10).[18]

C. Therapeutic Efficacy of Acupuncture

1. General Ailments

Documentation is available today in scientific journals and literature to suggest that acupuncture is appropriate for treating a wide variety of diseases, ranging from internal medicine to women's and children's ailments, and from neurology to organotherapy. Despite substantial progress achieved in expanding both the scope and the depth or degree of efficacy in medical treatment within recent decades, acupuncture is not regarded by medical doctors in China as a magic cure-all. They recognize with patient reality that, for certain illnesses, acupuncture is only moderately effective, and for certain ailments acupuncture has shown no effectiveness at all. However, the apparently spectacular successes achieved fairly recently with acupuncture, especially in the field of anesthesia, have served to spur the Chinese scientists to greater hopes and efforts for further achievements.

Acupuncture has been reported to be particularly useful in the treatment of functional disturbances, in the alleviation of pain, and in the reduction of muscular spasms. The therapeutic value of acupuncture in the treatment of groups or "systems" of diseases was assessed and results compiled from cases occurring throughout China, including Inner Mongolia, between 1951 and 1954. Of the 10,036 cases involving acu-

*Peking Acupunctural Anaesthesia Co-ordinating Group, "The Principle of Acupunctural Anaesthesia," *Peking Review*, 7–8, February 25, 1972.

FIGURE 10. Many rare and difficult cases of eye diseases have been successfully treated by new acupuncture therapy. (*China Pictorial,* September, 1970)

puncture, 8,063 were later reviewed and the number of cases successfully treated averaged 92.47 percent.[9e]

Highlights of some of the more significant Chinese scientific publications on acupuncture that are available up to 1967 may be summarized as follows:

(a) A new acupuncture spot named "Ya T'ung Ling" (toothache effective) is claimed by the Chinese as specifically for treating toothache. This spot, as shown in Fig. 11, is situated between the joints of the middle finger and the ring finger. According to clinical reports, this spot has demonstrated as effectiveness greater than 95 percent in toothache treatment.[19]

(b) Acupuncture and moxibustion are reported to be especially effective in the restoration of limb movement after polio. Acupuncture and moxibustion are applied at the *Yang Ming* spots to relieve paralysis.[20]

(c) It is well known that *Ho Ku* is one of the most commonly used points in treating diseases such as toothache, spasm of the upper extremities, lymphangitis, tumor of the thyroid gland, tonsillitis, parotitis, gingivitis, sinusitis and other ailments in the upper portion of the body. When acupuncture applied locally brings no relief in acute ab-

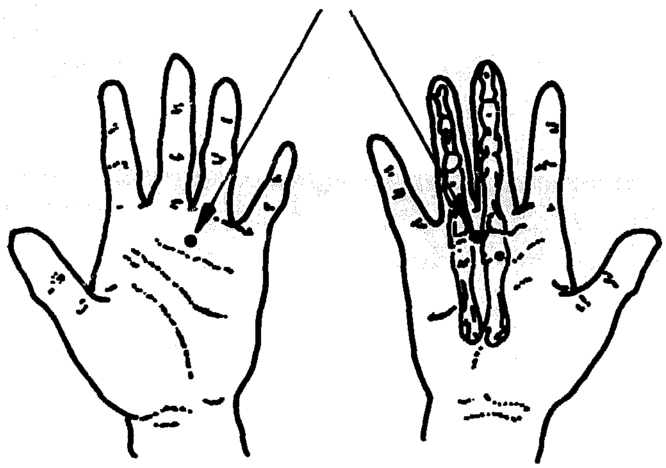

FIGURE 11. New Acupuncture spot effective in toothache (*Chiang-su Chung-i*, No. 7–1966, 40, July, 1966)

dominal pain, such as acute and chronic colitis, appendicitis, hernia, prolapsed anus, etc., needling at the Ho Ku site was found to produce the relief desired.[21]

(d) Treatment of 280 cases of goiter with acupuncture has been reported. The majority of the patients were between 14 and 25 years of age. Acupuncture was administered every other day for two weeks. All but two were cured. One of the two cases seemed to be lymphotuberculosis and the other appeared to be thyrophyma. This technique was applied in an entire *Hsien* (district) with later reports claiming that goiter, as a disease, has almost disappeared in that region because of this technique.[22]

(e) The acupuncture points of *Tien Tu, Ho Ku* and *Shao Shang* were found effective in the treatment of pharyngeal paralysis in 22 patients who had not responded to conventional treatment with hot steam, diathermy, etc. All of the 22 patients responded to acupuncture, although several courses of treatment were required in some.[23]

(f) Between May, 1962 and March, 1964, 115 cases of acute jaundicial, infectious hepatitis were divided into three groups of 40, 35 and 40 patients. One group was given acupuncture treatment; another, Western medical treatment (hepatic maintenance); and the third, joint Western and traditional medical treatment. Hepatic maintenance and build up for those treated with Western methods included administration of vitamins and liver products. Those treated by the joint method were given the same hepatic maintainers, plus a traditional medicine, comprised mainly of *Herba Artemisiae Capillaris.* Results were that from the points of view of symptomatic relief, jaundice eradication, and return of liver function, acupuncture was far superior to the other two methods used.[24]

(g) Acupuncture therapy was applied in 12 cases of postoperative pain in the anal region. Eight cases showed immediate response with cessation of pain, three improved, and one did not respond because of technical error. *Su Ku Hsueh,* located on the lateral surface of the small toe, was chosen as the specific anatomical point for the needle insertion.[25]

Acupunctùre was applied for the treatment of 1,032 cases of infantile paralysis at the Peking Municipal Children's Hospital from 1953 to 1962. Of 526 patients who received acupuncture treatment within two weeks of appearance of the disease, 253 were completely cured, 72 were nearly cured, 147 showed noticeable improvements, and 54 showed some improvement. The electromyograms of the patients who had received acupuncture treatment showed definite improvement. A greater number of acupuncture points in each course of treatment was recommended since a large number of muscles and muscle groups were involved. In a group of 99 patients who were given acupuncture at ten points in each course of treatment, 40 were completely cured. But in another group of 90 patients who were punctured at two to four points in each course of treatment, only 24 were completely cured. A diagram is given showing nine acupuncture points from the thigh down to the foot.[26]

In a study on acupuncture treatment and prevention of epidemic influenza, the following four points were selected: *Ta Chui, Nei Kuan, Ho Ku* and *Tsu San Li.* Results from observations of 1,006 cases showed that acupuncture caused the disappearance of symptoms in patients who had early and simple types of influenza. Fever usually began to fall in an hour. Five to 16 hours later, the temperature subsided to normal. The effect of acupuncture administered during the recovery period was even more pronounced. The general consensus is that acupuncture proved to be more effective than treatment with aspirin compounds alone. It is believed that acupuncture might have a prophylactic effect against influenza.[27]

2. Anesthesia

As mentioned earlier, a total of over 400,000 surgical operations were reported to have been performed under acupuncture anesthesia with a success ratio of about 90 percent. These operations were performed in towns, municipalities, districts, and metropolitan areas throughout the country on patients ranging from infants to 80-year-olds. The 33rd People's Liberation Army Field Hospital recently published a report on the analysis of 331 cases of acupuncture anesthesia performed over a 15-month period. Table 2 showns a breakdown of the types of surgery and the success ratios for attaining anesthesia. The average success ratio was found to be 95.2 percent. The best anesthesia results were obtained for operations in the regions of the head, neck and chest. The anesthesia success ratios for these series of

331 operations were reported to be comparable to those attained in similar hospitals elsewhere in China.

Table 2. Success Rates for Attaining Anesthesia

Sites of Surgery	Number Acupuncture Anesthesia	Results				Success %
		Good	Satisfactory	Fair	Failure	
Head, Neck	94	42	49	3		100.0
Chest	3		3			100.0
Abdomen	162	41	86	28	7	95.0
Lumbodorsal	5	2	2		1	80.0
Perineum	38	14	14	7	3	92.1
Upper Limbs	16	5	6	2	3	81.3
Lower Limbs	13	2	6	3	2	84.6
TOTAL	331	106	166	43	16	95.2

Such success in acupuncture anesthesia, as reported, is perhaps remarkable when one considers that the total development and growth of this anesthetic approach spanned a relatively short time period. In 1970, the Third Teaching Hospital of the Peking Medical College performed over 3,000 operations on the head, neck, chest, abdomen and limbs using acupuncture anesthesia—a tenfold increase over the number in the 8 years before the Cultural Revolution.

VII. ENGLISH TEXTBOOKS ON ACUPUNCTURE

In view of numerous inquiries on the availability of English textbooks on acupuncture, the writer recommends the following:

1. **Acupuncture, the Ancient Chinese Art of Healing,** by Felix Mann, 1971, Second Edition (11). This is the best known and most complete textbook of acupuncture in the English language. Dr. Mann is a British M.D. who has long been a student and practitioner in the subject. While visiting China in 1963 as a guest of the Chinese Medical Association, he studied certain developments in the field of acupuncture. The first edition of this popular book has also been translated into Chinese in China.[28]

2. **Chinese Acupuncture** by Dr. Wu Wei-p'ing.[5] This is the first textbook of Chinese acupuncture that has ever appeared in English. It is an English translation from the French edition of his original textbook in Chinese. It is presented in a very condensed form. Dr. Wu is an internationally known Chinese master acupuncturist.

3. **The Chinese Art of Healing** by Stephen Palos, 1971.[9] This is one of the first books covering traditional Chinese medicine in a comprehensive manner. Being a sinologist, the author gained

rapid familiarity with the subject. For this book, the Chinese Medical Society in Peking made available to the author Chinese material and research information on the traditional Chinese art of healing.

VIII. CONCLUSION

The universal precept in medical practice since ancient times has embodied the belief that beneficial cures and treatment should be made available to all mankind. Because of its philosophical derivation and its enshroudment in Oriental mysticism, acupuncture has appeared to be an irrational practice when viewed by Western medical science. During the last two decades, the development of acupuncture in China received a dramatic boost through official decree to integrate traditional and Western medicines. Only very recently, through personal observation, has the United States medical profession been introduced to demonstrations of therapeutic acupuncture and acupuncture anesthesia for major surgical procedures, which may lead to other significant medical discoveries.

The current concept held by Chinese scientists concerning the phenomenon of acupuncture anesthesia points to a possible interrelationship between *chinglo* (Meridian) and the nervous system, with the two main physiological effects being analgesic and regulatory. While significant advances have been made in this field, the Chinese authorities acknowledge a lack of compehensive knowledge of the *chinglo* theory and a full understanding of certain aspects of acupuncture anesthesia. They emphasize the need for more intensive scientific research to gain a better understanding of this important development. Recent communications between physicians and scientists of the United States and the People's Republic of China have established an initial bridgeway to provide an opportunity for improved interchange of information between the two countries. Results may be rewarding not only to the medical practice in the United States, but to medical science in general.

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PHARMACOLOGY

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INTRODUCTION

The origin of traditional Chinese medicine, notably herbal remedies and acupuncture, is intricately interwoven with Chinese philosophy and history dating back thousands of years before Christ. Whereas tremendous strides were made in Western medicine in its 250 years of growth, the rate of advancement of Chinese medical practice was extremely sluggish by comparison throughout its 3,000 years of development. It is only recently that, with intensified integration of Western and Chinese traditional medical practices in the cultural revolution period, herbal pharmacology has been shifted into a new phase of scientific development.

Significant achievements in modern pharmacology have been reported in recent years in Chinese literature as well as by Western scientists and physicians who have been recent visitors of the People's Republic of China. This new development, along with a growing curiosity in acupuncture and herbal medicine, account for the recent upsurge of interest in the ancient traditional medical practice. Special chapters have been assigned in this handbook for specific and detailed treatment of acupuncture and traditional medicine. In addition, a detailed and scholarly discussion of traditional medical practice is presented in Croizier's recent book, *Traditional Medicine in Modern China.*[1] This book provides extensive historical and philosophic background and points out the recent sociopolitical influences on traditional Chinese medical theory and practice. The focus of this chapter will be on the current status and development of pharmacology in China. Material used for this chapter was gathered from Chinese scientific literature, notably, the *Chinese Medical Journal* (into English); the *Yao-hsueh T'ung-pao (Pharmacology Bulletin);* and the *Yao-hsueh Hsueh-pao (Acta Phar-*

maceutica Sinica), etc. With the cessation of publication of these scientific journals in 1967 during the Cultural Revolution, the coverage of pharmacological research and development has since been limited to the news magazines, news periodicals, and newspapers.

To promote research and training in traditional medicine, the Academy of Traditional Medicine was established in Peking in 1955 to coordinate the activities of various research services on acupuncture, external pathology, internal pathology, traditional remedies, and the history of traditional medicine. Subsequent integration of traditional and Western scientific schools through government edict in 1958 resulted in intensive examination and development of traditional medicine through modern scientific methods. The Institute of Materia Medica in Peking which was recently visited by American scientists and doctors [2, 3] is a component of the Chinese Academy of Sciences. This Institute has a department of pharmaceutical chemical synthesis, department of phytochemistry, department of pharmacological analysis, and department of pharmacological research. Thus medicinal herbs, the mainstay of traditional medicine, received significant scrutiny and refinement in the development of pharmaceutical technology. The active principle of many important plant drugs has been identified and isolated. At the same time, the pharmaceutical industry has kept pace with the modern technology of drug synthesis. Of particular significance is the successful synthesis of insulin.

In consonance with the national drive to increase agricultural productivity, emphasis in pharmacology was placed on the development of such drugs as antibiotics, drugs for common diseases, drugs for parasitic diseases, commonly available herbs, and practical rural medicinals. Chinese herbal remedies are economical and are regarded as being very effective in rural and industrial medicine. Numerous "secret" perscriptions, collected during work with the peasants, have been collated and tested by scientifically trained doctors in research institutes to find the basic active ingredients. A number of these have proved effective in clinical trials.[4, 5a, 2a] The subject of anticancer drugs will be covered elsewhere in this handbook.

Chinese Materia Medica—An Historic Review

Chinese traditional medicine is regarded as one of the oldest healing practices in the world. Its pharmaceutical activity dates back to legendary times. The first materia medica *(pen ts'ao)* as compiled by the emperor, Shen Nung (about 2700 B.C.), who is generally regarded as the "Father of Chinese Medicine," and inventor of drug lore. Next, in order of merit was the *pen ts'ao* credited to the legendary emperor, Huang Ti (2600 B.C.), also called the "Yellow Emperor."

The earliest *pen ts'ao* is said to list 365 drugs of all kinds. In the 5th century A.D., a physician of renown, T'ao Hung-ching, added another 365 drugs to the early compilations, practically doubling the number of drugs of animal, vegetable and mineral origin. In the middle of the 7th century A.D., Ying Kung and Su Ching were ordered by Kao Tsung, the third emperor of the T'ang Dynasty, to revise T'ao Hung-ching's materia medica. The final version of these revisions listed 844 medicinal items and is considered the earliest pharmacopoeia in the world. During the Sung Dynasty, Tang Shen-wei, a physician, increased the number of drugs to more than 1,746 in his *Classified Materia Medica.*

A. The Compendium of Materia Medica

The Ming Dynasty in the 16th century is regarded "the most glorious period in the history of Chinese pharmacopoeia."[6] The great progress made in materia medica was, to a large extent, attributed to peace and stability and a fluorishing economy in existence within the empire. Undoubtedly, the greatest pharmacological achievement of all times which occurred during this period was marked by completion of the monumental *Pen Ts'ao Kang Mu* or the *Compendium of Materia Medica.* This landmark achievement was accomplished by Li Shih-chen (1518–1593 A.D.), a noted pharmacologist, physician and naturalist.

Completed in 1578 A.D., after 27 years of labor, this famous compendium was compiled from a study of more than 800 books, resulted in careful revisions by the author of 40 pharmacological and 70 medical works by earlier experts, addition of 374 new drugs, and even drew from historical classics, poetry and fiction. In summary, Chinese pharmacological knowledge, from the earliest beginnings to the 16th century, was analyzed, dissected, reorganized and reintegrated into an exhaustive and comprehensive monument of reference material which has since gained important recognition in international science and medicine and has proven of inestimable value for modern use.

The following is a reclassification of the drugs listed in the *Compendium of Materia Medica.*

Animals (insects, fishes, mollusks, birds, beasts and men)	444 drugs
Vegetable kingdom (herbs—610; vegetables, fruits, trees—484)	1,094 drugs
Metals and minerals	275 drugs
Articles of daily use (substances derived from garments and utensils prescribed in medicine)	79 drugs
Total	1,892 drugs

B. Contribution of Pen Ts'ao Kang Mu

The 374 new drugs added by Li Shih-chen in his *Compendium of Materia Medica* include *san ch'i (Gynura pinnatifida), man t'uo lo* (*Datura alba*), *fan mu pieh* (*Semen strychni*), *ya p'ien* (opium), *shao chiu* (alcohol), *p'u t'ao chiu* (grape wine), *chang nao* (camphor) and *ta feng tze* (lucreban-seed), which have remained valuable drugs ever since. He also recorded grains and vegetables introduced into China after the tenth century A.D., such as maize, kidney bean, carrot, sweet potato, pumpkin and snake-gourd.

Li Shih-chen conducted extensive research in the therapeutic properties of drugs. It was in this area that he made the greatest contribution to pharmacology. He not only cleared up doubtful points, but also made new discoveries. He found that *yen hu suo* (*Corydalis ambigua*) relieved pain and *ch'ang shan* (*Dichroa febrifuga*) cured malaria. Among his other discoveries were: the cathartic effect of *ch'ien niu tza* (*Ipomaeo hederacea*), the antipyretic effect of *huang ch'in* (*Scutellaria baicalensis*), the regulating effect of *yi mu ts'ao* (*Leonurus sibiricus*) on menstruation, the hemostatic effect of *san ch'i* (*Gynura pinnetifida*), the uretic effect of *hsiang ju* (*Elsholtzia cristata*), and the stimulating effect of *jen shen* (*ginseng*). The *Pen Ts'ao Kang Mu* even today is a vast treasurehouse for pharmacologists engaged in research. It is particularly rich in drugs of vegetable origin: over a thousand varieties are listed. Research in modern medicine has led to the discovery of the therapeutic properties of numerous drugs: *Ta feng tze yu* (lucrabanseed oil) as a cure for leprosy, *tang kuei* (*Ligusticum acutilobum*) for menstrual complaints, *ma, huang* (*Ephedra vulgaris*) for asthma, *lei wan* (*Mylitta lapidescens*) and *ping lang* (betel nut) kills tapeworms, *tu chung (Eucommia ulmoides)* alleviates high blood pressure, *ta huang* (rhubarb) and *huang lien* (*Coptis teeta*) are effective antibacterial agents, and many more.

Since its publication in 1596, the *Pen Ts'ao Kang Mu* has been in wide circulation and reprinted many times. For over 300 years it has been the companion of every practitioner of Chinese medicine. It has acquired international fame. It reached Japan 10 years after its first publication, and was twice translated into Japanese, once in 1783 and again in 1929. Among those who either partially translated or consulted the *Pen Ts'ao Kang Mu* when writing books on China were: Michael Boym, a Pole who wrote *Flora of China* (in Latin, published in 1659): du Halde, a Frenchman, who wrote *A Description of the Empire of China* (published in 1735, and containing two chapters on Chinese pharmacology); A. Tatarinov, Russian physician and sinologist, who compiled the *Manual of Chinese Materia Medica* in 1857. An abridged German translation of the *Pen Ts'ao Kang Mu*, called *Dalitsch Pflan-*

zenbuch, was published in 1928. There have been ten or more English translations. One of them was done by B. E. Read. Its first seven volumes appeared between 1928 and 1941.[7]

Pharmacological Research and Development of Herbal and Synthetic Drugs

Based on available scientific publications from China during the past 20 years, the more significant research and development in pharmacology may be presented as follows:

A. Significant Pharmacological Achievements

1. Drugs Against Parasitic Diseases

In 1958, a comprehensive survey of the Achievements in the Fight Against Parasitic Diseases was reported by Hou, et al.[8] Nationwide campaigns were conducted for the eradication of the five major parasitic diseases in China; namely, schistosomiasis, malaria, filariasis, ancylostomiasis, and kala-azar. Of these prevalent diseases, the greatest emphasis has been placed on schistosomiasis, as indicated by the abundance of literature on new and effective antischistosomal compounds. Of the new drugs synthesized and screened, the following were reported to be more promising antimonials: antimony ammonium gluconate, antimony sodium dimercaptosuccinate, and antimony dithiopropionate and thiouracil-antimony-1. Of the non-antimonial preparations rosaniline, hexachlorophene, and para-amino-oxybenzeneheptane were reported to have therapeutic potential. More recently, two newly discovered non-antimonial chemotherapeutic agents, coded as F30066 and F30069 (nitro-furan type) have been claimed to be highly effective oral anti-schistosomal agents.[9,10]

Among the Chinese herbal remedies, cucurbita pepo (pumpkin seeds) and wild daylily were found to possess definite therapeutic effects in experimental and clinical schistosomiasis. The effectiveness of pumpkin seeds was said to be enhanced by the concomitant use of antimony potassium tartrate. Pumpkin seeds were claimed to be safer and more effective than antimony potassium tartrate.[11, 12, 13]

With regard to other parasitic diseases, in vivax malaria radical cure reportedly was achieved in almost 100 percent of large series of cases treated with primaquine (15 mg. daily for 14 days) combined with chloroquine (300 mg. daily for the first four days) or cyclochloroguanide (a total dosage of 600 mg. given in four days). In a controlled group given chloroquine alone, there was a relapse rate of 50 percent. Of the medicinal plants, *Orixa japonica, T.* and *Brucea javanica, L.* showed a significant antimalarial activity in experimentally infected animals.[14]

In filariasis, the treatment course was successfully shortened to three days with hetrazan in dosages of 300 mg. three times daily. In the mass treatment of ancylostomiasis, tetrachloroethylene in a single dose of 3 to 4 ml. before bedtime has been generally used with satisfactory therapeutic results. 1-Bromo-2= naphthol was also reported to have been widely used with fewer side effects.[15, 16] Kala-azar is generally treated with sodium antimonial gluconate or other antimonial compounds. In the antimony-resistant cases, stilbamidine or the less toxic pentamidine is employed.[17, 18]

The combined use of pumpkin seeds and *Areca* nuts were claimed in several reports to have been found highly effective in the treatment of taeniasis; they were said to paralyze the cephalic half and the caudal half, respectively, of the tapeworm.[19, 20, 21]

Also of interest is a report on the efficacy of hexachloroparaxylol (HPX) and hexachlorophene (G-11) in the treatment of two human cases of Fasciolopsiasis Buski.[22]

2. Drugs for the Nervous system

Corydalis ambigua—Since the tranquilizing effect of Corydalis B was discovered in 1955–1957 a systematic study of its pharmacological properties has been carried out. The B substance is definitely effective as a tranquilizer, although not as active as hydergine, and it acts on different parts of the brain. Its analgesic and tranquilizing effects have been attributed to its levoglucose content. It also stimulates the secretion of ACTH.

3. Cardiovascular Drugs

a. Hypotensive drugs—*Rauwolfia verticillata* (grown in South China and Hainan Island), *Veratrum schindleri*,[23] *Paconia moutan*, and *Chrysanthemum indicum L.* have been found to have hypotensive activity. *Clerodendron trichotomum T.*, traditionally used in China for headaches, rheumatism and other rheumatoid ailments, has been used in recent years to treat hypertension. The three active principles of this plant have been isolated for study of their hypotensive effects. A new alkaloid, named Liensinene, has been isolated from the green center part (embryo) of the seeds of Asiatic lotus *Nelumbo nucifera G.* and found to have hypotensive effects.[24]

4. Antibacterial Drugs

Coptis chinesis F. is a Chinese traditional drug against dysentery. Berberine is one of the most active alkaloids studied.[25] Pai-ku, the seed of the plant *Ginkgo biloba L.*, is a folk medicine for relieving chest congestions and treating tuberculosis. Its active principle Pai-ku hyrochloric acid has been found effective in arresting tuberculosis in animals. However, there have been no clinical reports confirming its effect against tuberculosis.[26]

5. Insecticides

A number of new insecticides have been synthesized. For example, Titiwei is a new type of organic phosphate insecticide. It is many times more active than others against mosquitos, flies, fleas, bed bugs and cockroaches.[27]

6. Other Drugs

Leomurus sibiricus L. is a popular postnatal herbal medicine. Several of its alkaloids have been isolated and studied. It has been proven to be an effective uterine stimulant. *Glycyrrhiza glabra L.* (licorice) was found to have cortisone-like properties, as one of its constituents, hypoglycyrrhic acid, showed action similar to that of desoxycorticosterone. There have been favorable clinical reports on the use of licorice in a variety of disorders, notably, Addison's disease.[28] Mention should be made of a new effective molluscicidal agent, "SUHWA–203," against schistosomiasis japonica snails.[29] This new organic phosphorus insecticide was found by Chinese scientists to have an effective lethal action on the oncomelania snails. This may prove to be the most effective molluscicide against the resistant intermediate hosts, the oncomelania snails of schistosomiasis japonica, one of the most important and prevalent infectious diseases in China.

7. Biologicals

All the common antibiotics and biologicals currently used in the West have reached the production stage. The emphasis now is on prevention of communicable diseases. Considerable efforts have been made toward the development of vaccines for the treatment and prevention of Japanese B encephalitis, influenza, and trachoma, which are quite prevalent in China. Freeze-dried vaccines against measles, influenza and yellow fever as well as sugar-coated pills for polio vaccine have been produced.[30]

In connection with biologicals, it should be mentioned that Chinese scientists were the first in the world to achieve total synthesis of a biologically active protein—crystalline bovine insulin—by chemical method 1965. Two groups of Chinese chemists at the Institute of Biochemistry, Academia Sinica and Department of Chemistry, Peking University completed this research project after four years of effort. It is a significant contribution to basic research, signaling a beginning of an era of synthetic proteins.[31]

B. Pharmaceutical Industry

China's pharmaceutical industry has kept pace with the development of all industries of the country. Following 20 years of perseverance and self-reliance, the pharmaceutical industry has changed from an industry reprocessing imported drugs to a completely self-sufficient manufacturing organization. Today, drug factories of various sizes are present in every province and autonomous region. Production has been steadily increasing in recent years, particularly for antibiotics, vaccines and antipyretics. Modern pharmaceutical techniques such as paper chromatography, electrophoresis, fluorometric analysis and stereochemistry have been employed in research and development. Quality control standards have been formulated for herbal drug production. Noteworthy is the fact that the processing and preparation of traditional drugs in the farm villages have been greatly advanced. With improved drug manufacturing techniques, liquid drugs are made more stable resulting in considerable improvement in the preparation of drugs for injection.

Means of utilizing natural resources have also been emphasized. For example, substitutes have been found for gum arabic and cocoa beans. Studies are being conducted to improve ointment base and the manufacture of contraceptives. New machinery and effective work methods have been developed. Antibiotic factories have been built in various regions of China. Today, equipment such as fermentation tanks, conditioning apparatus, measuring equipment, air compressors, ultra centrifuges and titration equipment can be found of Chinese design and production. Factories built in recent years have used no foreign equipment.

The growing production of antibiotics demanded increasing quantities of lactose for fermentation, which was found to be expensive. Corn flour, which was inexpensive and plentiful, was first suggested as a substitute in 1958 by Professor Chang Wei-shen of the Peking Biological Research Laboratory. Experiments with corn flour also led to the successful use of molasses and glucose which China produces in large quantities.[5]

China manufactures considerable quantities of a great variety of antibiotics in current use; streptomycin, aureomycin, chloramphenicol, tetracyclines, and the new semi-synthetic penicillins. The development of antibiotic production has contributed to the promotion of industrial microbiology. Notable achievement has been made, for example, in the fermentation of amino acids and vitamins, and in the microbial oxidation of steroids. Industrial biochemistry can be expected to become one of the important scientific developments for the national economy. It should be pointed out that in present-day China, the intensified use of antibiotics is not confined to medicine, but also is used in agriculture and stock raising.

Since 1957, the price of penicillin has been markedly reduced with regularity. A wide range of antibiotics manufactured in China is presently available in large quantities for export to other Asiatic countries, Europe and South America.

C. Highlights on Practical Rural Medicinals

Common folk medicinals in China have been found to be simple, economic and, within limits, effective. In answer to a government call to support agricultural expansion, these medicinals are most extensively used in agricultural areas. The more common remedies are listed below with their reported uses and content: [33]

1. **Allium Tuberosum Roxb:** The *chiu-tsai* is a perennial bulbous plant of the *Liliaceae* family. It has long, flat leaves and a hot taste. Both the root and the seed are used medicinally. It contains essential oils, sulfates, carbohydrates, as well as Vitamin C. It is nutritious, "stomach strengthening," and has antihemorrhagic effects. Its uses include (a) chronic alimentary illnesses, including stomach pain, nausea, vomiting, etc; (b) sweating and excessive urination, debility in women, leukorrhea, cold in the lower extremities, etc.; (c) vomiting of blood, excessive bleeding in females; (d) chronic dysentery with blood in the stool; and (e) hemorrhoids and metroptosis.

2. **Hen's egg:** The shell is composed of calcium carbonate, calcium phosphate, as well as bits of animal colloidal matters and is an inexpensive source of calcium for use in pediatric rickets, adult tuberculosis or for females during pregnancy. The egg yoke "oil" contains lecithin and vitamins A and D. It is a nutritious tonic and may be used as a substitute for cod-liver oil for tuberculosis patients. It is more effective than cod-liver oil and less obnoxious. From his research on the effects of lecithin in skin diseases, Professor Ma Wen-chao found that this product increases epithelial cell activity and resistance.

3. **Loaches:** These eel-like fish are native to warm water bogs and ditches. The body is black and has no scales. The mucous secretion, used to treat acute inflammation of the skin, has also been used extensively in cases of erysipelas, cankers, facial sores, otitis media, burns, arthritic and other pains, etc. It is painted on the affected area.

4. **Luffa Gourd:** This is a type of vegetable grown all over the country and is known as T'ien Szu'kua, T'ien-lo, or Shui-kus (in Kwang-

tung). It is a vine of the *Cucurbitaceae* family. Fresh luffa contains saponin, niter, and a great deal of mucus, xylose adipose, proteins, and Vitamins B and C. The pulp contains pentosan and cellulose. Luffa can be used as a diuretic, "blood cleaner" and detoxicant. It has an antitussive effect and is an expectorant. In present day experience it is given for colds, acute bronchitis, sore throats, chest pains, etc. Luffa lotion can also be used as a high grade cosmetic. There are already commercial products sold in foreign countries that can be used on the face. Young people use it to beautify their faces. It is said to clear the skin and eradicate blemishes more effectively than other cosmetics.

5. **Sour Plum** (*Prunus mume*): This is the unripened plum fruit also known as "green plum". The *Wu-mei* or the *Pai-mei* are but the processed product of this plum. The plum belongs to the *Roseceae* family. It is cultivated all over China. The green fruit (raw) is used for medicinal purposes. The fruit contains succinic, citric, malic, tartaric acids, edible alcohols, native lugistic acid, as well as certain ceryl alcohol-like substances. The sour plum is used as a cooling and antifebrile agent. It is an astringent, stops diarrhea, relieves pain, suppresses cough, vomiting and nausea. It is a germicide due to its acidic nature. Taken orally, it inhibits bacterial growth in the alimentary tract. It is also used for ascaris worms. (From more than ten years' clinical experience, the writer can attest to the anti-nausea and anti-emetic as well as the anti-diarrhea effect of the aqueous extract of this plum.) In modern experience it has been found effective in epidemic dysentery or fever of unknown origin in children. When used in acute gastritis and diarrhea, it is reported to be more effective than sulfa drugs. When used for typhoid and paratyphoid cases, it effects early eradication of fever and shortening the course of treatment. It was claimed to be an effective preventive for the cholera epidemic during the summer of 1940 in suburbs of Soochow.

6. **Wax gourd** (*Benicasa hispada*) : It is also known as the "pillow" or "east" melon. It is available in all parts of China and is of the *Cucurbitaceae* family (obtainable in Chinese communities, New York, Los Angeles and San Francisco). The melon is large, cylindrical, resembling a pillow. When tender it is green and has fuzz covering the skin. When ripe, the surface will present a waxy and white powdery appearance. The flesh is light flavored and the center is hollow. The seed contains urease, adenal-histidine, trigonelline, etc. It is used for relieving inflammation, detoxication and healing of carbuncles and "internal pustulation." The peel of the gourd has a diuretic effect and is used in the treatment of nephretic edema.

7. **Corn silk:** Corn is a plant found in all rural areas. Its composition includes ergosterol, glucose, saponin, picrates, Vitamins C and K, and wood tar derivatives. According to Soviet research, oral administration of the silk preparation causes increases in biliary secretion and bilirubin concentration, accompanied by increased blood coagulinogenase, hastening blood coagulation. It is also a diuretic. It is used in cases of chronic hepatitis, bile duct illnesses, bile stagnation, biliary inflammation, stone formation, jaundice, chronic nephritic edema, urinary tract stone formation, diabetes, hemorrhagic purpura, nose bleeds and hematuria. It may also be effective in hemorrhages due to lack of coagulinase (agglutinase).

8. **Lotus:** This plant is present in all parts of China, growing in shallow ponds and boggy areas. The leaves, stalks and the flowers are named separately (in Chinese). The pistils are called *lien-shu*, the seeds are commonly called *lien-tzu*. The root contains starch, asparagin, raffinose; the leaves, stalk and pods, lotusate in small quantities. The flesh of the seed contains proteins, fats, carbohydrates, carotene, nucleoflavin, and ascorbic acid and all parts of the plant contain tannic products and have agglutinative effects. Small amounts of lotusin show cardiac stimulating and diuretic effects. The seeds are rich nutrients. Both the seeds and the young seedlings within serve as tranquilizers and diuretics. The root juice inhibits nausea and relieves drunkenness. The leaves, pods and stalks stop vomiting and bleeding. The seedlings "strengthen the gonads" and stop emissions. Thus it is prescribed for vomiting, nose bleeds, uterine bleeding, leukorrhea, chronic dysentery, diarrhea, nocturnal emissions, edema of pregnant women, and chronic nephritis. For chronic nephritis, it is more effective if used together with the leaves of *Artemisia vulgaris* and root of *Amperata arundinacia*. It is also used for hemorrhoids and anal fistulation.

9. **Mulberry Tree** (*Morus Alba*): This tree is cultivated all over China. The fruit is the mulberry and the leaves are used for silkworm feed. The white bark and the roots contain cetylic acid, certain sterols, as well as various glucosides. It also contains acid latex and volatile oils. The white bark has diuretic and antitussive activity. The shoot and leaves act as a blood pressure depressant. It is used for acute nephritis, heat stroke, edema of bronchial asthma, hypertension, rheumatic pains, etc.

10. **Earthworms** (also known as ch'u-chan): The traditional medical name is *ti-lung*. It is a vermes of the *annulata species*. It contains an antifebrile substance known as "antifebrile salt" (perichaeta), which has been found to be a derivative of tyrosine. From dried earthworms, it is possible to extract an effective nitrogen-containing component,

which has the effect of dilating the bronchioles and affect the lung function of the rabbit (Chinese translation by Chao Ch'eng-ku, Chang Ch'ang-shao, 1937). Its hypotensive effect is characterized in animal experimentation by mild, slow and sustained reduction of blood pressure. A detailed discussion on its hypotensive mechanism and composition of material is reported in the *Journal of the Lanchow Medical College, No. 4, 1959,* by Chang P'ei-yen, et al. Uses include influenza and other acute fevers, high fevers in children, headaches, hypertension, cerebral strokes and palsy.

11. **Toads** (also known as *lai-ha-mo*): The following have been extracted from the toad by Ch'en K'o-kuei: adrenalin, cholesterol, phellonic acid, cinobufofenine (also known as the amine of toad toxin), cinobufotoxin, cinobufogonin. (*Journal of Biology of Chemistry,* Vol. 87, No. 3, 1930, p. 741–53). Cinobufogonin and cinobufotoxin are stimulants and have myocardiac and vago-stimulating effects. Toad secretion is a stimulant, an anti-inflammatory and antitoxic drug. It is used for treating carbuncles and sores.

12. **Turtles:** They are native to lakes, rivers, ponds and bogs, especially in Chekiang Province. The shell contains gelatins, fats and salts. These are used for nourishment and tonics, weeping carbuncles, fistulation, tuberculosis of the spine, knee joint, etc., and hasten calcification of pulmonary tuberculosis.

13. **Grasshoppers and Locusts:** They are pests that attack rice plant leaves and are classified as *Pachytylus, Orthoptera* of the *Arthropodas.* They contain water, 22.6%; protein, 64.25%; fats, 2.33%; ashes, 3.3%; plus Vitamins A, B, etc. They are considered highly nourishing, tasty and can be used for subsidiary foodstuff and a condiment. Medicinally, they have the effect of calming the nerves and stopping coughs and they are used in whooping cough and tetanus. Grasshoppers are said to be specific for cases of pertussis and asthma.

Accelerated Growth of Natural Resources

In order to meet the increasing need for traditional Chinese plant remedies, their cultivation has been greatly accelerated in recent years. Intensive campaigns have been launched to encourage farmers to grow medicinal plants (Fig. 1). Response was enthusiastic, and, although planting and cultivation were accomplished solely by hand, results showed great increase in acreage cultivated and harvests sold over subsequent years (Fig. 2). Important measures have been adopted by all departments concerned to implement the directive of the State Council for the development of traditional medicine. Schools and training courses have been set up to teach the production of traditional

FIGURE 1. The *Aster tartaricus* cultivated by the Cadres' School of the Peking First Commerce Bureau. Chinese medicinal herbs are grown over large areas in the communes and brigades in the suburban counties of Peking (China Pictorial, Nov. 1971)

drugs (Fig. 3). There have been projects all over the country to accelerate cultivation and to introduce new medicinal herbs. Also, a number of medicinal plants reportedly have been successfully transplanted. For example, the famous *ginseng*, which was thought to be adaptable for cultivation only in the northeastern provinces, has been successfully planted in other areas, such as Shansi, Hopei, and Yunnan.[34] *Carthamus tinctorius, Chrysanthemum incanum L.* and *Dioscorea japonica* have been introduced to Kiangsu, Shanghai, Shantung, and Kuangtung. As they are produced locally, the needs for these plants in these provinces are met. There have also been large amounts of surplus to supply other regions where these plants are not grown.

As to traditional remedies of animal origin, there have also been programs of breeding medicinal animals with good results. For example, deer raising has developed rapidly in China the last few years (Fig. 4). A nation-wide survey program has also been carried out to locate all the soures of natural medicinal products in China.[32]

CONCLUSION

To the Western scientist, Chinese medicine, with its long traditions of herbal medications, superstitions, and philosophy, has appeared somewhat strange, irrational and enigmatic, and, at best, empirical. Recently, as a result of an initial blend of Western and traditional Chinese medical practice, some startling achievements such as

FIGURE 2. The clinic staff of a production brigade in Changshu County, Kiangsu Province, process the medicinal herbs they have gathered (*Medical Workers Serving The People Wholeheartedly*, Foreign Languages Press, Peking 1971)

acupuncture anesthesia have been revealed. Two facts have been demonstrated: (1) That Western and Chinese traditional medical practices are not irreconciliable, and (2) that further potential usefulness of traditional Chinese medicine to medical science would require the use of Western scientific methods to analyze systematically and thoroughly and to identify and clarify causative factors and relationships.

The challenge is clear. Initial headway gained by Western-trained scientists handicapped by limited equipment, experienced personnel and technological backup has demonstrated the great potential attainable if full marshalling of adequate scientific resources were possible. The Chinese materia medica is a vast storehouse of complex, loosely structured, pharmacological information subject to scientific screening and verification. In the past, Western medicine has gained immeasurably from chance discovery and application of ancient Oriental medicinals. Ephedrin (*Ma Huang* from China) and *Rauwolfia serpentina* (from India) are two classic examples of the application of Western science and technology to traditional herbal remedies. It is conceivable other herbal medicaments with equal potential to Western scientific

FIGURE 3. A health worker shows commune members the different medicinal plants and explains what they can do in treating and preventing diseases. (*China Reconstructs*, Nov. 1971)

FIGURE 4. The *Sika* deer is a wild animal of great economic value. The knobs and collagen of its antlers are effective in promoting various functions of the human body, treating weakness of the heart muscle and hastening the healing of wounds. The antlers, after processing, are used for ulcers and swellings. The foetus, tendons, tail and viscera of the deer can be made into medicine. Deer raising has developed rapidly in China in the past few years. Herds of deer grazing on a P.L.A. farm. (*China Pictorial*, Nov. 1971)

and medical areas of interest exist. Such areas of interest may well include the treatment of cancer, viral diesase, leukemia, and perhaps neuromuscular ailments such as muscular dystrophy and poliomyelitis. A key program launched by Western scientific and medical professions to conduct an investigation into Chinese medical practices and medicines would be fraught with frustration and difficulties, but the payoff may well be worth the effort.

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II. HEALTH CARE ORGANIZATION AND ADMINISTRATION

LAWS ON PUBLIC HEALTH

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In view of the fact that the present revived interest in matters Chinese is in large part prompted by the ping pong diplomacy of the Peking regime, it might be appropriate here to refer to a statement made by a member of the Chinese ping pong team while in the Washington, D.C. area in April, 1972. When he was asked the reason for China's enthusiasm for ping pong, the player said that in the past China had been known as the "sick man of East Asia" (Tung-Ya ping-fu) and that the Communist leaders felt that one excellent way of improving the public health of the country was through recognition and encouragement of sports activities such as ping pong.

Prior to coming to power in 1949 the Communist Chinese, under siege by the Nationalists, led an arduous existence in the remote, mountainous areas of the interior of China, where they witnessed and often fell victim to the ravages of disease flourishing there. They were made personally and acutely aware of the obstacles presented by lack of medicine and medical facilities and personnel. The constitutional documents issued by the Communist Chinese in the pre-1949 period reflect their desire to alleviate the physical suffering of the mass of China's poor and to lay a groundwork for the recovery of "East Asia's sick man" by restoring and guarding the health of its citizenry. The Administrative Program of the Shensi-Kansu-Ninghsia Border Region, approved by the Political Bureau of the Chinese Communist Party on May 1, 1941, sets forth in its Article 15 the Party's intention "to promote public health administration, to increase the supply of medicine and medical equipment, to attract medical personnel in order to reduce the sickness of the people, and at the same time to render assistance to disaster victims and refugees from outside (the border region).[1] Article 11 of the Administrative Program of the Shansi-Chahar-Hopei Border Region, promulgated on August 13, 1940, and passed on January 20, 1943, by the First Consultative Council of the Border Region as the Administrative Program of the Border Region, similarly indicates the aspiration "to promote the hygiene and sanitation movement and to improve public health in order to prevent the disaster caused by disease".[2] The people's right to freedom from ill health is affirmed in item 3 of the section "Rights of the People" in the Constitutional Principles of the Shensi-Kansu-Ninghsia Border Region, which was passed by the Third Consultative Council of that border region on April 23, 1946. In support of this right, the document declares that "public health education and the supply of medicine, medical services, and medical equipment shall be developed".[3]

The determination to improve the health of the Chinese populace through implementation of vigorous public health programs was reaffirmed in the constitutional documents issued upon and after institution of the People's Republic of China on October 1, 1949. The Common Program of the Chinese People's Political Consultative Conference, adopted on September 29, 1949, stated in its Article 48:

> *Article 48.* National physical culture shall be promoted. Public health and medical work shall be expanded and attention shall be paid to the protection of the health of mothers, infants and children.[4]

Article 93 of the Constitution of the People's Republic of China, which was adopted on September 20, 1954, and has remained in force at least formally up to the present, similarly provides;

> *Article 93.* Working people in the People's Republic of China have the right to material assistance in old age, and in case of illness or disability. To guarantee enjoyment of this right, the state provides social insurance. social assistance and public health services and gradually expands these facilities.[5]

In line with the policy relating to public health set forth in these constitutional documents, the People's Republic of China has enacted a large number of public health laws, regulations, directives, decisions, etc. What the regime considers the most important of these legal norms on public health have been published in the two major official statutory compilations of the Peking Government, *Chung yang jen min cheng fu fa ling hui pien* (Collections of Laws and Decrees of the Central People's Government) and *Chung-hua jen min kung ho kuo fa kuei hui pien* (Collection of Laws and Regulations of the People's Republic of China). The first of these collections comprises five volumes covering the period from September 1949 to September 1954 and published from 1952 to 1955; the second consists of 13 volumes covering the period from September 1954 to December 1963 and published from 1956 to 1964. To our knowledge, no new number has been added to the second series since 1964. Further, there are no public health documents included in the second series after Volume 11, which covers the period January to June 1960.

For discussion in this article, we have selected from these two statutory compilations 54 documents relating to public health. We have excluded from consideration only a very few of the documents included in these compilations under the rubric "public health," the basis for exclusion being the fact that these few documents dealt almost exclusively with physical culture. The 54 documents which we discuss appear to us to have been generally neglected in the study of public health in the People's Republic of China. In part the neglect is due to the scarcity of English translations of these documents; in part, however, it is due to the non-lawyer's reluctance to use legal materials from fear that they will be overly technical for his purposes. Our major aim in presenting this article is exposing as a misconception the attitude that Communist Chinese legal materials dealing with public health are of use principally, if not exclusively, to scholars of Chinese law. We hope to suggest here that study of legal documents has for the non-legal scholar certain advantages vis-à-vis the use of other types of research materials on public health in Communist China.

The American scholar of public health, with his general knowledge of the nature of Western legal materials, might expect to find in legal documents on Communist Chinese public health detailed descriptions in obscure, technical language of the structure and functions of public health organs on mainland China, elaborate presentations of the budgetary programs of these organs, more or less full statements of the public health services theoretically available to the citizen, etc. Knowing the universal gap between formal legal provisions and actual implementation of these principles, he might feel that he had best examine available materials relating to the actualities of public health in the People's Republic of China. General acquaintance with or a suspicion of the inferior role law plays in any Communist state might tend to confirm him in this latter view.

A reading of even a few legal documents relating to public health in the People's Republic of China (hereafter, PRC) will both disappoint and surprise our hypothetical American scholar of public health. Of the structure and functions, funding, scope of available services, etc., he will find only unsystematic and sketchy indications, thus bringing him to an awareness that partial information from many different types of Communist Chinese materials, among them the legal, must be pieced together before one gets a glimmering of the total public health picture on the Chinese mainland. Although sometimes more systematic structural and functional descriptions are found in legal documents than in other types of materials, the Communist Chinese leaders have far from felt constrained to precede the creation of an institution or program with an elaborate statement in black and white of its structure and functions, purposes, aims, funding, etc.

The American public health scholar, disappointed in his expectation of systematic description, perhaps will be pleasantly surprised by the *non-technical* nature of Communist Chinese legal documents. One of the chief explicit functions of the law in the PRC is education of the citizenry. To fulfill its educative role, the Peking leaders insist, the law must be readily intelligible to the cadres, often not highly educated, and the masses who are responsible for its implementation. A fundamental principle of the drafting of Communist Chinese legal documents, therefore, is that they be written in simple, non-technical language and style. These popularly oriented legal documents often are used as study materials in the waves of mass nature campaigns that regularly sweep over the mainland. Their tone typically is hortatory rather than cooly analytical or descriptive. They are replete with ideological formulations inserted as sincere justification for the principles they state and as propagandistic instruction for their readers.

The Communist Chinese leaders do not bring about the enactment of a law as a necessary and routine preliminary step in implementation of a particular policy. Typically, they have reduced a policy to a written statutory statement only when they have been most certain of its central importance and have felt most assured of its continued validity. Legal documents thus constitute a relatively succinct statement of the basic and enduring concerns of the regime. Further, legal documents issued by the central government generally are applicable to all of China, a characteristic which further confirms their basic nature and contributes to their lasting value.

With this background information on law in the PRC in mind, we wish to state the basic themes contained in the 54 legal documents considered here, thus removing the necessity of repeating them at every occurrence. The frequency with which these themes recur in documents issued during a ten-year period well illustrate the consistency of the Communist Chinese in their policy and approach to public health problems. These themes are:

1) Prevention, rather than treatment, is to be the primary emphasis of all public health work.

2) More and more public health services are to be extended, within the limitations of the possible, to the Chinese masses, most especially to the poor, the geographically isolated, and women and chil-

dren; if the people cannot come to receive these services, the services will be taken to them.

3) All possible human resources are to be drawn into public health work, particularly the People's Liberation Army, traditional Chinese doctors, and women cadres; such training as is necessary to their playing the intended role in public health work is to be provided.

4) There must be systematic gathering, synthesis, and analysis of information relative to the public health problems and to the human and natural resources available for combatting them.

5) A rational, scientific, and thorough approach toward public health problems is to be instilled in the cadres and in the masses to combat ignorance and superstition and to eradicate the haphazard, inefficient, and uncommitted approach of previous regimes towards these problems.

6) Exacting standards are to be set for all products, personnel, facilities, and services having bearing on public health.

7) Purposeful, informed research must be carried out relative to the various aspects of public health work, most particularly relative to the validity of traditional Chinese medicine.

For convenience of discussion, the 54 legal documents on public health in the PRC have been grouped into the following four categories: 1) prevention and treatment; 2) medical and public health personnel and facilities; 3) Chinese medicinal materials. Within each category, the documents are arranged chronologically. One document which does not fall neatly into any of the above categories is discussed briefly at the end under the heading "Miscellaneous."

I. Prevention and treatment

1. Directive of the Ministry of Public Health and the Public Health Department of the People's Revolutionary Military Council on promoting a plague prevention program for military personnel and civilians in the spring. February 10, 1950 (I.1: 631–633).[6]

The first document on public health included in the first statutory compilation, this directive elaborates upon most of the basic themes of public health work in the PRC set forth in the initial part of this paper and thus can be considered a basic source. Its first section gives some idea of the enormity of the public health problems faced by the regime in its early days, laying much of the blame for these problems at the door of the reactionaries. A spirit of confidence in the face of these problems characterizes the tone of this document. "Responsible personnel at the *hsien* (county) level and above" are charged with many responsibilities with regard to educative propaganda, administration, and actual implementation of plague prevention programs. As the title indicates, concern over the effect of health on the fighting capacity of its soldiery was one motivational source behind the public health work of the PRC.

2. Joint directive of the Ministry of Public Health and the Public Health Department of the People's Revolutionary Military Council pertaining to the prevention of cholera, April 22, 1950. (I.1: 638–639).

This directive, again jointly issued, is the first of several presented here dealing with combatting a specific disease. After indicating the areas usually most severely affected by the spread of cholera, the document delivers a scathing attack upon the Nationalist government for its failure to cope with the disease. The remainder of the document is devoted to the statement of various concrete steps which can and must be taken to eliminate cholera, among them the inoculation of 50% of the civilian population and 100% of the troops by mid-June in areas where there is a strong possibility of the outbreak of an epidemic. The proposal is to have a timely combined inoculation for cholera, typhoid, and typhus. There is a strong emphasis upon accurate and instantaneous reporting of cases of cholera as a primary means of controlling the spread of the disease. Special attention is to be devoted to areas where the masses are the poorest and sanitary conditions are worst, such as the boat-people communities and the slums in large cities; this approach is both scientifically valid and ideologically appealing to the Peking government.

3. Directive of the Government Administration Council regarding the launching of the autumn campaign for smallpox vaccination, promulgated October 12, 1950 (I.1: 640–641).

With characteristic Communist Chinese ambitiousness and determination, this directive sets forth the goal of completely wiping out smallpox in China within a specified time through universal free vaccination and indicates something of the manner and spirit in which this vaccination program is to be carried out. The seriousness of the regime's intention is evident in their insistence that traditional Chinese doctors be trained to administer vaccination and that, in places where no public health organs exist as yet, the cultural and educational organs must organize the vaccination program. The policy of "each one teach one" finds an early expression in the requirement that trained personnel "go to all *hsien* and all villages and further train village educational and cultural workers and women cadres" to carry out the program.

4. Provisional measures governing smallpox vaccination. Promulgated October 12, 1950 (I.1: 642–643).

Starting with the provision that "all inhabitants of the PRC regardless of nationality shall be vaccinated for smallpox," these provisional measures give much more detailed treatment than is customary in Chinese legal documents of the specific policies and features of the vaccination program. Its Article 6 contains the provision that those who refuse to be vaccinated even after reasonable efforts have been made to persuade them to submit to vaccination may be forced to receive the vaccination, a provision that is understandable if one takes into account the superstitiousness of many Chinese and their lack of knowledge of and fear of modern medical techniques. Trained medical personnel are denied the right to refuse an assignment in the public vaccination program, even if they are privately employed. Various unsanitary practices, such as taking serum from human sores, are prohibited.

5. Directive of the Government Administration Council regarding intensification of the patriotic public health campaign in 1953. December 31, 1952 (I.3: 211–212).

At the time this directive was issued, the Peking regime was irately charging the United States with using germ warfare as one of its tactics in the Korean war. Whether or not the charges were justified or whether or not the Communist Chinese themselves were convinced of the truthfulness of their charges is not known. What is certain is that in this directive the mainland authorities exploited the putative danger from germ warfare to spur the population on to more strenuous efforts in public health work. Exploitation of possible danger is a tactic which the Communist Chinese frequently use to give impetus to various campaigns and to keep the populace in a state of heightened tension. Even today, the slogan "be prepared for war, be prepared for famine" is frequently used. After calling for the extra vigilance necessitated by germ warfare, the directive details many concrete steps which can be taken to improve sanitation and hygiene. Another characteristically Communist Chinese tactic in mass campaigns appears in this directive's instruction that those who make real achievements in public health work are to be given wide publicity and those who lag behind are to be publicly censured. A *blitzkrieg* public health campaign was to be scheduled for the spring of 1953, a campaign for which a special Patriotic Public Health Campaign Committee was to lay plans. The name of this campaign and committee makes obvious the Communist Chinese equation of good public health practices to patriotism.

6. Directive of the Ministry of Higher Education, the Ministy of Education, the Ministry of Public Health, and the Physical Culture and Sports Commission regarding the introduction of health protection programs in the schools. June 17, 1954 (I.5: 211–213).

Although commending the schools for the progress which they have made since promulgation of a decision regarding the improvement of health conditions of students of schools of various levels, this directive takes the schools to task for emphasizing medical treatment to the neglect of disease prevention work. To correct this defect, the directive calls for the strengthening of concrete guidance to the schools in their health preservation programs from the educational, public health, and sports organs of various levels. To underwrite better implementation of the regime's policy, the directive specifies that expenses for school doctor's offices and health rooms and for health preservation work in general shall be included in the regular budget. The regime's readiness to encroach upon the "free time" of the Communist Chinese citizen in pursuit of its aims is evident in its instruction that elementary school teachers having responsibility for health preservation work shall use their vacation or afterwork hours to gain public health training.

7. Measures governing the control of communicable diseases. Approved June 1, 1955; issued July 5, 1955 (II.2: 823–827).

The first document from the second statutory compilation considered under the rubric "prevention and treatment," these measures are aimed at the control of two categories of communicable diseases, the first category comprising bubonic plague, cholera, and smallpox, and the second category consisting of 18 diseases, including meningitis, typhoid, and scarlet fever. The people's councils (governments) of various levels are charged with the responsibility of seeing to it that the public health organs carry out fully the regime's policies. Time limits are set for the reporting of the occurrence of any of the communicable diseases covered in these measures. Relatively detailed provisions governing quarantine, treatment of afflicted persons, and preventive education of those likely to be exposed to the afflicted are set forth.

8. Directive of the Ministry of Education, the Physical Culture and Sports Commission, and the Ministry of Public Health on the improvement of physical culture activities in middle and primary schools. August, 1955 (II.2: 828–833).

In addition to urging the strengthening of programs of sports activities, this directive charges the school doctor with the responsibility of seeing to it that sports activities shall be conducted with due consideration for the student's health.

9. Directive of the Ministry of Public Health on strengthening publicity on hygiene, June 1, 1956 (II.3: 565–567).

Holding forth the goal of catching up with the public health level of the more advanced nations in the world, this directive indicates that, in view of the increasing literacy of the Chinese population, it is timely to launch a campaign designed to increase knowledge and awareness of proper hygiene. Some of the mechanics of carrying out such a mass campaign are outlined.

10. Joint directive of the Ministry of Public Health and the All-China Federation of Trade Unions regarding the strengthening of hygiene and medical care activities in industrial and mining enterprises, September 13, 1956 (II.4: 473–478).

This joint directive was issued in response to the regime's having taken note of the rise of absenteeism on account of illness among industrial and mining workers. It directs public health medical treatment units and trade union organizations of all levels to strengthen the treatment and prevention of disease in all industrial and mining areas, especially through drawing up plans for the elimination of various kinds of occupational diseases within seven to 12 years and taking active steps to prevent such diseases as tuberculosis, malaria, arthritis, and various gastrointestinal disorders. These units and organizations also are advised to improve the working conditions of industrial and mining workers and to implement the policy of "prevention is primary" by conducting mass campaigns designed to educate the workers in good sanitation and hygiene. Workers in factories and mines are to receive periodic physical examinations, as are those employed in food supply units, eating facilities, and nurseries. A humane touch is added in the instruction that hospitalized patients, especially those without families, are to be visited and cheered up.

11. Directive of the Ministry of Public Health and the Ministry of Agriculture on the prevention and treatment of osteohypertrophy, January 12, 1957 (II.5: 325–330).

According to this directive, osteohypertrophy is endemic to northeastern and northwestern China and Inner Mongolia. It was found, for example, that 1983 or almost 71% of the 2,400 elementary school students in one county in Chilin were afflicted with this disease. Not entirely certain as to the cause of osteohypertrophy, the Communist Chinese here set forth a multi-pronged course of action based upon three theories of its possible causes, the theories being that it is caused by germs found in food, particularly grains; that it is caused by polluted water: and that it is caused by malnutrition. Three localities in Chilin, Heilungkiang, and Shensi are selected for experimental action and study which subsequently will form a basis for a more widespread attack upon osteohypertrophy.

12. Provisions regarding the scope of occupational diseases and the procedure for dealing with those who are afflicted with these diseases, issued February 28, 1957 (II.5: 331–333).

In keeping with the regime's ideological and political commitment to the working class, the Communist Chinese here outline a program for the identification, meticulous study, and treatment of 14 categories of occupational diseases. It is stated that workers afflicted with occupational diseases are to be given insurance benefits and that they are to be transferred to another job or area if such action would be beneficial to their health.

13. Notification by the Ministry of Public Health on the protection of women and minors performing labor in rural areas, the strengthening of publicity on health information among women and children, and the faithful carrying out of health work in nurseries, April 2, 1957 (II.5: 333–335).

The Communist Chinese have always paid special attention to women and youth as two possibly disaffected groups likely to give support to the Party if properly wooed. That the "liberated" Chinese woman is an essential part of the work force in post-1949 China gives the regime even more incentive to take steps to improve her life. This notification calls on a number of organizations in China to give widespread publicity to information relating to the protection of women and children, birth control, and child care. To ease the mind of the potentially worried mother who leaves her child behind in a nursery while she works, the notification calls for strict control of nursery personnel and close attention to sanitation and hygiene in the nursery.

14. Directive of the State Council regarding eradication of schistosomiasis, April 20, 1957 (II.5: 341–350).

Schistosomiasis, this directive points out, is a most serious disease whose victims in China number more than 10 million. As in the case of osteohypertrophy, concerted efforts are to be made to eradicate schistosomiasis.

15. Notification by the Ministry of Public Health regarding the issuance of a national plan for the prevention and treatment of leprosy, October 28, 1957 (II.6: 554–566).

This notification gives a description of special facilities established in China for the treatment of leprosy and figures on the numbers of those afflicted with, treated for, and cured of leprosy. Applying to leprosy the regime's basic policy that "prevention is primary," this document outlines several fundamental steps which can be carried out to control leprosy, including the establishment of leprosy prevention institutes and stations, improvement of the quality of personnel dealing with leprosy, and the strengthening of scientific research on leprosy.

16. Border quarantine regulations of the People's Republic of China, passed and promulgated December 23, 1957 (II.6: 566–567).

The border quarantine regulations of the PRC are aimed especially at preventing exit and entry of persons suffering from such epidemic diseases as bubonic plague, cholera, yellow fever, smallpox, typhoid, etc. The various articles of this document deal with the establishment of quarantine stations, inspection of the person and property of travellers, an epidemic intelligence and reporting system, the imposition of quarantine, and the punishment of violators.

17. Directive of the Central Committee of the Communist Party of China and the State Council concerning eradication of the four pests and adoption of hygiene practices, February 12, 1958 (II.7: 453–459).

Issued during the Great Leap Forward period, which was characterized by a frenetic assault on all limitations of time, material, physical strength, etc., this directive in effect declares war on sparrows, rats, flies, and mosquitoes. Target dates for the total elimination of these four pests are set for various localities.

18. Rules governing the application of the border quarantine regulations of the People's Republic of China, approved December 20, 1957; issued March 25, 1958 (II.7: 460–492).

This lengthy supplementary document consists of ten chapters: 1) general provisions, including definition of terms; 2) intelligence and reporting; 3) quarantine organs; 4) quarantine in seaports; 5) quarantine in airports; 6) quarantine at a land border; 7) procedures for handling cases; 8) handling of quarantined infectious diseases; 9) quarantine fees; and 10) supplementary provisions.

19. Notification by the Ministry of Public Health regarding the conscientious launching of public health work among the workers in medium- and small-scale enterprises, July 7, 1958 (II.8: 262–264).

Medium- and small-scale enterprises typically have fewer resources, facilities, and programs for carrying out public health work. In recognition of this phenomenon, the PRC Ministry of Public Health here singles such enterprises out for attention. Public health organs are directed to do special studies of the public health problems of these enterprises. Improvement of working conditions with a view toward controlling occupational disease is the focal point of policy with regard to medium- and small-scale enterprises. The notification also evidences a concern for those living in areas adjacent to these enterprises, for it urges the avoidance of sound, water, and atmospheric pollution.

20. Notification by the Ministry of Public Health regarding the issuance of a national plan (1958–1962) for the prevention and treatment of mental illness, September 15, 1958 (II.8: 266–272).

Although boasting of their achievements in work with mental illness, the Communist Chinese here are determined to rectify defects in this work, such as too great a reliance upon chemotherapy, neglect of treatment of outpatients, giving short shrift to the traditional Chinese treatment for mental illness, etc. They define the characteristics of the working style of an ideal mental health worker and outline the basic principles of treatment of the mentally ill, including physical therapy which combines both Chinese and Western methods; labor, most typically of the physical type; systematically organized athletic, cultural, and entertainment activities; and education. This document gives evidence of the shift of emphasis from having traditional Chinese doctors learn from Western medicine to having Western style doctors study and learn from traditional Chinese medicine.

21. Notification by the Ministry of Public Health regarding the issuance of a national plan for the prevention and treatment of trachoma, September 27, 1958 (II.8: 272–282).

Noting that it is estimated that as much as 50% of the Chinese population suffers from trachoma, this notification sets the goal of wiping out this serious disease within ten years. As is usual when a goal is set, the basic methods of attack are outlined. Again, there is a call for study of traditional Chinese ways of treatment and for the synthesis of these ways with the Western approach.

22. Notification by the Ministry of Public Health regarding the thorough implementation of the emergency directive of the Central Committee of the Communist Party of China and the State Council concerning the launching of the anti-disaster struggle, September 1, 1949 (II.10: 408–410).

Issued at a time of crisis in China precipitated in part by natural calamities, this notification backs up a crucially important directive issued previously by the high level party and state officials (such joint issuance is a reliable indication that the subject matter of the document is considered highly important). The notification addresses itself to the handling of physical maladies associated with natural disasters.

23. Regulations governing the safety of drinking water, issued September 17, 1959; effective November 1, 1959 (II.10: 410–416).

The three parts of these regulations are devoted to standards of water purity, choice of acceptable water sources, and protection of the purity of these sources. Strong emphasis is placed upon prevention of contamination of sources of drinking water.

24. Directive of the Central Patriotic Public Health Campaign Committee and the Ministry of Public Health regarding the energetic promotion of the winter and spring work for the prevention and treatment of infectious diseases, November 21, 1959 (II.10: 417–419).

Proof of the longevity of the Patriotic Public Health Committee, mentioned earlier, this directive calls for yet another energetic campaign to educate the people in the avoidance and handling of cases of infectious disease.

25. Notification by the Central Patriotic Public Health Campaign Committee and the Ministry of Public Health on strengthening preventive measures in connection with major summer and autumn diseases, May 11, 1960 (II.11: 215–219).

Praising the success of the campaign announced in the immediately preceding document, this notification calls for a campaign combining the themes of prevention of infectious diseases, eradication of the four pests, and close attention to hygiene.

II. Medical and Public Health Facilities and Personnel

26. Directive of the Ministry of Public Health regarding the 1950 medical administration work, April 14, 1950 (I.1: 634–637).

Set forth in this directive are the basic policies which guided the regime in its earliest efforts toward establishing a pervasive network of public health facilities on the Chinese mainland, starting from the restoration of public health organs previously operated by the Nationalists and then establishing as many new organs as feasible given the limitations of available funds and personnel. Preparatory to the drawing up of a national public health plan, all areas are enjoined to submit concrete data about existing facilities and personnel, and plans for future work in the area of public health.

The directive carries instructions aiming at a fundamental reorientation of public health work. Not only is prevention, rather than treatment, to be primary, but also all personnel must adopt the viewpoint of serving the people. The notion that medical work is another form of commercial activity is condemned, as is the attitude that the carrying out of medical work is dependent upon a high level of sophistication in available technology.

Although in this document the Chinese Communists do not insist upon abolition of the private sphere in medical practice, they do indicate that private public health and medical personnel "should be encouraged" to join semi-cooperative, united, or joint hospitals or joint clinics.

One of the central tasks is said to be the organization and further training of doctors practicing traditional Chinese medicine with a view toward synthesizing the best of traditional style and Western style medicine. The intention to organize training schools for practitioners of traditional medicine is announced along with an outline of a curriculum for them which would introduce the traditional doctor to the basic principles and practices of Western medicine.

The goal of the imposition of modern management techniques upon and control of hospitals and clinics, both public and private, is announced. These institutions in both the public and private sphere are to follow standardized fee schedules. The private hospital or clinic is warned that they also must shoulder part of the responsibility for public health work and that they must concern themselves with service and not just with money.

27. Provisional regulations governing the management of hospitals and clinics, approved January 19, 1951; promulgated March 15, 1951 (I.2: 489–491).

Applicable to all private and public hospitals and clinics, with the exception of clinics operated by Chinese herb doctors, these provisional regulations, open with the setting forth of certain modest standards which a medical facility must meet in order to call itself a hospital or a clinic. A hospital, for example, is required to have a minimum of only ten beds, two doctors, and three nurses or assistant nurses, and one pharmacist. The medical treatment and public health activities of all hospitals and clinics are to be under the supervision of the public health organs of the local people's government. The local people's government is empowered to issue essential licenses to privately operated hospitals and clinics and to pass judgment on their schedules of fees. The making of false claims in advertising is strictly prohibited. In Chapter 3 of this document, headed "Activities," hospitals and clinics are told that they must engage in work aimed at the prevention of disease, that they have certain responsibilities in the event of the outbreak of an epidemic, and that they cannot without proper reason refuse treatment to any person. Certain basic ethical requirements related to the practice of medicine are established. Chapter 4 defines a graded scale of punishments for violation of these regulations.

28. Decision of the Ministry of Public Health and the Ministry of Education on the development of public health education and the training of public health workers at all levels, approved and promulgated April 4, 1951 (I.2: 492–493).

According to the provisions of this decision, public health education in the PRC is to be divided into the high, intermediate, and basic levels, all of which are required to implement the government's policy of giving priority to preventive measures and of carrying out public health work principally for the benefit of the laboring people.

The existing system of high level medical education is to be reformed. Certain high level medical schools shall be authorized to conduct experimental programs in specialized medical education involving reduction of the number of years of study. (It should be noted that admission to these high level medical schools demands only a high school diploma and that the years of study given here refer to the number of years of study beyond high school.) In these experimental programs, students in the following four departments shall follow a five year course: departments of internal medicine, surgery, pediatrics, and obstetrics. Those specializing in dentistry, eye, ear, nose, and throat, and public health shall have a four year course of study. Students in any of the five departments of pharmacology also shall study four years.

At the high level, there also may be a special two-year course of study, roughly equivalent to a junior college course, in medicine, pharmacology, and public health engineering. Completion of the special two year course must be followed by a training period of at least six months.

Admission to intermediate level public health schools requires only a junior high diploma. Education at this level includes schools for medics, nurses, and maternity aides. Medics shall follow a two year course, followed by six months of practical training; the same requirement applies to nurses and maternity aides. A selected number of such schools, with the approval of the Ministry of Public Health, may set up special courses for the training of teachers to staff intermediate level schools; admission to this teacher training course requires graduation from high school. The teacher training course normally will require two years of study, followed by three to six months of practical training; however, in the case of those who already are graduates of schools of nursing or schools for maternity aides and who have had two years of practical experience, the course may be shortened to one year.

Intermediate level education for other types of public health technicians may encompass periods of from six months to two years, depending on the nature of the course.

Basic level public health education includes the training of personnel to staff public health organs at the *hsiang* (village) and *ts'un* (hamlet) levels, personnel skilled in the care of women and children, and nursing aides. Education for *hsiang* and *ts'un* public health personnel shall extend to six months, while lasting only three months for the other two categories of persons.

The enrollment of existing medical and public health schools shall be systematically increased, and new schools shall be established.

The Ministry of Education and the Ministry of Public Health shall jointly define minimum standards for the curricula and textbook content of medical and public health schools. High level medical schools shall be governed by the decision of the Government Administration Council regarding the guidance relationships of schools of higher learning. The routine administration, size of faculty, fiscal management, physical facilities, and curricula of intermediate level schools shall be under the supervision of public health organs at the provincial level;

however, the educational policy, system, and relations of such schools will be led by the government's education organs. Basic level public health education shall be led by public health administratve organs at the *hsien* (county) level, or, if necessary, by public health organs at the provincial level.

Plans for the high level medical training of members of minority nationalities shall be drawn up by the Ministry of Public Health of the Central Government; responsibility for training intermediate and basic level public health personnel devolves upon local public health organs in the minority nationality areas.

Public health organs at the provincial and muncipal level and above shall establish advanced training courses for Chinese herb doctors so as to enable them to acquire basic, scientific knowledge of medicine; the curricula of such advanced training courses shall be jointly formulated by the Ministry of Public Health and the Ministry of Education of the Central Government.

29. Decision of the Ministry of Public Health regarding the strengthening and development of the basic-level public health organizations, approved and promulgated April 4, 1951 (1.2: 494–495).

In pre-Communist China medical and public health facilities were concentrated in the large cities, leaving the populace of the rural areas and the industrial and mining areas with little or no access to medical treatment in case of illness and with little or no knowledge about how to preserve their health. In order to remedy this situation, this decision of the Ministry of Public Health calls for the systematic strengthening of existing public health organs at the *hsien* level and the creation, first in the southwest, the northwest, and other minority nationality areas, of organs in areas not having them. The larger industrial and mining areas were to be provided with a full complement of medical and public health personnel, who were to be responsible for the prevention and treatment of occupational diseases, the inspection of safety equipment, the dissemination of public health propaganda, the gathering of pertinent statistics, etc. Mobile plague prevention teams were to be sent to areas where there were minority nationality groups engaging primarily in animal husbandry.

In order to strengthen and develop basic level public health organs, the Central Government, the government organs of the Greater Administrative Areas, and the Ministries of Public Health and Education were to systematically train medical cadres, with a special emphasis on the training of medics and maternity nurses. Before such personnel can be trained, "surplus" public health personnel should be encouraged to go to the rural areas; unemployed medical personnel must be given further training for the same purpose.

30. Decision of the Ministry of Public Health on the adjustment of public-private relationships in medical and public health enterprises, approved and promulgated April 4, 1951 (I.2: 496–497).

With the promulgation of this document, the PRC took significant steps toward the socialization of medical work on the mainland. It provides that, in accordance with actual needs and concrete conditions, the public health administrative organs shall see to it that there is a reasonable division of labor between the various types of public and private medical and public health facilities. Any medical facility in which there is a measure of private participation, if assigned such a task, must provide free services in connection with plague prevention, health preservation, and war movements. Medical organs jointly operated by private individuals must be given proper guidance and assistance by local public health administrative organs; those engaging in private practice must be urged to organize joint public-private hospitals and clinics to supplement existing public medical organs. Privately operated medical facilities were to be given assistance by the public health administrative organs; if, however, it was found that such organs were not in a position to continue operation and they "voluntarily" requested assistance, they could either be reorganized as public-private jointly-operated medical organs or taken over by the government.

An extended section of the document is devoted to a definition of the future relationship between publicly and privately operated pharmaceutical factories and suppliers, the emphasis being on their carrying out a reasonable division of labor on the basis of a unified production plan.

31. Decision of the Ministry of Public Health regarding unity and mutual-assistance study in the medical profession, approved and promulgated April 4, 1951 (I.2: 498–499).

This decision indicates that there were in China at the time less than 20,000 doctors trained in Western medicine, while there were hundreds of thousands of traditional Chinese herb doctors. In order to derive the greatest benefit from this vast pool of medical manpower, the Ministry of Public Health here dictates several actions which are to be taken to the end of increasing the scientific knowledge and sophistication of the traditional Chinese doctors. At the same time Western style doctors are mildly berated for their aloofness from the masses and enjoined, along with their traditional colleagues, to increase their political awareness and professional knowledge. One way in which the Western style doctor could express greater political awareness is clearly indicated: he can devote time after working hours to the teaching of scientific medicine to traditional Chinese doctors. In addition to such more or less informal scientific instruction, formal classes and study programs are to be organized by various medical schools and groups for the further training of experienced herb doctors. The Ministry of Public Health is to set up organs to gather information about and then to carry out systematic research of the therapeutic possibilities of traditional Chinese medicines and methods of treatment. Those herb doctors who have undergone advanced, scientifically oriented training are to be used as much as possible by the public health organs in both treatment and preventive work. Basic courses of scientific medicine are to be introduced into the curricula of herb medicine schools.

32. Provisional regulations governing physicians, approved April 18, 1951; promulgated May 1, 1951 (I.2: 500–503).

The regulations define the requisite qualifications, the responsibilities, and the obligations of physicians, including alien physicians, practicing Western-style medicine in the PRC.

The first of eight categories of persons who may be issued the license essential to practice includes those who are graduates of publicly operated medical schools either in China or abroad or who are graduates of a privately operated medical school with a course of study of four or more years. It is noteworthy, however, that these regulations provide that, from the time of their promulgation, those who graduate from a public or a private medical school, before being eligible for a license, must first serve for one or two years in a public or private medical facility as assigned by the Central Government. The other seven categories of persons eligible for a license include those who have passed various types of medical examinations and those who have had varying degrees of successful experience in the actual practice of medicine. Four categories of persons are eligible for a temporary physician's license; four categories describe persons with somewhat less training and less practical experience than are required for a full physician's license. A list of characteristics which bar a person from eligibility for a license is given.

Mentioned first as an obligation of the physician is obedience to the orders of the Central People's Government to participate in the war defending the country. Doctors further are required to observe the laws and regulations of the Central People's Government pertinent to medical practice, to follow the procedures laid down by the public health organs, to involve themselves actively with the health of the people, to accept the guidance of the public health organs of the local people's government, and to assist in promoting health preservation work. More specific requirements are such matters as the taking of appropriate steps in case of detection or suspicion of infectious disease, delaying accepting payment for their services in the case of an emergency or a natural disaster, never refusing to give treatment without proper reason, never writing a prescription in such a way that it can only be filled by one collaborating pharmacist, reporting all medical evidence of crime, and never inducing abortion unless the diagnosis shows that the pregnant woman's life is in danger.

A graded series of punishments is prescribed for negligence, ranging from warning to criminal prosecution in the serious cases.

33. Provisional regulations governing doctors of traditional Chinese medicine, approved April 18, 1951; promulgated May 1, 1951 (I.2: 504–507).

These regulations define the requisite qualifications, responsibilities, and obligations of doctors of traditional Chinese medicine.

Six categories of persons eligible for licensing are set forth in Chapter 2, along with four categories of persons eligible to receive a temporary license. Four conditions are described which bar a person from receiving a license.

The responsibilities and obligations of the Chinese traditional physician described in Chapter 3 are almost identical to those set forth in the Provisional Regulations Governing Physicians, the major exceptions being the requirement that a Chinese traditional doctor cannot prescribe a chemically compounded medicine or give an injection unless he has had scientific training in medical treatment and that under no condition is he to prescribe or induce abortion.

Chapter 4, dealing with punishments and awards, is identical to that in the counterpart regulations for Western style physicians.

34. Directive of the Government Administration Council regarding the provision of medical treatment and disease prevention at public expense for state employees at all levels of the people's governments, political parties, organizations, and their subordinate business units, June 27, 1952 (I.3: 209–210).

Under the provisions of the Labour Insurance Regulations of the People's Republic of China, first promulgated on February 26, 1951, the right to free medical treatment under certain conditions had been extended to workers in certain types of industrial, mining, transport, communication, and construction enterprises. The above named directive basically provides for the progressive extension of this right to free medical services to all personnel in government agencies, democratic parties, people's organizations, and their departments through the country. It stipulates that in accordance with available medical and surgical facilities, various localities may work out plans to provide outpatient and hospitalization services gradually. A timetable of target dates for the initial extension of these services is provided. In places where there are no suitable facilities available, money to cover medical expenses is to be indirectly issued to the sick as a provisional measure.

35. Decision of the Government Administration Council on strengthening the public health personnel in national defense construction, passed July 13, 1951; promulgated July 18, 1951 (I.2: 508–509).

Passed during the Korean war, this decision sets forth a policy of encouraging public and private medical personnel to participate in public health work in the armed forces, and at the same time cautions that health preservation work among the masses must also be given due weight. It offers the incentive of increased salary, possible awards, and the opportunity for further study to those medical personnel who "voluntarily" participate in public health work in the armed forces. Privately practicing medical personnel are to be convinced and encouraged to devote part or all of their time to work in the public health organs so that these organs will not remain unstaffed after the exodus of public health workers to the armed forces. Those private practitioners who do not opt for working in the armed forces nor in the public health organs are to be "assisted" by the public health administrative organs of various places to participate in or to organize joint public-private medical organs. In the case of recent graduates of medical schools, priority is to be given in work assignments to defense construction work.

36. Measures governing the organization of the Industrial Hygiene Commission, approved December 28, 1954 (II.1: 513–514).

These measures provide for the creation of an Industrial Hygiene Commission, the purpose of which is to be the strengthening of public health work in industry, the strengthening of unified guidance of such work, and the improvement of coordination between public health units in various industries.

37. Notification by the Ministry of Public Health on strengthening the operations and organs involved in drug administration in various provinces and municipalities, March 27, 1956 (II.3: 563–564).

This notification aims at the tightening of control of the quality, sale, and distribution of all pharmaceuticals, including traditional Chinese herbal medicines, and pharmaceutical equipment. In addition, it calls for scientific research into the therapeutic properties of herbal medicines, and the study and testing of new pharmaceutical manufacturing equipment.

38. Joint directive of the Ministry of Urban Construction and the Ministry of Public Health concerning supervisory work on public health facilities in urban planning and construction, August 16, 1956 (II.4: 471–472).

Probably the best example of the advanced thinking of the Communist Chinese on ecological matters, this joint directive calls for close cooperation between urban construction units and public health units in the planning of the future development of the national economy and the construction and reconstruction of cities with due regard to economic, public health, and aesthetic factors so as to create conditions in which the people can enjoy a more satisfying and healthful life. Many points warranting special consideration are enumerated, among them the establishment of "buffer zones" between industrial and residential areas; the planting of greenery; the location of graveyards and facilities for the disposal of human waste and garbage; and the protection of open air sources of drinking water.

39. Directive of the Ministry of Public Health on the improvement of nursing work, April 3, 1957 (II.5: 335–340).

This 1957 directive touches upon the proper utilization of available nursing personnel and the improvement of the basic education, advanced training, working conditions and welfare of nurses.

40. Directive of the Ministry of Public Health on improving the zoned medical service program, May 13, 1957 (II.5: 351–357).

With a view toward effecting better cooperation among existing medical facilities, this directive avows the intention of dividing the nation into various zones in which medical treatment and prevention networks will be established. This policy is to be carried out experimentally in Peking, Tientsin, and Shanghai, and then extended to large and medium-sized cities.

41. Directive of the Ministry of Public Health on strengthening the leadership in basic-level public health organizations, August 7, 1957 (II.6: 540–546).

The term "basic-level public health organizations" encompasses joint clinics and health protection stations established in such locations as villages, towns, city blocks, enterprises, government agencies, schools, and agricultural cooperatives. This directive calls for the strengthening of the administration of these organizations, the correct understanding of government policy by personnel affiliated with them, the improvement of the skill of these personnel, the enhancement of efficiency, etc.

42. Notification by the State Council approving and transmitting the measures of the Ministry of Public Health for directing industrial hygiene work through a division of labor, August 13, 1957 (II.6: 546–550).

This notification delineates in broad terms the respective jurisdictions in public health work of public health units associated with factories and mines and the administration of these factories and mines.

43. Directive of the Ministry of Public Health on the implementation of the measures for directing industrial hygiene work through a division of labor, November 1, 1957 (II.6: 550–554).

This supplementary directive describes in more concrete and detailed terms the division of labor between public health units associated with factories and mines and the administration of these enterprises.

44. Directive of the Ministry of Public Health regarding the strengthening of public health facilities in mountainous regions, February 4, 1958 (II.7: 450–453).

Long neglected in the public health programs of previous governments, the people living in remote, mountainous regions of China should be singled out for special attention in the planning and funding of health preservation and treatment services.

45. Notification by the Ministry of Public Health and the Ministry of Finance to the effect that the entire wages of hospital workers are to be paid from the state budget, February 5, 1960 (II.11: 207–208).

This notification announces the government's intention to increase its subsidies to hospitals so that from 1960 the salary of hospital workers shall be paid entirely from the state budget.

III. Chinese Medicinal Materials

46. Several provisions of the Ministry of Public Health pertaining to the question of leadership and management of the free market for Chinese medicinal materials, issued July 25, 1957 (II.6: 529–530).

These provisions chiefly dictate that the purchase as a commodity of 38 kinds of Chinese medicinal materials will be restricted to the Medicinal Materials Corporation or cooperatives especially assigned with the task of their requisition-purchase; that the supply-demand factor must be taken into consideration in setting their price; and that purchasing should be carried out in accordance with an overall plan.

47. Several provisions of the Ministry of Public Health regarding the business operation and control of Chinese medicinal materials, issued August 17, 1957 (II.6: 531–540).

These provisions indicate that up to the end of 1956 there were some 2,000 organs under the Medicinal Materials Corporation, employing some 41,900 persons. The organization of this loosely-knit group of organs should be tightened. Production of medicinal materials should be properly planned, and the sources of supply improved through such steps as lending money to growers and systematically collecting medicinal materials growing in the wild. The quality of the medicines made from these materials should be closely controlled, and distribution of the product should be carried out according to a scale of priorities based upon need. This document also includes a list of the functions and responsibilities of the Medicinal Materials Corporation of China.

48. Notification by the State Council to the effect that, at the time the wild-grown plant materials are fully utilized, attention must be paid to the supply of Chinese medicinal materials, July 11, 1958 (II.8: 264–266).

In order to conserve the limited supply of Chinese medicinal materials for their most efficient use, priority should be given to therapeutic uses in the case of medicinal materials which also have dietary and industrial uses. At the same time, plans should be drawn up to increase the production of certain of these materials.

49. Directive of the State Council on the question of developing the production of Chinese medicinal materials, October 31, 1958 (II.8: 282–286).

This directive indicates that, although there has in general been an increase since 1949 in the production of Chinese medicinal materials, in the case of some of these materials there presently exists a shortage due to vast quantities having been used in treatment of certain diseases and also to their cultivation having been neglected when attention was focused upon the cultivation of foodstuffs. The supply of these materials must be increased and can be increased by such steps as eradicating the superstitious belief that they can be cultivated only in certain areas and systematically cultivating some materials which previously have been grown only in the wild. In making plans to increase production, proper attention must be given to quality control and efficient purchase and distribution.

50. Notification by the State Council transmitting and approving the report of the Ministry of Public Health on the question of Chinese medicinal materials, March 7, 1959 (II.9: 277–278).

This notification reports that the State Council has approved the request of the Ministry of Public Health that around JMP 30,000,000 be allocated for the advance purchase of Chinese medicinal materials in an effort to assist growers in increasing production of these materials.

5. Notification by the Ministry of Public Health on seizing the opportunity of vigorously promoting the work of producing and purchasing Chinese medicinal materials during the autumn and winter seasons, August 21, 1959 (II.10: 405–408).

The systems of growing, gathering, and purchasing Chinese medicinal materials, an estimated 80% of which are grown in the wild, should be improved as this notification stipulates, recommending such concrete steps as adequately compensating agricultural workers who gather the wild materials, having the purchasing done by public health personnel with a knowledge of pharmacology, and encouraging producers to provide the best possible conditions for growth. The government, it is indicated, is trying to regulate the dosage of medicines compounded from these medicinal materials in an effort to conserve the supply and also is attempting to eliminate the attitude that one should take certain medicines whether one really needs them or not.

52. Directive of the Ministry of Public Health regarding the all-out seizure of the opportunity of carrying out the planting of spring medicinal materials, as well as the promotion of collecting wild-grown medicinal materials, March 9, 1960 (II.11: 209–212).

This directive proclaims the necessity of launching a spring campaign to carry out the planting of cultivated medicinal materials and the gathering of wild-grown ones which reach the proper stage of maturity in the spring. Training classes and short-term schools should be set up to train the people in the proper scientific techniques of cultivation of Chinese medicinal materials. The target is the planting of 6,000,000 hectares of medicinal materials.

53. Notification by the Ministry of Public Health on the question of a general survey of sources of wild-grown medicinal materials, March 11, 1960 (II.11: 212–215).

This notification makes public a plan to carry out in three years (1960–1962) a systematic survey of the sources of wild-grown medicinal materials under the leadership of the Party and with enlistment of the masses. While the plan estimates that there are more than 2,800 kinds of wild-grown animal and plant medicinal materials, only about 1,000 varieties were being handled at the time by the organs dealing with medicinal materials. An enumeration of units and groups to participate in this survey gives evidence of its importance to the regime, as does the description of the approach to be taken in conducting the survey.

IV. Miscellaneous

54. Rules for dissecting corpses, approved April 28, 1957, issued July 15, 1957 (II.6: 525–529).

These rules describe the procedures to be followed in the dissection of corpses for teaching purposes in medical schools and for determination of the cause of death for legal and non-legal purposes.

V. Conclusions

The absence, after Volume 11, of legislation on public health in the second statutory collection is so conspicuous that it demands some explanation. The point to be stressed in this explanation is that the failure to include further legislation on public health does not in itself necessarily point to a downgrading of the importance of public health by the Communist Chinese authorities or need it imply that there were no further notable developments in public health after 1960. The first, obvious observation is that not every legal document issued in the PRC was selected for inclusion in the statutory collections. But the failure to include legislation on public health in Volumes 12 and 13 also must be viewed against the background of the decrease in the overall size of these two volumes in comparison to previous volumes of the second series. No volume of Volumes 1 through 10 numbers less than 300 pages, even though nine of these ten volumes cover only six-month periods; and one has a total of 887 pages. Volume 11, however, has only 230 pages! Volume 12 has only 148 pages; and Volume 13, which covers a twelve-month rather than a six-month period, has only 280 pages. This decrease in the size of the volumes of the second statutory compilation is one reflection of the fact that, after having reached its heyday in the mid-1950's, formally enacted and published law in general played an increasingly minor role in the People's Republic of China even before the onset of the Cultural Revolution. Public health hence was not the only area in which the amount of formal legislation declined. Third, as we have indicated previously, not subscribing to the notion of the rule of law, the Peking regime has at no point felt it essential that every action proceed from a previously enacted statutory base. Examination of the development of public health in the PRC, especially in the period after 1960, necessitates one's looking at various types of available sources other than the publicly promulgated legal ones. Doubtless the most valuable sources of a legal or quasi-legal nature are not available. From what one finds in an examination of actual practice, one perhaps can infer that certain directives not accessible to us have been issued to those administering the public health system. This body of unpublished instructions to state and party cadres having the character of law always exists in the PRC: its importance and perhaps its volume waxes and wanes with the fluctuations in the amount of formally promulgated legal documents.

It appears to us that, in comparison with that on other topics, legislation on public health in the PRC is rather complete, given the nature of Communist Chinese legal documents. In writing its laws, the Peking government does not aim at full, technical statements devoid of loopholes, but at a statement of policy vague enough to permit flexibility in implementation, simple enough to be readily understood by the average citizen, and inspiring enough to constitute effective propaganda. We feel that the examination above of 54 legal documents has yielded a rather complete statement of the basic policies which have prevailed in the area of public health in the PRC since 1949. The emphases have changed somewhat over the years, particularly since the thought of Mao Tse-tung became the sun illuminating every aspect of life in Communist China, but at least the roots of every basic policy in public health can be found in even the earliest legal documents considered here.

The very consistency in public health policy in the PRC may have served to diminish the volume of law on this topic, for Communist Chinese laws often are issued in response to changes in policy. Public health likely has been an area relatively free of controversy on the mainland. The question rarely has been what policy to pursue; it instead has been from the beginning how to make adequate resources, both human and financial, available for the implementation of previously decided policy. Communist Chinese ideology dictates that policy in public health be oriented toward the masses, and the Peking government pays much more than lip-service to its ideology. The orientation stemming from the ideology is doubly determined by the need to have the people in robust health so as to be able to withstand the physical demands made upon them in the interests of the nationalistic policy of rapid development of the agricultural and industrial economy. Communist Chinese policy in public health work has flown readily from the basic orientation toward the masses; there has been little need for voluminous legislation to chart vacillations in policy and approach.

Another feature of the above description of public health legislation in the PRC which merits further comment is the proportionately great number of documents, especially in the latter years surveyed, devoted exclusively to Chinese medicinal materials and the frequent mention in other documents of traditional Chinese herb doctors. From the beginning, expediency dictated that the regime utilize fully both those trained in traditional Chinese medicine and the pharmacopoeia associated with their practice. The regime's public health policy and programs were ambitious ones, but their success was crucial to even more ambitious economic policies and programs. Further, if one succeeds in bettering the health of the masses, one has a tangible achievement which one can put on display as evidence of one's genuine concern for the people's lot and thus perhaps win support in other policy areas where success comes more slowly, with greater exertion, and with less personally felt benefits. The Communist Chinese leaders initially may have had greater faith in Western-style medicine than in their "home-grown" variety, but doctors trained in Western medicine were pitifully few, and Western pharmaceuticals not only limited and expensive, but also unfamiliar and hence a cause of fear to many of the superstitious Chinese. Traditional Chinese doctors and medicinal materials likely were brought into public health work to the extent that they were at least in part because of a begrudging attitude that some knowledge and some therapeutic effectiveness were better than none. The early laws make it evident that the regime was concerned that the traditional doctors get further and more scientific training and that the therapeutic properties of traditional medicinal materials be scientifically ascertained. Though expediency was long operative in the regime's stance toward traditional Chinese medicines and medical practitioners, and though the need for their use perhaps increased with the worsening of Sino-Soviet relations and China's progressive self reliance, a motivation other than expediency becomes more and more evident in the later documents surveyed here. Traditional Chinese doctors and medicines became a source of genuine pride to the leadership. One cannot doubt that those in charge were convinced of the effectiveness of the traditional remedies and proud of that effectiveness, if one considers the sizeable expenditure of human and financial resources which implementation of the legal documents on Chinese medicinal materials would require. The very fact that so many documents on traditional Chinese medicines were included in the second statutory compilation is a good indicator of the import which the regime attaches to them.

Study of legal documents on public health in the PRC has a value exending beyond the knowledge one thereby acquires about a specific topic. All areas of policy in the PRC are so intimately entwined, that knowledge of one area carries over into one's understanding of other areas. The basic orientation, the approach, the spirit, and some of the techniques one finds in legislation on public health are readily discernible in, for example, labor legislation and legislation on the family. The author hopes that this study of public health legislation of the PRC encourages specialists in public health and other aspects of the contemporary Communist Chinese scene to make use of the available [illegible] sources.

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2. *Ibid.*, p. 99.
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6. The following system of citation is used in this article: The initial upper case roman numeral, either "I" or "II", refers to the first or the second series of volumes making up the two statutory compilations; in other words, the roman numeral "I" refers to *Chung yang jen min cheng fu fa ling hui pien* (Collection of Laws and Decrees of the Central People's Government), and the roman numeral "II" refers to *Chung-hua jen kung ho kuo fa kuei hui pien* (Collection of Laws and Regulations of the People's Republic of China.) The arabic numeral following the roman numeral refers to the volume of the series in which the Chinese text of the document appears. The arabic numerals following the colon refer to the page number on which the Chinese text of the document appears. (I.1: 631–633) then means that the Chinese text of the document appears on pages 631 to 633 of Volume 1 of the first compilation, *Chung yang jen min cheng fu fa ling hui pien.*

The publication schedule of the two series is as follows:

Chung yang jen min cheng fu fa ling hui pien

Vol. No.	Coverage	Publication Date
1	Sept. 1949–Dec. 1950	1952
2	1951	1953
3	1952	1954
4	1953	1955
5	Jan.–September 1954	1955

Chung hua jen min kung ho kuo fa kuei hui pien

Vol. No.	Coverage	Publication Date
1	Sept. 1954–June 1955	1956
2	July–Dec. 1955	1956
3	Jan–June 1956	1956
4	July–Dec. 1956	1957
5	Jan–June 1957	1957
6	July–Dec. 1957	1958
7	Jan–June 1958	1958
8	July–Dec. 1958	1959
9	Jan–June 1959	1959
10	July–Dec. 1959	1960
11	Jan–June 1960	1960
12	July 1960–Dec. 1961	1962
13	Jan 1962–Dec. 1963	1964

HEALTH CARE FOR RURAL AREAS

Susan B. Rifkin, B.A., M.I.A.

In the face of adverse conditions of overpopulation, limitation of resources and a technological base, factors shared by the developing nations, the People's Republic of China is attempting to devise a health system which de-emphasizes high Western standards of medical care and is geared to meet the less sophisticated needs of the local population. This system relies upon prevention rather than cure, upon the rapid expansion of health facilities and upon extensive and often intensive use of traditional practitioners, health teams and medical auxiliaries in an attempt to make possible health and medical care for most of China's 80 percent rural population. By focusing on these programs, the Chinese are diverging from large investments in curative medicine and highly skilled manpower, which would be available only to wealthy urban classes.

A major reason for China's apparently impressive expansion of rural health services is the effort of the leadership to coordinate health programs with economic plans. The Chinese Communists early recognized the need to protect China's largest resource, its manpower. Health problems became not only the concern of medical professionals, but also of the economic and political strategists. For this reason, health policies are an integral part of, rather than excluded from, overall development planning.

The development of health services in China has followed the various stages of economic development. Based on the principle that "to defend the life and health of the people by wiping out diseases means to protect the most important and the most important productive force in the world," [1] health policies have been formulated within the broad guidelines promulgated by the Chairman of the People's Republic of China, Mao Tse-tung. His four standards demand that medical care must 1) serve the workers, peasants and soldiers, 2) put prevention first, 3) unite Western and traditional medicine, and 4) co-ordinate medical campaigns with mass movements.[2]

The period from 1950–1952 was one of economic rehabilitation reflected in the health sphere by the concern of the leadership in providing the basic organization for health and medical care and in eradicating as quickly as possible epidemic diseases. In the first instance, the government not only established the Ministry of Public Health in 1949 and re-structured the already existing hospitals and research centers but also took measures to mobilize the trained medical personnel. Private practice was strongly discouraged and Western doctors were urged to join practitioners of traditional medicine in organizing United Clinics to make their services available to the state. Medical schools expanded in order to train more needed personnel for public service.

To provide care for China's predominately rural population and to disperse medical talent from its heavily concentrated urban base, other measures were taken. Upon the remnants of an incipient rural health structure created during the Republican period (1911–1949), the Chinese began to extend the health network. To carry out the dictum of the First National Health Congress (1950) that health work should serve the masses,[3] four basic health units were reconstituted: 1) *The Epidemic Prevention Stations* had responsibility for the reporting of, and inoculations against, all communicable diseases. Under the control of local authorities, they carried out public health work and dealt with sanitation problems in their region. They provided the basis of the early rural health structure; 2) *Affiliated Clinics* were established in areas where there were on other health units to administer medical care to and carry out health programs for local people; 3) *The Red Cross and Red Crescent Societies,* which had been present in China since 1904, now had responsibility for sanitation work through the use of environmental inspection teams and for health education programs. They also carried out their traditional duties of rendering first aid in times of disaster; 4) *Spare Time Clinics* were established in factories, mines, etc.,—their business hours so arranged to meet the off duty hours of the workers. Duties included rendering first aid to workers in case of emergency, conducting routine health examinations, giving inoculations against infectious diseases and checking absenteeism due to illness. All four units were responsible for health education.

Health teams led by members of the core of 18,000–20,000 Western trained doctors present in China in the early 1950's[4] staffed these units. The viability of their work depended on the auxiliary worker who could carry out a number of health and medical measures and release the precious time and skills of the professional physician. Auxiliary workers were divided into four groups: 1) the specialist, educated for two years in one field of medical care; 2) the paramedical professional, such as nurses and lab technicians who studied two/three years to perfect their skills; 3) the hygiene workers whose three/six months training focused on environmental problems and disease control; and, 4) the part-time worker who in a one/three month training period learned to give vaccinations and to recognize and report endemic diseases.

Auxiliaries learned both curative and preventive techniques [5] and by participating in both types of activities made possible the maximization of their much demanded skills denied by the separation of prophylaxis and curative work characterized in Western medical training. Such flexibility attempted to encourage medical people to make use of indigenous resources and talents and to develop treatment and skills most appropriate for local conditions.

Early achievements of the health teams included reported successes in the anti-syphilis campaigns, and the rapid creation of health services for the minority peoples of China to prevent the threatened extinction of some of these tribes. The teams became extremely important as a means by which to get health care and education to remote areas virtually neglected by government health services up until this time. Their continued use brought new standards of medical and health protection to the Chinese people.

Using growing medical organization and the health teams, the leadership turned its attention to methods of disease eradication. In order to implement preventive measures such as vaccinations and to impose conditions of sanitation for the control and abolition of contagious diseases, the government established mass campaigns for the mobilization of the entire population. Mass campaigns for health purposes were called "Patriotic Health Campaigns" and were first initiated in 1952 to urge the people to improve village water sanitation and to eradicate the four pests (rats, flies, mosquitoes and bedbugs) which were the carriers of certain infections whose widespread presence was allegedly due to the use of germ warfare by the Americans in the Korean War.[6] Poorly organized, these initial campaigns were soon restructured as "Shock Attack" movements providing techniques for instant participation of the people whenever the authorities felt a health campaign necessary. "Shock Attacks" which proved effective for an intensive effort for a short period of time, reached their zenith in the Great Leap period of 1957–58 at a time when agriculture became increasingly important in the economic development of China. Thereafter, campaigns became institutionalized as seasonal affairs aimed at the eradication of all communicable disease as well as the four pests. They also had intrinsic value as a vehicle for health education and as machinery for the dissemination of health propaganda in both urban and rural areas.

The period of the First Five Year Plan, 1953–57, emphasized the development of heavy industry rather than agriculture and accordingly, health policies focused on programs to benefit urban, industrial workers.[7] The mass campaigns continued to hold an important place in health plans as did the training of new personnel but little concern focused on rural health organizations. Then by 1956, economic planners realized the importance of agriculture as a means of capital formation and began to reformulate their development strategies.

With the promulgation of the Twelve Year Plan for Agricultural Development in 1956, the Chinese chose to stress agriculture as the basis of its economic growth and to link health explicitly with agricultural production. "Our aim is to fully utilize this favorable condition—large population and abundant manpower—in China in order to accelerate the development speed of production to the highest degree".[8] The Chinese formed agrarian co-operatives and focused health activities in the countryside where the large population density provided the necessary manpower to implement the economic goals. To ensure that all people had access to some type of medical care, attention centered on the expansion of medical facilities and manpower. The policies formulated at this period to achieve these goals have remained, with some modification, the basis for the development of health services in China.

The cornerstone for the development of rural health programs was a revived system of state-supported *hsien* (county) hospitals and health centers which had been established in China in the 1930's. County hospitals were generally divided into the following departments: internal medicine, surgery, obstetrics, pediatrics, traditional Chinese medicine, radiology, laboratory and other specific departments, and a dispensary. In addition to providing medical care, these units organized patriotic health campaigns, aided smaller health units, sent health teams to remote areas and trained medical personnel. By 1957 most of China's 2000 counties had at least one hospital.[9]

In addition to those established in the counties, hospitals were set up in market towns, in more remote mountain areas and among the minority tribes. Such distribution allowed better health and medical services in the countryside and better suited the dispersion of the rural population. In areas where no hospital was constructed, clinics, subclinics, health stations and mobile hospital units were established as local health centers. By 1957 the number of group practice clinics and sub-district health clinics were in excess of 50,000. Health stations established in the agricultural producers' co-operatives exceeded 10,000.[10]

In 1958, with the formation of the communes, the rural health network was further modified.[11] A major feature of this period was the decentralization of responsibility from the state to the local level. Although the state continued to operate the county hospitals, the communes ran their own basic medical units. At this time, the rural health center or institute became the responsible organ for all local health activities.

The health center, organized around the health centers of the former agricultural co-operatives, was under the direction of the commune's Management Committee's Department of Culture, Education and Health but was professionally guided by the *hsien* hospital or health center (in the Chinese documents these two terms are used interchangeably). It had responsibility for the health and medical work of the smaller units—the production brigades and their subsidiary components, the production team. A typical organizational pattern for commune health work is found in Yanglo commune in Chung-yang *hsien* in Shensi province, (see Fig. 1). Duties of the health center included: care for out-patient and regional health work; direction of mass campaigns; the investigation and control of contagious diseases; the inspection of public mess halls, nurseries, kindergartens and maternity hospitals; the delivery of medical care; the training of medical people and planning and implementation of all preventive programs.

In order to staff these expanded facilities, the Chinese made several important decisions. As a first measure, steps were taken to pay more than lip service to the 500,000 practitioners of traditional medicine.[13] As early as 1954, the Chinese Academy of Traditional Medicine was established and in the 1956–58 period, a concentrated effort was begun to introduce both traditional doctors and medical theory into the university classroom. A search for the synthesis of the two systems became a goal and strongly encouraged students to study both systems (this call to study both types of medicine has become increasingly imperative in the period which has followed the Cultural Revolution). In addition, Western trained doctors were urged to study Chinese medicine in special courses devised for this purpose. By 1958, there were reportedly over 13 colleges and several hundred secondary schools of traditional medicine established which were training 70,000 apprentices.[14]

Under this new official attitude, traditional doctors in increasing numbers joined the national and municipal public health services. They were assigned to hospital and clinics of various types and were integrated into the existing organizational system. In the rural areas, their increased presence provided an alternative type of treatment to Western medicine because here, as the Chinese indicate, "the traditional methods of treatment are preferred because they are simple and effective and appropriate to the constitution and habits of the Chinese

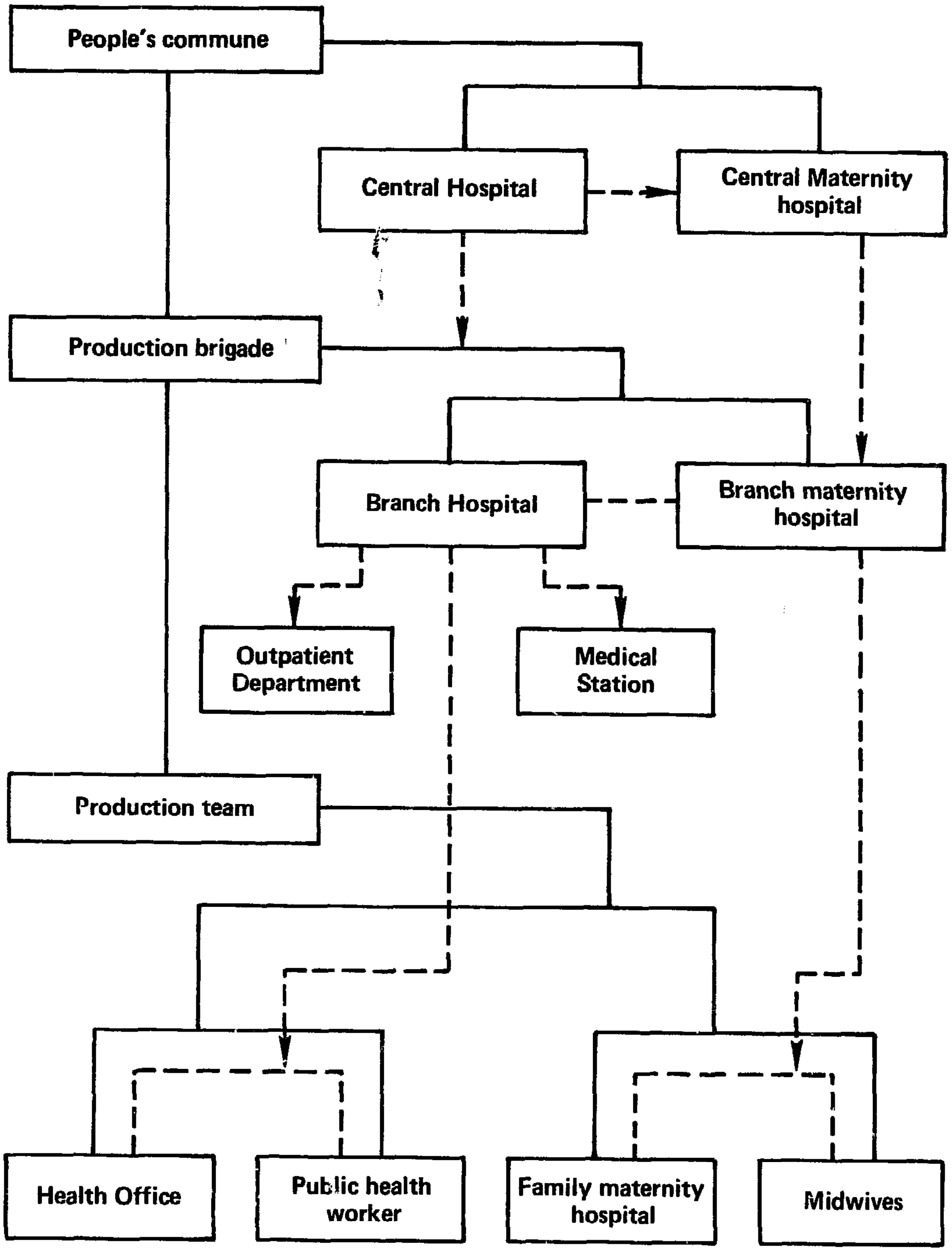

FIGURE 1. System of Basic-level Health Organizations at the Yung-lo People's Commune.

people".[15] The traditional doctors staffed rural health centers, trained auxiliaries and carried out health team work. In 1956, 30,000 traditional practitioners had been incorporated into government public health organs.[16]

Another measure first taken during the Great Leap period to meet rural health need was the transfer of urban medical personnel to the countryside to lead and/or serve on health teams in rural areas. Following the policies of decentralization of authority, encouragement of the development of indigenous local resources through the organization of the communes and uniting "theory with practice," the Chinese leadership called for highly trained medical doctors to travel the hinterland and to teach local people to build and support local health services. On a rotation system which provided for one year's leave of absence from their urban institutions,[17] city medical personnel rapidly expanded the ranks of rural medical services.

Once in the countryside, the senior medical doctors were stationed in the rural hospital where their talents could be used to direct the organization of new health services and the training of local staff.[18] In addition, they not only used their medical skills to treat the peasant population but also applied their talents to seek solutions to common rather than rare disease problems. The younger medical doctors who came from the city, for the most part, travelled with the mobile medical teams and applied their medical specialty to treat and train local people in the communes. As staff members of health units called mobile hospitals, these doctors would recruit some of the county and local medical workers, travel to areas with little or no health and medical care services, set up a central clinic and spend 2–3 months checking all the local inhabitants. They would treat the cases they could and refer the rest to more advanced clinics. Their presence also encouraged the institute personnel to raise their own health standards. Rural service continued to be strongly encouraged for newly graduated doctors. The *Chinese Medical Journal* reported that most of 1963's graduate doctors (25,000) were sent for duty in county hospitals or mining enterprises.[19]

A third step was to create a new type of auxiliary worker, the forerunner of the present "barefoot doctor" who was educated in the training centers that proliferated during the Great Leap period. Studying medicine on a part-time basis or in spare time schools, these workers were trained to carry out rudimentary treatment, and preventive and sanitation work. The appearance of this type of personnel enabled the employment of these people in health work during slack seasons and provided means of "on the spot" treatment. It also created a corps of concerned locals who had stakes in the good health of the commune.

All these steps rapidly augmented the ranks of available manpower. Excluding the traditional doctors between 1957–58, demographer Leo Orleans claims that there was an average annual increase of 198,000 total medical people as compared with 173,000 in the 1952–57 period.[20]

In the aftermath of the tremendous economic push of the Great Leap period and with the withdrawal of the Soviet technicians in 1960 the Chinese leadership began to consolidate its economic plans. "Self-reliance" began to emerge as a major theme for development and a search for the most appropriate use of available material and manpower resources commenced. In recently available documents from Red Guard sources, this period (1960–65) has been characterized as that of dominance by the technocrats and bureaucrats and development of urban areas rather then the countryside. In the field of health and medical care, it is an era described as one in which the drive for excellence in medical research and training diverted scarce resources from the establishment of health services for the masses.[21]

Although no doubt there was a drive for expanison of advanced research and of skilled manpower, it appears that in the rural areas most phases of economic planning were by no means ignored. The leadership still advanced agriculture as the basis of economic growth and continued to take steps to protect the health of the rural agrarian manpower. The Chinese consistently stressed the need for preventive programs and for medical treatment for the peasants in order to increase agricultural production and the need to improve and expand health services. Facilities greatly expanded: in 1940 there were 1,775 county health centers; [22] in 1957 there were 60,000; [23] and by 1962 the reports indicated 210,000 health centers had been established in these rural areas.[24]

With regard to medical manpower, training of medical auxiliaries and diffusion of skilled medical doctors to rural areas remained policy goals. Medical colleges were set up in many of the provinces and students were taught to combine scientific research with production objectives. In addition, the Chinese Academy of Medicine (CAM) sent some of its top rank staff to the rural areas to assist in the control of endemic diseases and to do other health work. In 1964, nearly 500 men from 11 research institutes visited over 23 provinces and 70 health centers.[25]

In the months immediately prior to the onset of the Cultural Revolution in 1966, concern for rural health services reached a new high. In 1965, Mao issued his famous "June 26" directive stating "In health work put stress on the rural areas".[26] In response to this appeal, the number of urban personnel travelling to the countryside rapidly increased. In the five months following issuance of this command, over 1,600 mobile medical teams comprising 29,000 urban medical professionals were in the rural areas. Led by such prominent figures as Dr. Huang Chai-ssu, President of the Chinese Academy of Medical Sciences, these teams were organized on a large scale to involve large numbers of health and medical people on all levels.[27] In addition, the leadership established a Rural Health Institute and designated the Institute for Labour Hygiene, Environment Sanitation and Nutrition to provide support for the efforts of the health teams in the areas of rural disease control and health.

The period of the Cultural Revolution and the era after has seen a more explicit development of the policy of "self-reliance" through the stress on the three principles of: (1) developing both industry and agriculture, (2) equalizing development of urban and rural areas, and (3) closing the gap between mental and manual labor. In the health field these policies concentrated on the expansion and diffusion in the rural areas of the mobile medical teams; the rapid increase of the medical auxiliary corps; and the widespread implementation of the cooperative medical system instituted within the commune. In addition, policies have reflected an increased concern with need for methods by which to institutionalize the newly expanded rural health system.

In the post-1965 era, nearly all urban medical personnel who are sent to the countryside become members of mobile medical teams. The transfer of personnel has become a permanent long range goal of the Chinese with efforts made to keep one third of all urban medical people in the rural areas at any given time.[29] The work in which they engage, in addition to treatment and training, includes guiding local mass health campaigns, doing research on prevention and cure of the disease most common to the places they visit; and lecturing and teaching about health education and important medical techniques to upgrade local personnel. Urban teams live in the homes of the local peasants and learn to exist without city comforts. They also engage in manual labor through aiding in agricultural work and assisting in the physical building of rural health facilities.[29]

A major task for the mobile medical teams is contribution to the expansion of the corps of medical auxiliaries through the training of the "barefoot doctors." These auxiliaries, like their Great Leap predecessors, learn both Western and traditional medicine during the agricultural slack season in order to serve the community in which they live. Depending on a system of referral to more highly trained personnel, on the periodic visits from the physicians of the mobile medical teams, on preventive medical techniques and on high morale of and acceptance by the people whom they treat, these medical workers give substance to the latest medical policies. Their duties include treatment of minor ailments, dissemination of birth control information, and the responsibility for the organization of health education programs, patriotic health campaigns and general sanitation work in their locale. The Chinese press states that their present number is over one million persons.[30]

The work of the "barefoot doctors" is not only supported by the traditional medical assistants, nurses, midwives, laboratory technicians, and the like, but also by thousands of public health workers who learn to prevent and treat minor injuries and diseases, administer preventive shots and know how to make tourniquets, bandages and splints. They also know some acupuncture techniques to treat simple cases. In late 1969, when Mao commanded a preparation against war, the press reported the rapid appearance of the family health worker, a member of each commune household who was equipped with first aid techniques to treat minor problems and to aid actively sanitation work and health campaigns.[31]

The cooperative medical scheme first appeared in the reorganization plans of the Great Leap period. However, it was not until the Cultural Revolution and after that its broad adoption has become apparent. Basically, the system calls for both the commune and the commune member to contribute a fixed amount per annum for medical care. In return, the patient pays only a minimal amount of money for treatment and medicines he receives. While the exact scheme varies from commune to commune the system adapted by the Chunhsing production brigade, Kukong county, Kwangtung province seems to be typical.

From 1957–1964 when the brigade was the basic accounting unit, medical expenses were paid by the brigade and patients paid only a registration fee. From 1965, when the production team became the basic accounting unit, the scheme was restructured so that the commune, brigade and production team members each lay aside a fixed amount per year. In recent years, the contribution from an individual member is about one yuan (a yuan is equal to about $.50 according to the 1970 rates of exchange). The production team contributes one yuan per capita from its welfare fund and the production brigade gives 2000 yuan per annum. Given the size of the brigade, the total is about 8000 yuan per year.[32] Patients' fees are paid yearly by the brigade. The establishment of cooperative medical schemes not only has made medical services more accessible to local inhabitants by providing finances for immediate treatment but also has relieved the state from heavy investment for similar returns in local medical and health care services.

Culmination of self-reliance in the manpower and resource mobilization policies can be witnessed in reports of the emergence of "red medical villages" where all inhabitants "work for better health" by collecting herbs, making their own medicines and emphasizing prevention but combining it with cure. In these areas each brigade has its own pharmacy; each village has its own "barefoot doctor;" several families have joint first aid stations; and each family has its own health worker.[33] These villages represent the attempts of the Chinese to reduce the inequality between medical standards in the urban and rural areas and to provide medical and health care for all its 800 million people.

While all these measures provide sensible solutions to obvious needs, the chaos of the Cultural Revolution made the task of establishing an integrated rural health infrastructure difficult. By 1968 it was apparent that the professional medical people could not carry out their duties as members of the mobile medical teams and participate in the political activities of the period simultaneously. In order to prevent a breakdown of the health system, the Chinese leadership turned to the one group that had remained relatively cohesive during this era of struggle, the People's Liberation Army. By June 1969 the PLA had sent more than 4,000 medical teams and 30,000 men to the countryside.[34] In the one year period ending July 1970 they had sent 6,000 teams with 80,000 members for rural health work.[35]

The PLA has become the model for emulation for all medical and health work in the country. Medical professionals are urged to establish hospitals in the character of the Red Army hospital for the civil war period (1937–49). To meet the directives for rural health work, medical college curricula often imitate the Red Army Health School founded in Juichin by Mao Tsetung in 1931. The structure stresses decentralization of educational facilities by establishing university branches in local areas. It also focuses on practical experience as a principle of instruction by sending students to treat and teach throughout the countryside.[36] "Barefoot doctors" are called upon to copy the feats of the PLA medical teams. It is evident the future role of the army will be an important factor in Chinese rural health developments.

Despite the problems that continue to plague the present system, the Chinese seem to be making inroads into their massive health problems. By attempting to modify the tradition of Western medical systems, which continue to maintain an emphasis on curative medicine administered by "fully qualified" doctors available by necessity of cost to the urban rich, the Chinese may be discovering ways of letting health care "serve the people." Through the use of health teams and auxiliary workers, through the implementation of mass campaigns, through the integration of Western and traditional medicine and practitioners and through a continuing emphasis on health work in the rural areas, the health system sets guide-lines for distributing medical resources in order that the majority of people have access to health protection and medical care. For this reason and for many others, the new Chinese medical and health care system will continue to be of interest both to the medical profession and national policy makers who must find solutions for the existing medical care problems among the rural peoples of the world.

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MEDICAL PERSONNEL AND THEIR TRAINING

Victor W. Sidel, M.D.

INTRODUCTION

The material in this paper on the current situation with regard to medical personnel and their training in the People's Republic of China was gathered during a one month's visit by my wife and me in September-October, 1971 as the guests of the Chinese Medical Association. Although very few statistical data on the current numbers of medical workers and their training were available, a wealth of anecdotal material was generously shared with us. From the limited statistical data, and the large amount of material on individuals, institutions, and communities, I have attempted to sketch part of the current picture of health manpower in China as we were given it. It should be noted that this picture is necessarily incomplete.

The material on the past history of China's health manpower has been much easier to collect from materials published in English. I am especially indebted to sources such as Ralph Croizier's *Traditional Medicine in Modern China,*[1] Szeming Sze's *China's Health Problems,*[2] and Leo Orleans' *Professional Manpower and Education in Communist China*[3] and *Medical Education and Manpower in Communist China.*[4] Although these historical data are also incomplete, and vary from source to source, they have a verifiable quality—in the bibliographic sense—absent as yet from our data on the current scene.

Health Manpower in Pre-Liberation China

The present situation with regard to medical personnel and their training in the People's Republic of China, in my view, is impossible to comprehend without an understanding of the situation prior to 1949, the year in which Mao's People's Liberation Army wrested control of mainland China from the Nationalist forces under Chiang Kai-shek. The history of medicine in China during this period is dual, with little interchange between the two streams. It is a history on the one hand of traditional Chinese medicine (*zhongyi*), which by legend extends back some 30 centuries before the beginning of the Christian era, but whose surviving classics were probably written in about the third or second century B.C. It is a history on the other hand of the introduction of what the Chinese call "Western medicine" (*xiyi*), with its "scientific" orientation, which began in China with the establishment of a dispensary at Macao by Robert Morrison in 1827 and the arrival of Peter Parker in Canton as the first full-time medical missionary in China in 1835.[1a]

Traditional Chinese medicine had its "theoretical" basis in such concepts as *yin* and *yang*, the proper balance of which was felt to be necessary to the maintenance of good health, and in *ch'i*, the vital life force. It also had a strong empirical base, in its use of herbal medicine and other techniques handed down through the generations.

The practitioners of Chinese medicine apparently varied greatly in their training and in their skills. The absence of any well-defined national qualifications for doctors of Chinese medicine prior to Liberation makes it very difficult to estimate their number. Professor Knud Faber, in his study for the League of Nations in 1930, was told that there were 1,200,000 practitioners of Chinese medicine and 7,000,000 "druggists."[5] When qualifications for doctors of Chinese medicine were formally defined by the government of the People's Republic in 1955, the total number for the entire People's Republic of China was given as 486,700.[6] It is therefore probably not unreasonable to estimate the number of "traditional" doctors in 1949 at about 500,000, or about one for every 1,100 of the 540 million people in China at that time.

Although the definition of a doctor of Western medicine is considerably simpler, estimates of their number are almost as varied as the estimates of traditional doctors. In 1932 the number of registered Western doctors was 2,919, 65 per cent of them practicing in the three coastal provinces of Kiangsu, Kwangtung, and Chekiang.[1c]

By 1937, the same registry included 9,098 physicians, but Croizier points out that this is probably an inflated figure because it includes every physician registered from 1929 through 1937 without any removal of the names of those who had stopped practicing.[1c] In 1943, in the midst of the "War of Resistance against Japan", Szeming Sze, Secretary-General of the Chinese Medical Association and Editor of the Chinese Medical Journal, estimated that there were 12,000 doctors in China. But of these he states:

". . . only 60% of the total are duly qualified doctors, the balance being apprentice-trained practitioners who were permitted to register up to 1937; (b) 75% are concentrated in the main ports of the six coastal provinces; (c) 92% are under the age of 50, and 67% under the age of 40, showing the relatively recent development of medical schools.[2a]"

Chinese estimates of the number of doctors of Western medicine in China at the time of Liberation in 1949 vary from 20,000 to 41,400.[4b] One Western estimate is as low as 10,000.[1d] Thus the Western-doctor-to-population ratio in 1949 may have been as little as one doctor for every 45,000 people or as "high" as one doctor for every 14,000. In either case, the number is extremely low, and it seems clear that the only doctors to whom the vast majority of the peasants in the rural areas, and of the poor people of the cities, had access were the doctors of traditional medicine.

Efforts had been made, of course, during the years prior to 1949 to increase the number of health personnel of the "Western" type. The bulk of the effort, however, went into the training of physicians following European or American models. Missionary medical schools supported by groups in the United States, Germany, France, and England were developed and the Peking Union Medical College was founded and supported through the Rockefeller Foundation and its affiliate, the China Medical Board. Although some observers called for new forms of health personnel and new forms of training—notably Professor Faber, whose League of Nations report called for "Special Medical Schools" to increase the number of physicians trained to 5000 per year (compared to less than 200 per year being graduated in 1929),[1c] and Dr. John Grant, who wrote of rural health workers working through rural health stations[7]—relatively little came of these suggestions. Even under the pressure of the war against Japan, with its considerable unrestricted aid from the United States, the "Emergency Medical Services Training Schools" did little to meet the need for some 30,000 medical officers.[1e] The limited medical education facilities and the limited production of "scientific" doctors, in short, followed Western models which seem, both at the time and in retrospect, completely inappropriate, as well as inadequate, to meet the massive needs of China's people.

Health Manpower From Liberation to Cultural Revolution

At the time of Liberation a vast effort was undertaken to meet the needs. It had been a tradition in the People's Liberation Army that in each liberated village medical services would be provided insofar as possible by Army personnel, and this tradition led to a prompt emphasis on medical education by the new government. Although the data on medical care personnel and their education vary, it is possible to find some official figures for the years 1949 to 1958. Since that time data have been less easily available; those which could be found through 1968 have been gathered and cogently integrated and analyzed by Orleans.[4] He estimates that at the end of 1966 there were about 150,000 doctors of Western medicine in China, a ratio of one doctor for every 5,000 people.*

This almost incredible increase in number of doctors—over 100,000 trained in 17 years—was accomplished through major restructuring of China's medical schools. This was largely done using models provided by Soviet advisors, which led to medical schools independent of universities and divided into "faculties" of therapeutics (often further subdivided into a faculty of pediatrics), public health, pharmacy, and stomatology. The basic medical school course was five or six years, with one school—the China Medical College, successor to the Peking Union Medical College—having a course of eight years and training mainly teachers and researchers. Students were generally required to complete senior middle school, the rough equivalent of our high school. Testimony from Westerners visiting China in the late 1950's and early 1960's suggests that this was indeed the basic pattern. In addition there was evidence that some schools were providing less than "standard" training but whose graduates were still to be considered by the authorities as "regular doctors" (as contrasted with the assistant doctors described below). Theodore Fox, editor of the *Lancet,* wrote in 1957, for example, of the difficulty of dealing with an annual class of 400–600 and of shortening the curriculum: "Lasting harm is done to a profession, and the people it serves, by introducing new members who have not had a proper basic training . . . Much useful work can be done by people without a good basic training, but they should not be called doctors. In China, I would say, entry to the over-crowded medical colleges should be further curtailed, and the need for more 'pairs of hands' in medicine should be met by training more feldshers . . ." [9]

Be that as it may, there clearly was an increase in the number of medical schools and a vast increase in the class size in each. Again estimates vary, but in 1962 there were said to be about 60 medical schools teaching Western medicine and ten teaching traditional Chinese medicine. As an example of the accomplishments in one of these schools, we were told, that, in the First Medical College in Peking in the 37 years from 1912 (the year of its founding) to 1949, there had been only 1,049 graduates. In the 22 years between 1949 and 1971, there were 10,000

*To show the range of estimates, the Dean of Faculty of Medicine at the University of New South Wales, Australia, in an article in 1969 gave a ratio of one doctor per 22,000 inhabitants, unquestionably too low.[8] The point, of course, is that truly reliable figures are as yet unavailable.

graduates. Although it is probable that this number includes some pharmacists and some nurses as well as doctors, the increase in graduates is impressive.

With regard to the training of doctors of Chinese medicine during this period, it appears that both the apprenticeship and the medical school methods were used. Orleans estimates that about five or six thousand doctors of Chinese medicine were graduated annually. It is difficult to know how to combine the figures on these graduates, who may have numbered as many as 75,000 during the 17-year period in question, with our estimate of a half million traditional Chinese doctors at the start of the period. It is probably best simply to assume that the new graduates did little more than replace those lost by death and retirement, leaving the etimated total at about 500,000 in 1965.

Great efforts were made during this period to integrate the doctors of traditional Chinese medicine with the doctors of Western medicine and to make better use of the traditional doctors. This movement began in the early 1950's with a directive by Chairman Mao Tse-tung that Western medicine was to be combined as much as possible with Chinese medicine. Mao has stated, for example, that "Chinese medicine and pharmacology are a great treasure-house; efforts should be made to explore them and raise them to a higher level." [10]

There were many reasons for the emphasis on Chinese medicine. The first, of course, was that most, if not all, Chinese are convinced of the efficacy of many of the methods of Chinese medicine. It was certainly true that the rural people, especially, had great faith in their traditional doctors and would at times refuse to accept Western practice even when it was available. On more ideological grounds, Croizier attributes the emphasis on Chinese medicine to "cultural nationalism," which has led to stress on "Chinese painting," "Chinese music," and "Chinese drama." [11] A more pragmatic aspect—possibly the most important, since the Chinese are unashamedly pragmatic in their application of ideology —was the fact that the only practitioners available to most people in the rural areas were the traditional doctors and it was therefore felt to be important that they be brought into close contact with Western medicine rather than remaining isolated from it. In the period following Liberation, this combination indeed began to be accomplished—for example, the Chinese Medical Association, which prior to 1949 had been open only to doctors of Western medicine, began to open its doors to some traditional Chinese physicians—but the integration appears to have met with incomplete success.

Another major source of medical manpower, again following the Soviet model, was the development of "middle medical schools." One set of estimates is that there were 170 such schools in 1957, 200 in 1964 and

230 in 1965.[4c] These schools accepted students after junior middle school, equivalent to our junior high school, and offered them courses of about three years. They might graduate as physicians' assistants (comparable in many ways, insofar as I can tell, to the Soviet feldshers), nurses, midwives, pharmacists, and radiology or laboratory technicians. Their description bears a startling resemblence to the Soviet "middle medical schools," which train feldshers, nurses, midwives, pharmacists, and radiology or laboratory technicians, as well as "dentists", in a program of about three years following the equivalent of junior high school graduation.

Orleans estimates that at the end of 1966 there were approximately 172,000 assistant doctors, 186,000 nurses, 42,000 midwives, and 100,000 pharmacists.[4d] In addition, he estimates that among the graduates of "higher medical education", of which the physician is the most numerous example, there were at the end of 1966 some 30,000 dentists (whom the Soviets would at this level of training call stomatologists rather than dentists) and 20,000 pharmacists (or, to distinguish them from the middle medical school pharmacy graduates, "pharmacologists"). Overall, then, an informed guess on the medical manpower in the People's Republic of China at the time of the start of the Cultural Revolution in 1965 would appear to be:

Type of Personnel	*Number*	*Number per 100,000 Population*	*People per Practitioner*
Doctors of Western Medicine	150,000	21	5,000
Doctors of Chinese Medicine	500,000	70	1,500
Stomatologists	30,000	4	25,000
"Pharmacologists"	20,000	3	36,000
Assistant doctors	170,000	23	4,300
Nurses	185,000	26	3,900
Midwives	40,000	6	18,000
Pharmacists	100,000	14	7,000

Although comparison with the United States has no direct significance since the job definitions, the medical problems, and medical care organization are so different, it may be helpful in understanding these data to note that in the United States in 1970, for a population of some 210 million, there were approximately 335,000 physicians (158 per 100,000, or one for each 630 people), 93,000 dentists (46 per 100,000, or one per 2,200) and 700,000 nurses (345 per 100,000, or one per 290).

Health Manpower Post-Cultural Revolution

Formal medical education was almost entirely discontinued during the height of the Cultural Revolution. Those already in medical school were apparently given some accelerated training, were graduated, and assigned to medical services in the countryside. Other major new efforts were made to re-distribute existing health manpower, which despite previous attempts were still said to be concentrated in urban areas.

In 1965, as one of the earliest acts of the Revolution, Chairman Mao issued his "June 26th Directive": "In health and medical work, put the stress on the rural areas." Doctors in urban hospitals, for example, are now required to spend periods of time ranging from three months to one year on rotation in rural areas; some one-third of urban physicians are on such assignment at any given time. If the doctor volunteers to spend a period of time longer than a year in the country-side, he may take his family with him; for shorter periods, the doctor's family remains in the city. The role of the urban doctors in the rural area is not only to provide medical services directly and to train indigenous rural personnel (such as the "barefoot doctors") but also for the urban doctors to be "re-educated" into the needs and problems of the people in the rural areas.

An example of this type of rotation was given us by Dr. Hsu Chia-yu, the Deputy Chief of Internal Medicine at the "East is Red" Hospital in Shanghai and our interpreter while we were in China. Since 1965 Dr. Hsu has had three rotations into a rural county on the outskirts of Shanghai: one for 3 months, one for 6 months, and one for a year. During one of these tours Dr. Hsu's task was training barefoot doctors in a county hospital, and then returning with them to their commune to provide on-the-job supervision and training. As Dr. Hsu described it, he lived with a barefoot doctor and his family, sleeping at night in the same bed and using the same pillow as the barefoot doctor. He told us that this had been quite difficult for him to do because he had been raised in Shanghai and had never shared a pillow with anyone before. Dr. Hsu described how he and the barefoot doctor would talk before going to sleep, both of the patients they had seen during the day and of their hopes and goals for their society.

Although there were precedents for its development prior to 1965—and even some precedents prior to 1949—the Cultural Revolution brought rapid expansion of new forms of health manpower, very different from the "regular" doctors and the "middle" medical personnel. These new forms of health workers are not thought of primarily as health workers at all; they are counted in the Chinese statistics—and apparently think of themselves—primarily as agricultural workers (the "barefoot doctors"), production workers (the "worker doctors"), or housewives or retired people (the "Red Guard doctors"). None of these workers is said to be paid specifically for his medical work; he simply does not lose work points (in the case of the barefoot doctor) or salary (in the case of the worker doctor) for the time he spends doing his health work. In general this effort seemed to absorb about half of his time, the exact amount depending on the work load of the institution.*

The description of the barefoot doctor's duties varied from area to area but there were many common features. In general, they have responsibility for environmental sanitation, for immunization, for first aid, and for portions of personal primary medical care and post-illness follow-up.

With regard to environmental sanitation, the barefoot doctor has responsibility, for example, for the proper disposal and later use of human feces as fertilizer, for the purity of the drinking water, and for the control of and campaigns against "pests". Many of the actual sanitation tasks are usually carried out by more junior "health workers" whom the barefoot doctor trains and supervises. Immunizations are an important responsibility of the barefoot doctor, but again are often actually performed by the "health workers", who do their work during lunch hours and "leisure time".

Health education and elements of primary medical care are other important parts of the task of the barefoot doctor. The barefoot doctor is also readily available for medical emergencies since he often works in the fields with his patients and lives among them. He is said to be skilled in first aid and in the treatment of "minor and common illnesses." Perhaps most important, his fellow workers know him well and trust him.

Some idea of the range of what the barefoot doctor is supposed to know is provided by a *Barefoot Doctor Handbook*,[12] published in Hunan Province but apparently widely available in China. Excerpts from the Table of Contents of the *Handbook* are shown in Table 1. The presence of diseases in the Table do not necessarily reflect their incidence and prevalence; rickets, for example, was a most important disease in China in the past and is discussed in the *Handbook*, but we were told it has been almost entirely eliminated with the improvement of dietary conditions. Another, perhaps more direct, measure of what the barefoot doctor does is the contents of his medical bag. An overall list of what the barefoot doctor's bag might contain—provided us by the Chinese Medical Association—is shown in Table 2; the items which we actually found in a barefoot doctor's bag in a commune near Shanghai and in a worker doctor's cabinet in a factory in Peking are noted. Careful review of these items with the barefoot doctor and worker doctor showed a remarkably detailed knowledge of the nature of the medica-

*A detailed description of the barefoot doctors and their training is presented in the *New England Journal of Medicine*.[11]

tions under their control, the indications and contraindications for the medicine, and their potential for adverse reactions.

The barefoot doctor receives the usual income of an agricultural worker, perhaps 300 yuan ($120) per year. The commune worker's income depends on the total income of his commune and the number of "work points" which he collects. The barefoot doctor generates work points for himself by doing medical work just as though he was doing agricultural work during the same period.

The explanation of the method of payment given us in 1971 differed somewhat from the description given in *China's Medicine* in 1968.[13]

> "The barefoot doctor of the Dongbin brigade, which is well off, earned 300 yuan. Of this, 100 yuan came from doing farm work, the rest was paid him by the brigade for his medical services. Actually, however, 125 of this remaining amount was made up by what he himself turned over to the brigade in the way of fees for making home calls, giving injections (5 fen each) and delivering babies (3 yuan each). Thus what the brigade actually paid out was only 75 yuan."

These fee-for-service payments, and salary to the barefoot doctor specifically for medical services, are apparently being de-emphasized by the development of "collective medical services" in the communes. As it was explained to us, the commune collects a small annual premium (about 1 yuan) from each commune member; the medical collective, with a subsidy from general commune funds if needed, then covers all of the medical expenses for the member over the course of the year.

The worker doctor is analogous to the barefoot doctor, but works in the urban factories. As in the recruitment of the barefoot doctor from among the commune members, a factory worker is chosen by his fellow workers to become the worker doctor in their workshop. The bulk of his health work is spent on health education and on preventive medicine. He teaches his fellow workers about the early recognition of certain diseases and ensures that the immunizations of the workers in his shop are up-to-date. He treats "common illnesses" right in the shop, most often by the use of acupuncture. The medications which we found in one worker doctor's medicine cabinet are also shown in Table 2. Like the barefoot doctor, he seemed to have an accurate knowledge of these medications under his control.

The Red Guard doctor serves in the lane and neighborhood health stations. She is usually a housewife; all the Red Guard doctors live in the neighborhood which their lane health center serves, usually no more than 300 yards from the station.

The major tasks of the Red Guard doctors relate to preventive medicine. They are responsible for the immunizations in the lane, which they do themselves, and the maintenance of records and statistics on the children's immunizations. The Red Guard doctor also helps organize the people through the Great Patriotic Health Movements to ensure sanitation and prevent disease.

Another important function of the Red Guard doctors is the dissemination of birth control information. Birth control data are gathered by the Red Guard doctors during monthly visits to each woman in the area covered by the health station. As a result of this intensive effort, the birth rate in the cities has apparently declined markedly.

Although to my knowledge there are no data available on the numbers of current health manpower in China, during our visit in October, 1971 we were given health manpower figures for the Peking and Shanghai independent municipalities:

	Number	*Number per 100,000 Population*	People per Practitioner
Shanghai (10 million people in 10 urban districts and 10 rural counties)			
Doctors of Western medicine	9,000	90	1,000
Doctors of Chinese medicine	3,500	35	2,900
Assistant (middle-grade) doctors	4,000	40	2,500
Nurses	15,000	150	700
Technicians, pharmacists, etc.	14,000	140	700
Peking (7 million people in 9 urban districts and 9 rural counties)			
Doctors of Western medicine	10,000	100	700
Doctors of Chinese medicine	2,000	20	3,500
Assistant (middle-grade) doctors	5,000	50	1,400
Nurses	11,000	110	600
Technicians, pharmacists, etc.	8,000	80	900

These figures do not include barefoot doctors, worker doctors, or Red Guard Doctors, who are not considered "health" manpower. There are now said to be "over a million" barefoot doctors in China.

Training of Health Personnel

In the aftermath of the Cultural Revolution, all institutions of any significant size in China including educational institutions are being run by "Revolutionary Committees". These Committees generally consist of a "three-in-one" combination of one or two representatives of China's Army (the "People's Liberation Army"), one or more cadres (political workers, usually but not necessarily members of the Communist Party), and representatives of the "mass." In the case of a factory, the "mass" are its workers; in the case of a commune, its peasants; in the case of a hospital, its nurses, doctors, and other workers; and in the case of a medical school, its faculty and—in at least one of the schools we visited—its students. The Revolutionary Committee sets the policies and directs their implementation for the institution, within guidelines set out by higher policy-making groups on a national and local level.

The Cultural Revolution had an enormous impact on education. The old educational system was severely criticized. For example, the Revolutionary Committee of the Shanghai First Medical College in 1968 wrote in *China's Medicine:*

> ". . . the students, once they entered a medical college, were long exposed to the poison of 'making one's own way and achieving fame, wealth and position' by scrambling up the ladder rung by rung: assistant—lecturer—professor, or resident—chief resident—visiting doctor—department head—director. Under the influence of the bourgeois idea of 'one who has technique has all', not a few students preferred indolence and ease, had a hankering for city life and big hospitals and, regarding themselves as 'elite,' refused to go to the countryside and mountainous regions. With such notions in their heads, how would they possibly serve the workers, peasants and soldiers?" [13]

Not only were the attitudes developed felt to be inappropriate, but the curriculum was said to be "decayed and timeworn" and "copied from capitalist and revisionist countries (*i.e.*, the United States and Soviet Union)."

> ". . . The curriculum required students to study as long as six or even eight years, but after graduation they were unable to treat independently even the most frequently encountered diseases. Leaving the big hospital, with its laboratories and modern equipment, they found themselves at their wits' end. In the course of six years, three-fourths of the time was spent studying textbooks and reciting abstract theories . . . The preclinical work that the students could find no effective use for, the supposedly basic theories which had been drilled into them. Education in the medical colleges over the years was carried out after the fashion of stuffing and fattening Peking ducks. The students memorized the subjects for the examination, and once their ordeals were over, all was well and forgotten." [13]

Higher education was therefore changed following the Cultural Revolution both in relation to how students are chosen and to how and what they are taught. In the past few years students have left school after completion of junior middle school, at about age 16. They then go off for at least two years, and more likely three years, to work in a commune or factory. At the end of that period of time, if they are chosen by their fellow workers, they are admitted to universities, professional schools or technical schools. The criteria by which they are chosen by their peers include not only intellectual accomplishments, but more importantly the attitudes and principles they have expressed and live by during their period of work. As we were repeatedly told, it is a person's "politics" and his "attitude toward the people" rather than how brilliant he is which determine whether he will be a good doctor or other kind of professional.

With regard to style and content of education, not only was the curriculum generally shortened in the wake of the Cultural Revolution but the practical content was markedly increased relative to the theoretical content. Also, periods of direct work were included in all programs. Thus a student studying physics now spends some of this time in factories learning how physics can be helpful in production and a student of biology spends time on the communes learning how biology can be helpful in agriculture.

Medical Schools*

The most immediate effect on Chinese medical schools was that they admitted no new classes for three years. In 1969, the schools began to resume their teaching, but on an experimental basis. At the Dr. Sun Yat-Sen Medical School in Canton, for example, a class of 65 students was admitted on May 7, 1969 and graduated after only one year of training. We were told, however, they are not felt to be "fully" educated doctors. On May 6, 1970 a new class of 600 students was admitted to the Sun Yat-Sen School; of the 600 approximately 350 are male and 250 are female. These students will graduate after two years of training. Another class of 600 students was admitted in October, 1970 and it is anticipated they will graduate in three years. In 1972 another 600 students will be admitted.

At the First Peking Medical College, after a three-year hiatus, 600 students were enrolled in December, 1970 and the school expects to enroll 1,000 students in 1972 and every year thereafter. In Shanghai, the First and Second Shanghai Medical Schools were in October 1971 just in the process of admitting their first classes following the Cultural Revolution.

Since choice of entrants into medical schools lies primarily with their fellow-workers in the communes or factories, not surprisingly those who have indicated interest and skill in the caring roles, such as barefoot doctors and nurses, will often be the ones chosen. Once a student is chosen by his fellow workers and recommended by the administration of the factory or commune, his entrance into medical school must also be approved by the administration of the medical school. The criteria used are: (1) ideological commitment; (2) academic ability; and (3)

*This material was in part presented in *The New Physician*.[14]

physical fitness. We were told that medical schools rarely exercise a veto over those chosen by their fellow-workers.

The length of medical training has been considerably shortened. During the years from 1949 to 1965, medical education in general required five years with a sixth year of internship. Although each of China's medical schools is developing its own experimental curriculum since the Cultural Revolution, it appears that none are generally planned to be longer than about three years.

The two-year curriculum in Canton, which is now underway, started with a three-month combination course in anatomy, histology, biochemistry, and physiology. This was followed by a three-month period in which groups of about 30 students went to the countryside with three teachers. The students then returned to the campus in Canton where they took a six-month combined course which included pharmacology, parasitology, pathology, and physical and laboratory diagnosis. For their second and final year, it is planned that the students will have four months in internal medicine and pediatrics, four months in surgery and the surgical specialties (including ten days of ophthalmology) and then four months back in the countryside to practice under supervision what they have learned. They will also have courses in traditional Chinese medicine and in Mao Tse-tung thought.

The pattern for a three-year program was presented to us in Peking.* The first course included anatomy, physiology, biochemistry and histology. This course lasted about four months and was followed by another four months' course which included bacteriology, parasitology, pharmacology, pathology, laboratory diagnosis and physical diagnosis. To complete the first year, and at the end of each succeeding year, there will be two months of physical training, military training, and manual work, and one month of vacation. Also included in the first year is political education and training in aspects of traditional Chinese medicine.

During the first six months of the second year, it is planned that the students will begin their clinical training by taking courses in internal medicine, pediatrics, surgery, obstetrics and gynecology. For the last three months of the second year, the first six months of the third year, the students will go into the countryside with their teachers to learn practical clinical medicine, public health and epidemiology. They will also learn and practice traditional and herb medicine, and with their teachers will do physical labor in the communes in which they are working. During the last three months of their third and final year, the students will return to a teaching hospital in Peking where they will con-

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*This presentation was also the basis for Dimond's description of the current curriculum at the First Peking Medical School.[15]

solidate what they have learned in the countryside through lectures, discussions, ward rounds, and clinical conferences.

When we asked how they had managed to compress material, which had previously taken six years, into three years, we were told that it was done by eliminating the irrelevant and the redundant, by combining the theoretical with the practical, and by using the "three-in-one" principle of: teachers teach students; students teach teachers; and students teach students. New methods of teaching are being tried. We were told that now, in contrast to the past, students are encouraged to be much more questioning of what they are taught and to participate much more in the educational process.

There are said to be no grades and no competition. Examinations are for the purpose of letting the students know what they have not completely understood, and of letting the teachers know what they are not teaching successfully. Grades are not given because classes are small enough and the teachers are able to get to know the students well and know how they are doing.

There is apparently almost no attrition for academic reasons. When students fail to finish their medical education because of ill health, they are encouraged to return when they are well. There is no tuition, and students are paid a modest stipend that is apparently sufficient for only a most modest standard of living.

Training of the Barefoot Doctor and His Analogue

In the same way that much of the work of the barefoot doctor seems to vary from place to place in China, so too does the pattern of his education. The most frequent pattern appears to be a three-month period of formal training, either in the county hospital or in the commune hospital, that is fairly evenly divided between theoretical and practical work. As in the education of regular doctors, there are said to be no grades and no competition between the students. The three-month training is followed by a variable period of on-the-job supervised experience. As seems to be common throughout most job requirements in present-day China, there appears to be little emphasis on a specific credential or certificate which has been earned, but rather on the skills which the individual can demonstrate in a particular job situation.

The formal training of the worker doctor seems in general to be shorter than that of the barefoot doctor, usually about a month. Continuing on-the-job supervision and training is considered much more important. One worker doctor we talked with has his continuing training by spending an entire day every two weeks in the health clinic of his factory. He said that when his production schedule makes it possible he sometimes spends an entire week in the health clinic.

In the formal training period of the Red Guard doctor, which lasts only ten days, the emphasis is on allaying the fears of the housewives that they cannot do the medical work. The Red Guard doctors also receive continuing training, by working closely with the doctor who is assigned to the health station. A period each day is set aside for reviewing their medical activities and discussing the works of Chairman Mao and its applicability to their own work. In one specific case, the Red Guard doctors from the 23 lane health stations supervised by a district health center in Peking get together weekly for lectures and exchange of experience.

Summary

In the course of 22 years the People's Republic of China has managed to make almost incredible progress in the training and distribution of health care personnel. Starting with grossly inadequate numbers, they have trained large numbers of Western-type physicians, have trained "middle medical workers" along the lines of Soviet models, and have developed new types of health workers who help bridge the gap between "professional" and "para-professional" and help fill the gaps in availability of medical personnel. Especially since the Cultural Revolution, there have been great changes in distribution of medical workers, with urban personnel being rotated for periods up to a year or moving out for longer periods into the rural areas.

The nature of the training of medical personnel has also changed markedly since the Cultural Revolution. These changes include a shift in the criteria for admission from academic prowess toward ideologic commitment, a shortening and restructuring of the curriculum, an emphasis on the practical compared to the theoretical, and an increased integration of training in the techniques of traditional Chinese medicine into the education of Western-type personnel. Above all, there appears to be a firm commitment to the development of human potential and to the importance of human services, both in the selection and training of medical personnel and in their relationship to their patients and communities.

TABLE I

Excerpts from the Table of Contents of the Barefoot Doctor's Handbook

Chapter I Recognition of the Human Body
Section 1—Perceptive Organ Systems
Eye; Ear; Nose; Tongue; Throat; Pharynx
Section 2—Histology of the Skin

Section 3—Nervous System
Cranial nerves; Spinal cord and spinal nerves; Autonomic nerves; Reflexes
Section 4—Endocrine System
Thyroid gland; Adrenals; Insulin; Pituitary; Gonads
Section 5—Motor System . . .
Section 6—Circulatory System . . .
Section 7—Respiratory System . . .
Section 8—Digestive System . . .
Section 9—Urinary System . . .
Section 10—Reproductive System . . .
Section 11—Characteristic of the Different Systems in Children
Section 12—Perception of the Human Body by Traditional Methods . . .

Chapter II Common Sense of Hygiene
Section 1—The Patriotic Health Movement
Water hygiene; Management of night soil; Food hygiene
Section 2—Hygiene in Agricultural and Industrial Production . . .
Section 3—Wiping out Pests
Eradication of flies, mosquitoes, rats, etc.
Section 4—Personal Hygiene
Oral hygiene; Skin and clothing

Chapter III Some Knowledge of Diagnosis
Section 1—How to Understand Disease
History-taking; Inspection; Auscultation; Palpation; Tendon reflexes
Section 2—How to Analyze the Etiology of Disease
Constitutional factors (temperament, body build, etc.); External factors (physical, biological, seasonal, etc.)
Section 3—How to Differentiate the Syndromes of Traditional Medicine . . .

Chapter IV Some Knowledge of Treatment
Section 1—Traditional and Herb Medicinal Therapy
Section 2—Empirical Methods Used Among the Mass . . .
Section 3—New Traditional Methods
"New acupuncture;" Moxibustion; etc.
Section 4—General Techniques
Dressings; Incision and drainage; Local anesthesia; Gastric lavage, External cardiac massage, Ligation of vas deferens, etc.

Chapter V Birth Control
Section 1—Meaning of Family Planning
Section 2—Encouragement of Late Marriage
Section 3—Contraception
Traditional; Condoms; Oral contraceptives
Section 4—Permanent Sterilization . . .
Section 5— Artificial Abortion
Section 6—Modern Methods of Delivery

Chapter VI Diagnosis and Treatment of Common diseases
Section 1—Rescue and Cure of the Wounded in Warfare . . .
Section 2—Emergencies
Drowning; Electric shock; Burns, Snake bite; etc.

Section 3—Common Symptoms
Fever; Jaundice; Edema; Epistaxis; Hematuria; etc.
Section 4—Common Infectious Diseases
Influenza; Measles; Varicella; Pertussis; etc.
Section 5—Parasitic Diseases
Schistosomiasis; Filariasis; Hookworm; etc.
Section 6—Internal Medicine
Upper respiratory infection; Asthma, Cirrhosis, Migraine, etc.
Section 7—Surgical and Traumatic Disease
Fracture, Dislocations; Sprains; Carbuncles; etc.
Section 8—Obstetric and Gynecologic Disease
Dysmenorrhea; Leukorrhea; Mastitis; etc.
Section 9—Pediatric Disease
Rickets; Infantile diarrhea; Thrush; "Summer fever"; etc.
Section 10—ENT Disease (Including Eye and Stomatology)
Rhinitis; Sinusitis; Toothache, Keratitis; etc.

Chapter VII Traditional and Herb Medicines
Section 1—General Information
Section 2—Commonly Used Medicines
Individual listings of 533 traditional medicines.

TABLE II

Standard List of Items Included in a Barefoot Doctor's Bag

Medications
Adona ampoules
Adrenalin ampoules
Aminophyllin tablets and ampoules [1]
Ammonium Chloride tablets and solution [2]
Analgin tablets and ampoules
A.P.C. or P.P.C. tablets (aspirin-Phenacetin-caffeine) [1,2]
Atropine tablets
Belladonna Extract tablets [1,2]
Berberine (a traditional Chinese medicine with antibiotic properties) tablets [1]
Brown's Mixture tablets and Liquid [1]
Butazolidin (phenylbutazone) tablets
Caffeine Sodium Benzoate ampoules
Chloromycetin (chloramphenicol) ampoules and capsules
Chlorpheniramine tablets [2]
Chlorpromazine tablets and ampoules [1,2]
Chlothamine tablets
Coramine (nikethamide) ampoules
D.C.T. tablets
Dolantine ampoules
D.P.P. tablets
Ephedrine Sulfate tablets
Furadantin (nitrofurantoin) tablets [2]
Furazolidone tablets [1,2]
Gastropin (a medication for peptic ulcer) tablets [2]
Lobodura tablets
Luminal (phenobarbital) tablets [1]

Paperazine tablets
Penicillin, crystalline
Penicillin, procaine
Phenergan (promethazine) tablets
Phenolax (a laxative) tablets [1,2]
Probanthine (propantheline bromide) tablets
Reserpine tablets
S.M.2 tablets
Soda Bicarbonate tablets
S.T. tablets
Sulfadiazine tablets and ampoules [1]
Sulfaguanidine tablets
Sulfamethoxypyridazine tablets [1,2]
Syntomycin capsules
Terramycin (oxytetracycline) tablets
Tetracycline tablets [1]
Valium (diazepam) tablets [1]
Violactyl (lactobacillus) tablets [1]
Vitamin B1 tablets [1]
Vitamin B2 tablets [2]
Vitamin C tablets [2]
Vitamin K tablets [2]
Vitamin U tablets [2]
Yeast tablets [1]

Topical Agents

Alcohol [1]
Boric Acid Ointment
"Eye Drops"
"Eye Ointment"
Gentian Violet [1]
Iodine Tincture
Mercurochrome [1]
"Nose Drops"
"Sulfa Ointment"

Traditional and Herb Medicines

Pills and tablets. Type depends on the individual commune or other site. Examples include antipyretics,[1,2] antitussives,[1,2] antispasmodics,[2] and medication for dysmenorrhea.[2]

Equipment

Acupuncture Needles [1]
Adhesive Tape
Bandages and Gauze
Bowl (for changing dressings)
Cotton Sponges
Cotton Swabs [1]
Cups (for drinking)
Forceps
Fountain Pen
Hypodermic Needles [1]
Manometer (sphygmomanometer)

Notebook for Records
Paper Bag
Rubber Tubing
Scissors
Syringes, 2 cc. and 5 cc.[1]
Thermometer, oral and rectal[1]

[1] Items found in the bag of a barefoot doctor in a commune outside Peking.

[2] Items found in the cabinet of a worker doctor in a Peking factory.

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THE ACADEMY OF MEDICAL SCIENCES

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A Doctrine for Research

From their ideology and historical experience, Chinese political leaders have deduced a research doctrine which guides research policy. Although this doctrine has been remarkably consistent over the years, it has been sufficiently ambiguous to allow for varied interpretations in policy and implementation. At the core of China's research doctrine are four elements. First, Chinese research must "serve production" and be oriented towards the solution of practical problems generally. Second, there has been an emphasis on indigenous capabilities; China's own social, intellectual and economic experiences—historical and contemporary—can provide the material for creating a unique (and ultimately, a superior) research tradition. Third, the creation of this tradition will involve the masses of workers and peasants and will not be the sole province of a professional elite. This element is justified on both epistemological and political grounds. Epistemologically, Marxism-Leninism as interpreted by Mao finds the origins of "correct ideas" in "social practice," familiarity with which is purportedly most intense among workers and peasants. Politically, the emergence of a modern technoscientific educated elite is no more acceptable to Mao than would be the persistence of a traditional Confucian educated elite. Chinese research policy therefore has been marked by periods of intense anti-professionalism. Fourth and finally, science and technology are to be integral and honored parts of the new China. The struggle for "scientific experiment", along with the struggle for production and the class struggle, are celebrated as the three great tasks of the revolutionary society. At the risk of oversimplifying, China's research doctrine might be summed up as "science for everyone, everyone a scientist."

A recent study of medical sociologists, relating research environments with scientific innovation, reported that innovation is more likely to occur in marginally academic settings than in purely academic settings. In the former environment, the consequences of research were considered to be more visible than in the latter, and the requirements for "relevance" often contributed to making research in the marginally academic settings more difficult.[1] In part the difficulty was related to the fact that the problems of the "real world" defied accepted academic disciplinary organization and procedures. If one juxtaposes these findings with Chinese experiences with research and development over the last twenty years, one finds that the Chinese, through organizational trial and error and much ideological exhortation, interestingly are coming to the same conclusions. Given Chinese research goals, which are highly pragmatic, the Chinese seem to be concluding that the cutting edge of innovation leading to the realization of those goals is where intellectual effort and social practice meet. Attempts to understand the contemporary role and functions of particular research institutions such as the Chinese Academy of Medical Sciences (CAMS) are best made with reference to the ideological nuances and changing organizational arrangements that have been so characteristic of research efforts in the People's Republic of China.

Problems in Implementing Doctrinal Goals

At the time of the founding of the People's Republic of China, the political leadership had three kinds of resources for the task of promoting science and technology in the new China. First, it had the legacy of Republican China with its established, but war-torn and generally underdeveloped collection of research institutions, and its limited number of scientists and engineers. Second, the leadership had its own experience in governing vast regions of China. In terms of population and area these regions were larger than many countries of the world. Although this included little or no experience in managing institutionalized research, it was an experience rich in improvisation and innovation necessary to meet the exigencies of wartime and guerrilla existence and was a highly formative period for Chinese Communist leadership techniques and administrative style. Finally, the Chinese leaders had the advice and assistance of the Soviet Union at their disposal, and not surprisingly, from the Chinese perspective of 1950, the latter was the source of greatest inspiration. While Soviet experience was an inspiration, the raw materials for a new research program had to come from the existing institutions and manpower. Thus initially, in the period 1949–1957, these latter resources were reorganized along the lines of the Soviet research system, and the scientists underwent ideological remolding to reorient them towards the nature of research in a socialist state.

The two crucial aspects of the Soviet research system of the 1950's that impressed the Chinese were the centrality of a national academy of sciences and a national system of research planning. While Chinese scientists were asked to reorient themselves to Soviet science through learning Russian and engaging in scientific dialogue, administratively the Academia Sinica was being reorganized into a new Chinese Academy of Sciences (CAS) complete with a Soviet-style secretariat (established in 1954) and a system of departments (*hsueh-pu, otdelenie*) (established in 1956). This system included a department of mathematics, physics, and chemistry, a department of biological sciences, one of earth sciences, one of technical sciences, and finally a department of social sciences. The departments were led by department committees (and their standing committees) composed of "board members" chosen from China's more distinguished scientists. Subordinate to the departments were institutes and laboratories in specialized fields. At the level of the institute and laboratory, the business of the Academy was run by a director, one or more deputy directors (often the chief Party cadres) and by two committees. The academic committee was responsible for the direction, planning and supervision of the actual research work, while a committee on institute affairs had responsibility for personnel, finances and other administrative tasks. Penetrating the levels of the institute and laboratory as well, of course, was the ubiquitous Party organization.

The role of board member, which has been compared to that of the Soviet academician, but which was of more than honorific importance, was crucial to the workings of the Academy. Some board members were recruited from research institutions other than the Academy itself and held their positions at CAS concurrently with positions at universities and colleges and other research establishments not directly under CAS. The department committees were to be forums at which scientists from different research sectors (academy, higher education, government ministry) but roughly the same fields would exchange views, plan for, and help coordinate the nation's research. The first major task for the departments was the formulation of a long term, 12 year plan for scientific research, drawn up during 1956–57 with Soviet assistance. A national research plan of this sort is essentially a political document since it allocates the right and the necessary resources to do certain kinds of research to some organizations and it denies those rights and resources to others. Disagreement arose over how much basic research should be done outside the CAS (and over how much basic research should be done), and how much applied research should be done within CAS.

The departments, along with a powerful secretariat, were to make the Academy the preeminent academic institution in the nation, not only in terms of substantive research, but as a leader in science policy as well. Inherent in the emerging new role of CAS was an enhancement of its own prestige and power at the expense of the higher education sector particularly, but of the government ministry sector as well.

By 1956–57 it was apparent to scientists and administrators that this essentially Soviet model was not suited to China's conditions and pressing needs. Instead of fostering inter-sectoral cooperation, the system seemed to frustrate it. Instead of promoting interdisciplinary outputs of information useful for "production," the system seemed to encourage narrowly conceived, overspecialized research constrained by the boundaries of traditional academic disciplines and reinforced by the Academy's organization into specialized research institutes. In order to compensate for the weak leadership by the CAS mechanism, the Chinese created a high level Scientific Planning Commission (SPC) in 1956 which later evolved into the powerful State Scientific and Technological Commission (SSTC) in 1958. Although the details of the 12 year plan have never been made public, it is known that the plan was divided into 12 broad areas of research. The problem undertaken by the SPC, for which it was given the necessary authority, was to work out the details for administering the plan, with particular emphasis on intersectoral coordination and the avoidance of duplication of effort. Its strategy was to redefine the plan into 26 task areas, and to begin to enforce coordination among performers. Over time these coordinated performing units evolved into what might be called "micro research systems," and typically would include one or more institutes of CAS, university departments, research units under an industrial ministry, and units from one of the specialized academies.

Although the opportunity for using the CAS departments as mechanisms for annual planning was not abandoned, additional mechanisms—particularly national conferences on especially important research problems, and by the early 1960's, professional societies—were used for this purpose. Thus by the end of the 1950's China's national research system had undergone two significant readjustments. First, the pre-49 system had been remolded along Soviet lines, and second, significant departures from the Soviet model were accomplished shortly after the initial reorganization was completed.

Medical Research—Organization and Policy

Medical research was not immune from these stresses and strains. The leaders of the People's Republic of China (PRC) inherited from the Nationalists a not insignificant medical establishment. Perhaps the two most significant institutions from the pre-49 period were the Peking Union Medical College complex and the national Central Institute of Medical Research with its 15 departments organized under the old Ministry of Health. The former institution produced many of contemporary China's leading men of medicine and continues to be an important medical center today, under a new name.

Medical science no less than the other sciences was subject to the implications stemming from the interactions of ideology, doctrine and organization. Medical research, too, was to be oriented towards practice and China's more pressing problems. Medical research was included as one of the "12 points" of the 12 year science plan and was to concentrate on "prevention and eradication of a number of diseases most detrimental to the people's health." This concern for "common and recurring" diseases has been official policy for 20 years but has received added emphasis in the post-Cultural Revolution period. The doctrinal stress on indigenous capabilities which applied to all sciences was considerably more meaningful in medicine than in other areas. From the very early days of the PRC, stress was placed on indigenous Chinese medicine, and personnel trained in Western medicine were urged to study Chinese medicine. Additional emphasis has been placed on Chinese medicine since late 1958 when Mao Tse-tung made his now famous statement that "Chinese medicine and pharmacology are a great treasure house. Efforts should be made to explore them and raise them to a higher level."

The attention to Chinese medicine is not unrelated to the third doctrinal point urging integration with the masses. In part, traditional Chinese medicine has been interpreted as an expression of the wisdom of the masses and hence a *bona fide* source of new knowledge. Anti-elitism has been expressed in programmatic forms as well, presented most graphically perhaps in a series of photos reproduced in the December 1965 issue of the *Chinese Medical Journal* showing the president of the CAMS and other leading medical scientists practicing in the countryside as members of mobile medical teams and learning about the health problems of the common man.[2] This "downward" transfer of medical intellectuals has received considerable emphasis during and after the Cultural Revolution, in part to compensate for the urban-rural split that allegedly had developed as a result of the mistaken, urban oriented policies of the Ministry of Health during the early 1960's.

Research on Traditional Chinese Medicine

Because of the centrality of a national academy of sciences in the Soviet model, Chinese organizational efforts in the early 1950's were directed towards the CAS, with relatively little attention to medical research. The first new organizational departure in medical research, in keeping with the emphasis on indigenous capabilities, was the establishment of the Academy of Traditional Chinese Medicine in Peking in December, 1955. In noting the opening of the Academy, a *People's Daily* editorial stressed the importance of making the Academy's work directly relevant to the treatment of widespread diseases. Its initial research program reflected this policy, emphasizing work on diseases of the liver and gall bladder, asthma, rheumatism, intestinal diseases, dropsy, high blood pressure, cancer, and tuberculosis of the bone and lymph glands. The new Academy had research institutes in four fields: medicine, surgery, acupuncture and pharmaceutics.[3] The original staffing consisted of thirty doctors trained in Chinese medicine who had available to them modern laboratory facilities. The feature of the new Academy which made it most unique was the inclusion of 120 doctors trained in Western medicine who were to undergo simultaneously training in Chinese medicine and participate in research on (the scientific basis of) traditional medicine. During the course of the next decade, the Academy had expanded its research to include the herbal treatment of leprosy, heart disease, disease of the nervous system, blood, eyes, bone fractures and gynecology. A fifth institute for rural diseases was added as were two hospitals. The research staff had expanded to 300 and some 200 doctors of Western medicine had received training at the Academy, as had 100 doctors from other countries.[4]

As with most other areas of research in China, the organization of research on Chinese medicine is decentralized. Under the general direction of the Academy of Traditional Medicine, provincial research institutes were established. One significant example of such an institute is the Szechwan Institute of Traditional Medicinal Materials, located in the area of west China which produces one third of China's herbal medicine. Again, similar to other research organizations, the Academy is tied in to a micro-system which is directed by a special unit for research on Chinese medicine in the State Scientific and Technological Commission which works closely with the Ministry of Health and includes hospitals and clinics, training and educational institutions, regional research institutes, appropriate professional societies under the Chinese Medical Association and institutes of the Chinese Academy of Medical Sciences.

Modern Medical Science

In moving from research on Chinese medicine to Western medical science one is again struck by the early influence of the Soviet model and the subsequent departure from that model. Soviet influence in medicine began in the early 1950's as it did in the sciences generally. Chinese medical researchers were well represented in an important CAS delegation that went to Moscow in 1953 to lay the groundwork for Sino-Soviet scientific and technological cooperation. Ties with the Soviet Union in the field of medical science continued throughout the 1950's and may have reached their fullest expression in the only known agreement between the Soviet Academy of Medical Sciences and CAMS, signed in 1960.[5] Ironically, this came at a time when government to government relations were beginning to deteriorate.

The establishment of the Chinese Academy of Medical Sciences under the Ministry of Health in 1956 appears to be an emulation of the Soviet model. As in the Soviet Union, CAMS was administratively an organ of a central ministry, but had extensive functional ties with the national academy of sciences and with other sectors of the nation's research system.[6] These ties in China were institutionalized initially through the pervasive system of "concurrent positions," alluded to above. As noted by Cheng Chu-yuan in his biographical survey of 1200 Chinese scientists, most scientists wore at least three hats: they were professors in an institution of higher education, research fellows in one of the academies, and members of an academic Committee for a research institute.[7] CAMS was represented at CAS by placing eight of its people as board members of the Department of Biology, (as of 1964). Some 14 other Department of Biology board members had their main areas of interest or responsibility in the medical and public health field. Since there were 65 board members in biology, this meant that approximately one third were from medicine.

Knowledge of budget procedures for Chinese research and development is very limited. Western analysts assume that most civilian R & D is financed out of a central science budget, which supports the work of the academies as well as the research performed by educational institutions and government ministries.[8] It was estimated that prior to the Cultural Revolution, CAS spent about 30 per cent of the science budget, while only 5—10 per cent went to CAMS and the Academy of Agricultural Sciences combined.[9] Since the work of CAMS is supervised by both the Ministry of Health and Science and Technology Commission, it is possible that funds from the science budget flow to CAMS through both of those organizations. In addition, however, CAMS has undertaken some non-research health work, such as the participation of the Institute of Dermatology and Venereology in anti-venereal disease campaigns, and may receive funds for such work from the program budget of the Ministry of Health. The emphasis on the decentralization of research in recent years further complicates budgeting procedures since one of the reasons prompting the Chinese to decentralize government activities has been to relieve the central government of financial burdens. It is possible, therefore, that since the Cultural Revolution, a larger share of the costs of medical research is being financed by local government.

Precise figures for the number of people employed at CAMS and its affiliated institutions are, like budget data, difficult to come by. The last reasonably reliable figures are from 1958, at which time it was estimated that some 4,327 people were employed at CAMS. Of these, 629 were considered "scientific workers," (the rest were auxiliary staff) only 102 of whom were considered "senior scientists".[10] A safe assumption is that the number of scientific workers increased four times by the beginning of the Cultural Revolution in 1966.[11]

The organization of CAMS is somewhat less complicated than CAS. At the top of the organization chart is a president and four vice presidents. Huang Chia-ssu, now 65 years old, has occupied the President's position since 1959. Huang, a chest surgeon, received his M.D. from Peking Union Medical College in 1933, and received an M.S. from the University of Michigan in 1943. He is a member of the Communist Party and prior to the cultural revolution held four other posts which related to his work at CAMS. First, he was President of the China Medical College. He represented CAMS and the medical community as a board member and member of the standing committee of the Department of Biology of CAS. He was also a vice-chairman of the China Association for Science and Technology (CAST), an organization that oversees Chinese professional societies and also has responsibility for popularizing science and technology. Finally, Huang was a vice-chairman of the Chinese Medical Association (CMA), the "peak organization" for more specialized medical societies, which is subordinate to CAST.

Prior to the cultural revolution, the vice-presidents included Hsueh Kung-ch'o, Shen Chi-chen and Lin Chiao-chih. Hsueh is a physiologist but his educational background is uncertain. In the course of his career since 1949 he has also been a vice-president and secretary of the CCP committee of the Chinese Medical University, secretary-general of the Chinese Medical Association and vice-chairman of the China Physiology Society. Shen's educational background is also unknown, but he did hold a position as board member, and member of the standing committee of the Department of Biology, CAS. Since there are a large number of women researchers employed at CAMS, it is fitting that a distinguished woman medical scientist be included as a vice-president. Lin Ch'iao-chih, like many other senior medical personnel, is a product of Peking Union Medical College. She is a board member of the Department of Biology, CAS, and is director of the Department of Obstetrics and Gynecology of CAMS. She also holds posts in CAST, the Chinese

Medical Association, and heads the department of obstetrics and gynecology of a Peking medical school. In addition, Lin held a very significant position as head of the CMA's Committee on Directing Birth Control Technology which works with the Ministry of Health and local government and party organs, in directing and implementing China's population control policies.

Also mentioned as vice presidents of CAMS have been Pai Hsi-ch'ing, Chang Chih-ch'iang and Huang Hu. Very little is known of Pai, although he was listed as a vice-president as late as 1965.[12] Chang is exclusively a Party man with no known professional background in medicine. In 1958 he was the first secretary of the CCP Committee of CAMS and by 1960 he was listed as a vice-president. In 1966, he may have relinquished his post at CAMS in becoming the Director of the Political Department of the Ministry of Public Health. Little is known of the career of Huang Hu.

Like the Academy of Sciences, a system of departments forms the second layer of organization of CAMS. These include the following: bacteriology and immunology, biochemistry, chemistry, hygiene, internal medicine, microbiology, nutrition, obstetrics and gynecology, pathology, experimental morphology, pharmaceutical chemistry, therapeutics, pharmacological botany, pharmacology and experimental therapeutics, physiology, sanitation, surgery, and virology. Little is known of the operation of these departments but presumably they were intended to help provide "academic leadership" and to aid in planning. One would expect to find therefore large numbers of the department members holding concurrent positions at medical schools and hospitals.

The system of concurrent positions can better be understood by hypothesizing membership patterns for a single department, let us say surgery. One hypothetical member, Dr. Lin, will be employed chiefly at the CAMS itself at the Institute of Tuberculosis Research in Peking. Another member, Dr. Huang, will find his chief place of employment at a major hospital in Shanghai where he will be a leading member of that hospital's surgical department. A third hypothetical member, Dr. Chang, will spend most of his time as a professor of surgery at a leading medical school. All three would be surgeons engaged in research, but with different principal places of employment, and in the cases of the last two members, those places of employment would not necessarily be under the administrative responsibility of CAMS. In terms of planning, insuring that ideas filter up to policy makers, coordination, and implementation of research policy, the three members have much in common and the use of the department mechanism of concurrent positions was designed to facilitate the performance of those functions. In actuality, our three hypothetical individuals would probably have professional responsibilities in more than one institutional setting. Dr. Lin, for example, might teach at a local medical school and also may be attached to a surgical staff of a CAMS affiliated hospital. Similar multiple responsibilities may be imagined for Drs. Huang and Chang. If one excludes the responsibilities within the academy sector, the professional roles of research-oriented surgeons in China would seem quite similar to those in the United States.

Below the departments are the actual research performing units themselves, the 17+ institutes of CAMS, and its five affiliated hospitals. Most of the institutes were created after the establishment of CAMS, although a few antedate it. For the most part they are led by directors who have had advanced training outside of China. The striking feature about the institutes is the close association they maintain with hospitals, medical schools and relevant institutes of CAS. In this connection it is important to remember that there is a great deal of medical research in China done in institutions not related to CAMS through direct administrative ties. The Ministry of Health operates some institutes such as the Institute of Vaccine and Serum Research independently of CAMS. Others are run by local governments, such as the Kiangsu Provincial Anti-Schistosomiasis Research Institute, and some 100+ hospitals around the country are engaged in research.

In addition, institutes under CAS's Department of Biology are engaged in medical research. Physiologist Chang Hsiang-t'ung (Ph.D., Yale, 1946) for instance has been working on the theoretical aspects of acupuncture at the Institute of Physiology (Shanghai) since 1965.[13] The Institute of Pharmaceutical Research (Shanghai) has been active in producing new drugs. The Institute of Materia Medica and other institutes have also been active in medically related research. There are also provincial academies of medical science. Since 1958–59 there have been continuing attempts to decentralize research in China. The establishment of provincial academies are one institutional manifestation of decentralization efforts. These provincial academies maintain close ties with the central Academy, but are administratively subordinate to provincial governments.

The key concept in Chinese research administration seems to be systematic cooperation, built around micro research systems. Regardless of institutional affiliation, research units with common interests and missions are expected to work together closely. In reporting the production of a new antibiotic "Qingdamycin," for instance, the New China News Agency noted that the innovation was the result of joint efforts by 36 units, of which three were identified: the Microbiology Laboratory of the East China Institute of Sub-Tropical Plants, under CAS, the Shanghai #4 Pharmaceutical Plant, and the Szechuan Medical College. What this and many other cases like it suggest is that Chinese research has evolved to the point where much of it is carried on by temporary forms of organization which bring together talents and resources residing in permanent institutions for the sake of solving particular problems. As such the system bears a rough resemblance to the idea of project management in the United States, and is characterized by organizational impermanence, task orientation, regular exposure to practical problems and the blurring of distinctions between pure and applied research. The research units with which CAMS has maintained linkages are noted in the detailed descriptions of the institutes found in the appendix.

In 1958, CAMS undertook a significant new responsibility with the opening of the China Medical College. Like its counterpart institution in the natural sciences, the University of Science and Technology which opened the same year under the CAS, the Medical College was to be training ground for China's future medical elite. It was to be directly supervised by CAMS, and employ CAMS personnel on its faculty in turning out highly educated medical scientists. The stress on professional quality and the length of training (eight years) brought the idea of the Medical College under severe criticism during the Cultural Revolution. It was held up as one more example of the serious mistakes which characterized the policies of the Ministry of Health.

Research in the Post Cultural Revolution Period

The complete story of the impact of the Cultural Revolution upon China's science and technology remains to be told, but enough is known to piece together a rough picture of what occurred and what resulted. In the original "16 point program," which served as the blueprint for the Cultural Revolution, there was explicit reference to scientific research and the importance of sparing scientists from unnecessary disruption. As the Cultural Revolution proceeded, however, the research establishment became involved and there is no doubt that research work was disrupted. Significantly, however, the individuals in the research establishment most subject to political attack were the non-scientist administrators of research, particularly personnel at the SSTC, the Secretariat and Party organization in CAS, and some scientists who were politically visible by virtue of their holding significant administrative posts. There is no evidence of a widespread purge of scientists, although the organizational environment for research, which had stabilized in the early 1960's after the reorganizations of the 1950's, was again disturbed. A further move towards decentralization seems to have occurred with some technology-oriented institutes of CAS removed and placed under local government authority. The past system of governance at the academies has been replaced by the institution of the revolutionary committee. At the level of individual institutes, the old two committee system (committee for institute affairs, academic committee) has now been abolished and has been replaced by one "three in one" combination committee, composed of workers, leadership cadres and research personnel. In spite of these fundamental organizational changes, reports from Western visitors indicate that research continues.[14]

In the area of medical research, the picture is complicated by the fact that medical and health policies and the Ministry of Health itself came under very heavy attack during the Cultural Revolution. The Ministry of Health was accused of neglecting medical care in rural areas and the treatment of "common disease" in favor of high proficiency in training and specialization, and of giving attention to problems of interest only to professional scientists. One manifestation of this "mistaken" policy was the eight-year medical education program at the China Medical College. This program was taken as the epitome of the overemphasis on professionalism, specialization and detachment from the real medical problems of a rapidly changing China. Once the attack on the program was begun, it gave rise to the following ditty composed by revolutionary students:

> "These eight years in the old China Medical College—
> The havoc they wrought!
> In three years, no medicine did we glean;
> In five years, no patients were seen;
> A full eight years, and no contact with workers and peasants brought." [15]

Medical research similarly came under attack for being under the influence of "bourgeois authorities" and experts who allegedly "pursued personal fame and gain . . . [who] used to shut themselves up in their laboratories to study rare diseases which involved complicated treatment."[16] To combat this syndrome, additional emphasis was placed on sending medical researchers to the countryside, as mobile medical teams, and there were reports that some medical workers, including some from CAMS were to be resettled more permanently in the countryside.[17] These post-Cultural Revolution measures, when expressed numerically, represent perhaps the greatest redeployment of professional manpower the world has ever seen. According to one report, some 330,000 medical workers (doctors, nurses and support personnel) from urban areas have "settled permanently" in the coutnryside. Another 400,000 doctors and nurses have been recruited into mobile medical teams.[18] Recent Western visitors report that they were informed that "one third of the faculty of China's medical schools and hospital staff must be in the countryside at all times . . ." [19]

The emphasis in medical research, then, in the post-Cultural Revolution period is increasingly on a fuller implementation of Mao's principles of attention to rural health needs, and combining Western and Chinese medicine in practice and in research. Much of the latter work appears to be going on at the province level at provincial institutions, and indeed the transfer of professional medical personnel from the academic centers (particularly Peking and Shanghai) may have the secondary effect of strengthening these provincial units.

In spite of all this, CAMS appears to have survived the Cultural Revolution and research continues. President Huang Chia-ssu has also survived and continues to have an active leadership role at CAMS, probably as a leading member of the Academy's Revolutionary Committee. Vice-president Lin Chiao-chih also continues to be active both in her position at CAMS and as head of the Department of Gynecology and Obstetrics of Peking Fanti (Anti-imperialist) Hospital (recently renamed).[20] Recently Ch'en Wen-chieh, director of the Blood Transfusion and Hematology Research Institute of CAMS was one of two Chinese delegates to the McGill University Sesqui-Centennial Conference, again suggesting a certain continuity of medical research personnel in pre- and post-Cultural Revolution China.[21] In a recent report on his trip to China, Dr. E. Grey Dimond noted active research at the Institutes of Industrial Hygiene, Cancer Research, Experimental Medicine, Epidemiology, Virology, Antibiotics, Hematology, Parasitology, Medical Biology and Dermatology.[22]

Increasingly, reports of medical breakthroughs come less from Academy institutes than from medical schools and their associated hospitals. The most celebrated of all new developments in Chinese medicine, acupuncture anaesthesia, poses an interesting case of the relationship between academic research and practical innovation which characterizes the post-Cultural Revolution research system. As suggested above, serious medical research on acupuncture, using modern methods, was begun in the mid-1950's, and presumably continued. It is not clear whether at any time this research was oriented specifically towards using acupuncture for anaesthetic purposes. Rather the official version of the origins of acupuncture anaesthetic stresses that it was begun by ideologically inspired health workers during the Great Leap Forward who first used it to stop pain from toothache, tooth and tonsil extractions, and sore throats. Achieving success with these measures, they then tried using the new techniques on other minor operations without using chemical anaesthetics. They were again successful. The development of acupuncture anaesthetic did not progress beyond this point, however, because the Ministry of Health, under the influence of Liu Shao-ch'i, discouraged serious attention to it. It was only after the changes wrought by the Cultural Revolution that a "mass movement" was begun for the clinical use of acupuncture anaesthesia and for scientific studies of it.

This case is instructive, and is typical of many official reports of innovations in China. These tell us that many innovations originate outside formal research settings, "in practice," and sometimes run counter to accepted professional wisdom. They tell us too that formal research organizations in China have as a key part of their activities the "summing up," interpretation and explanation of these new innovations. Finally, they tell that when the innovation is truly anomalous, as in the case of acupuncture anaesthesia, the academic research units are expected to take up these anomolies as new topics for basic research.[23] If the cutting edge of new innovation comes outside of purely academic settings, as predicted by ideology, the importance of institutions such as CAMS as originally structured, will be diminished in the eyes of national policy makers.

Although medical research will continue to reflect the research policy's emphasis on practical matters, it should be remembered that that same policy has consistently made allowances for basic research, and has stressed the importance of reaching and surpassing "world levels." Research administrators around the world who are plagued with reconciling the organizational requirements of applied research and development with those of basic research should find China's evolving policies in this area worthy of their attention. The trend, at this writing, appears to be towards encouraging both at the interfaces of academic institutes, hospitals, clinics, mobile medical teams, and medical schools.

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    My estimate is based on viewing the 1958 figure as a fraction of total scientific research manpower from the same year and extrapolating a figure for 1966 on the basis of total manpower increases, keeping the fraction of medical researchers constant.
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APPENDIX

Institutes and Hospitals under the Chinese Academy of Medical Sciences

I.

Information concerning the following institutes was compiled from Cheng, C.Y.: Scientific and Engineering Manpower in Communist China, 1949–1963; National Science Foundation, Washington, D.C., 1965; Surveys and Research Corporation: Directory of Selected Scientific Institutions in Mainland China; Hoover Institution Press, 1970; and from scattered primary sources. Cheng (p. 27) notes that in 1963, CAMS had 20 institutes under its supervision. The Directory of Selected Scientific Institutions in Mainland China provides information on only 14 institutes. CAMS President Huang Chia-ssu, in a 1966 interview reported by the New China News Agency, claimed that the Academy had 17 institutes.

A. Institute of Acupuncture and Moxibustion: Peking
B. Institute of Antibiotics: Peking
C. Institute of Biologicals: Peking
D. Institute of Blood Transfusion and Hematology: Peking
E. Institute of Cardiovascular Diseases: Peking
F. Institute of Dermatology and Venereology: Peking
G. Institute of Epidemiology and Microbiology: Peking
H. Institute of Experimental Medicine: Peking
I. Institute of Hypertension: Shanghai
J. Institute of Internal Medicine: Peking
K. Institute of Labor Hygiene, Labor Protection and Occupational Disease Research: Peking
L. Institute of Medical Biology: Peking
M. Institute of Medical Radiology: Canton
N. Institute of Neurosurgery: Peking
O. Institute of Occupational Health, Environmental Health and Nutrition: Peking
P. Institute of Oncology: Peking
Q. Institute of Ophthalmology: Peking
R. Institute of Parasitology: Nanking
S. Institute of Pediatrics: Peking
T. Institute of Pharmacology: Peking
U. Institute of Surgery: Peking
V. Institute of Traditional Chinese Medicine: Peking

W. Institute of Tuberculosis Research: Peking
X. Institute of Virology: Peking

II.

Associated Hospitals

Fanti Hospital, Peking
Fu Wai Hospital, Peking (head and chest surgery)
Peking Union Hospital
Peking Tumor Hospital
Hsüan Wu Hospital, Peking (neurosurgery)

III. HEALTH PROBLEMS

POPULATION DYNAMICS

Leo A. Orleans

It is much more satisfactory to be born and to die with the assistance or in the presence of a representative of the medical profession. It is at this most basic level that population relates to medicine and public health. The improved health conditions that follow an increase in medical manpower and facilities together with other factors in the development process inevitably result in the survival of more babies (reduction of infant mortality) and a longer life (increase in life expectancy). Unfortunately, a developing country that achieves the desired drop in mortality—usually a matter of top priority—must also be prepared to cope with a not so desirable increase in the rate of population growth and the inevitable economic problems that ensue from the created imbalance between production and consumption. Medical sciences share in responsibility for this dilemna by reducing the death rate; and medical sciences are also asked to solve it by reducing the birth rate.

The People's Republic of China is an ideal country in which to view the interrelationship between the medical-public health revolution and population, for despite the lack of hard data for systematic analysis, the process described above was easily discernible and much of it was played out in a short period of just twenty years. It is therefore most appropriate for any person interested in China's achievements and problems in public health and medicine also to have some understanding of the nation's population dynamics.

THE POPULATION RECORD

An excursion into China's historical population record is a fascinating experience. Unfortunately, however, although the available figures go back thousands of years, they tell us much more about Chinese society and culture than about the population record itself. The various series have gaps that range from a few years to a few centuries and can not be used without some rather subjective analysis and adjustments; the resulting estimates remain very tentative indeed.

In the first half of the 20th century several efforts were made to enumerate the population of China by the tottering Manchu Government, by the new Republican Government and by a member of the institutions and ministries of the Kuomintang. The results continued to be only approximations and the figure of 450 million that was cited by the League of Nations in the 1930's survived for the purpose of general usage for almost two decades.

The 1953 Census

The inaccuracies of the old population figures were recognized by the Chinese Communists, as was the need for something better, not only to provide population data for national planning purposes but also to register voters for the upcoming elections. The problems involved in such a massive effort to cover hundreds of millions of people scattered over tens of thousands of square miles was also appreciated. Obviously the solution was a population count and preparatory work started at the end of 1952. Because of the difficulties involved in any attempt to count hundreds of millions of people scattered over 3.7 million square miles of land area, Peking was forced to make two basic decisions. First, it was not going to be a census with canvassers visiting every household, but rather a registration in which the head of the household would come to the registration office and report all those living under his roof. Second, the count was going to be as simple as possible, and would contain only four items of information: name, date of birth, sex, and nationality. Even this, however, turned out to be an extremely difficult procedure that took more than a full year to complete. The product of this effort is known as the 1953 Census of the People's Republic of China and the final tabulations were reported by the State Statistical Bureau on November 1, 1954.

According to this report, at midnight on June 30, 1953 the total population on the Chinese mainland was 582,603,417 (sic!), plus 11,743,320 overseas Chinese and 7,591,298 persons on Taiwan, for a very precise grand total of 601,938,035. Of this total 51.82 percent were men and 48.18 percent were women. Also included in the initial report were information on the provincial distribution of the total population, some scanty age data, urban-rural distribution of the total population, including the inhabitants in cities of over 500,000, and the distribution of the country's national minorities.

The crucial question, of course, is how valid are the reported results? Was China, in fact, able to take its "first modern census" as claimed by the regime?

Considering the fact that it takes almost the full ten years to plan and execute a decennial census in a western country and that even then results are subject to considerable error, it is easy to find reasons for casting doubt on the validity of the 1953 effort. The Chinese instinctive reluctance to being registered (or counted), the extension of the census-taking period to almost a year, the manual tabulation of millions of registration forms by poorly motivated and poorly trained "counters" and many other factors would cause our Western statisticians certain apoplexy. There are adequate factors, however, which to some extent balance the criticisms and make acceptance of the 1953 census not simply a matter of wishful thinking.

The census was a sincere effort to obtain accurate population data. By 1953 the regime had secured complete control over the land, with both the Party and the government structure and power reaching down to the lowest administrative units and industrial and agricultural organizations. The lead time for the census was short, but the training effort was intensive. The simplicity of the basic schedule and the length of time it took to register the population and tabulate the results would suggest that the Chinese tried to overcome inherent difficulties and arrive at a reasonable headcount of the population on the Chinese Mainland. Finally, the Chinese themselves use the same data that were released to the world.

In sum, the 1953 effort was not a "modern census" by any stretch of the imagination, but it was probably the best head-count ever taken in China. Because there is no reasonable alternative to the total population reported by the 1953 census, it is difficult to determine the effect of expediency in tilting the balance toward acceptance rather than rejection of this figure. At any rate, it is almost universally accepted and used as a basis for all projections of the size of the population of China.

Population Registers

The 1953 census provided Peking with a population for a specific date, but the only way to maintain a population record between formal counts is through a system of population registers. The first efforts to maintain a register of the population were limited primarily to the urban areas and were the responsibility of the Ministry of Public Security. Not only was this population more concentrated and thus easier to survey, but the need to control migration into and between cities also promoted the establishment of a registration system. Sporadic efforts to register births, deaths, and population were also initiated in scattered areas. In both urban and rural areas, however, the coverage was incomplete and only occasional figures for small areas were reported, presumably on the basis of these registers.

Peking had to cope with three major difficulties before it could effect any substantial improvement in the registration system: (1) a shortage of trained personnel; (2) administrative deficiencies; and (3) traditional habits of thought which tended to militate against a conscientious regard for accuracy on the part of individuals directly or indirectly responsible for the collection and processing of statistical data. Furthermore, the generally inept rural personnel who were responsible for filling out innumerable statistical forms usually considered the collation of population data as the least important of their tasks. It is small wonder then that during the 1950's statistical journals were prone to complain that "falsification and blind estimates must be resolutely curbed."

The difficulties the Chinese government had in devising and implementing the necessary procedures for population registers is reflected in the fact that as late as 1954 some provinces held conferences to draw up plans for a population registration system and that in 1955 a newspaper editorial complained that the results of the census were already outdated and there was still no registration system to provide the regime with up-to-date population figures. In a January 1956 directive, the State Council attempted to overcome some of the problems by transferring all the responsibilities for household registration from various civil departments to the Ministry of Public Security. Vesting the responsibility in this Ministry rather than in the State Statistical Bureau or the Ministry of Internal Affairs is most indicative of the fact that the main reason for establishing the registration system was not to maintain population records but to control the population. The first article of the regulations governing registration states: "These regulations are enacted to maintain social order, to protect the rights and interests of the citizen, and to serve Socialist construction."

Despite the shaky nature of the registers, in June 1957 the State Statistical Bureau managed to issue what stands today as the only official series of national population figures ever to be published by Peking:

End of Year	Number (000's)	Percent Increase
1949	541,670	. . .
1950	551,960	1.90
1951	563,000	2.00
1952	574,820	2.10
1953	587,960	2.29
1954	601,720	2.34
1955	614,650	2.14
1956	627,800	2.14

Since the only possible source for these figures is the registration system which admittedly did not even exist during most of the years covered by the report, there is every reason to be suspicious of the data. The explanation that accompanies the figures only tends to support any doubts one might have about them. It must be pointed out, however, that, because they are unique and because they are official, the figures are generally accepted and widely used.

Well aware of the existing problems with population registers, Peking adopted a new set of regulations early in 1958 which were to tighten up and improve the system. It is impossible to say if this new effort might have turned out to be an improvement over the previous years, because the new regulations were soon overtaken by the ill-fated Great Leap which raised havoc with the economy and destroyed the infant statistical system. During the "three bitter years" that followed, natural calamities, food shortages, the withdrawal of Russian aid, and the disruptive effects of the Great Leap created conditions under which population statistics could hardly have concerned either the local statistical worker or the official in Peking. A few years later, with the gradual recovery of the Chinese economy, new attempts were made to reestablish the statistical organization. The slow and painful efforts understandably concentrated on economic data more vital to China's recovery than on population statistics, and were probably once again disrupted by the distrubances brought on by the Cultural Revolution.

The All-Purpose Figures

Considering the problems China has been experiencing in establishing a workable system of population registers and the political and economic crises that periodically disrupted the country and the statistics, the fact that since 1957 there has not been a single demographically-based figure published concerning the country's population should not surprise anyone. Peking does not have an accurate figure of China's total population; certainly the often-used totals, which, over the years have progressed from 600, to 650 to 700, and now occasionally to 750 million, are nothing more than general all-purpose figures that provide a reasonable order of magnitude for use in speeches, articles and other writings.

Although most of those who have been most intimately concerned with the size of China's population have long insisted that Peking does not know how many people live on its territory, the more casual observer of the population scene was much more prone to insist that the People's Republic with its controls and with the needs of a planned economy must know the size of its population and, for some unexplained reason, is only keeping it a secret. Recently, however, a high

Chinese official admitted the absence of national population statistics. In November 1971 Vice Premier Li Hsien-nien made the following surprising admission to a correspondent of a Cairo newspaper:

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

This unusual admission should at least temporarily end the expectation that Peking will come up with an official disclosure of China's population.

POLICIES AND VITAL RATES

From the above discussion it should be evident that the total of 582.6 million reported following the 1953 census represents a reasonable base for any estimates of China's population, but all the figures since then have been either of questionable validity or outright guesses by Peking. Despite this paucity of data, it would be wrong to conclude that nothing is known about the population of China. Over the years there has been considerable amount of data on Peking's attitudes toward population and on policies and programs that either directly or indirectly affect the country's fertility and mortality rates. It is the analysis of these policies that makes it possible to speculate on the trends of the birth and death rates and to suggest alternative projections of the population of China.

Levels in old China

In a society where there are no restrictions on reproduction, the crude birth rate can be as high as 50 per 1,000 or even higher. This has not been the case in China, where traditional customs and social forces tending to limit fertility outweighed those which encouraged unlimited families.

In the past, China has been known to worry about underpopulation. The vast territories controlled by the early emperors were, for the most part, sparsely populated. More people meant more tax money, larger armies, and, finally, greater power. Early marriages were encouraged and the Confucian admonition, "To die without an offspring is one of the three gravest unfilial acts," was almost universally accepted, particularly since a male child represented the only available form of old-age insurance. With the extremely high infant and child mortality which prevailed during most years, a couple needed three sons to ensure the survival of one to adulthood; and to have three boys, that family would have to have had, on the average, six children.

On the other hand, there were a number of cultural, social and economic factors throughout China's history which had the effect of limiting fertility. Considering China's size and the diversity of her population, not all the factors were applicable across the board; but they were widespread enough to be significant. Among them were disease and malnutrition, which may act to limit fertility; the practice, by certain segments of the population, of coitus interruptus; female infanticide, thereby reducing the number of women to reach the reproductive ages; the common practice of breast-feeding babies for as long as one to two years, which deters conception; inheritance patterns which limited marriage choices in order to retain family holdings; late marriages delayed for financial reasons such as lack of dowry and gifts or lack of money for the purchase of brides for the sons; shortage of girls due to prostitution, concubinage, and the already mentioned female infanticide; social approval of celibacy and disapproval of widows remarrying. Considering these inhibiting factors, the historical level of the Chinese birth rate for every 1,000 persons was more likely to be in the mid-forties rather than the mid-fifties.

Of particular significance was the practice of infanticide or child neglect—the postnatal mode of birth control. Although practiced to eliminate defective and unhealthy offspring, it was primarily aimed at the female child who, as a consumer, could be a serious burden to the poor family, but because she would leave home on reaching marriageable age, she would be useless in perpetuating the family line and in the observance of filial piety. The practice of infanticide continued into the twentieth century, and as late as 1943 an official publication of the Nationalist Government exhorted its readers to cease this practice proclaiming the "drowning of girl infants is to be prohibited." Since fertility depends not simply on the numbers of people but the number of women in the population, the effect of infanticide on population growth could be significant.

Chances are that China's birth rate was more or less stable for many centuries with only minor regional variations. But specifically, what was the birth rate during the decades immediately preceding the Communist takeover of the Mainland? Numerous estimates have been made; local investigations were conducted in many parts of China, particularly in the 1920's and 1930's. In some of the regional surveys birth rates were sampled directly; in other surveys data on age composition were obtained from which approximate birth rates were estimated. The differences obtained in these surveys may reflect inaccuracies just as likely in the raw data and in the assessment as in the actual rates of fertility. Obviously no one knows for sure what the crude birth rate was, but probably most authorities would agree that a rate of 40 to 45 per 1,000 population is a reasonable figure and encompasses most of the suggested estimates.

Whereas the birth rate in China can be considered as high with probably only minor fluctuations over the centuries, the death rate is more difficult to estimate since it tended to fluctuate between high and very high, depending on the extent and intensity of frequent famines, natural disasters, military conflicts, and widespread epidemics of such "filth diseases" as typhus, cholera, plague, typhoid, and dysentery. For the overwhelming majority of the Chinese population, death came without any interference from medical personnel, health facilities, or drugs. Without straying into a dubious evaluation of the efficacy of Chinese medicine, it is fair to say that the small number of legitimate doctors in practice were true scholars who contributed to the development, propagation, and perpetuation of the art over several thousands of years.* Unfortunately these few were supplemented by a much larger number of "incongruous, diversified, variable, motley group of physicians, leeches, empirics and imposters", who gave traditional Chinese medicine a bad name and, in some areas, a reputation as one of the nine lowest occupations in China.

During the first half of the twentieth century many dedicated people worked hard to improve the level of medical care in China. Through the efforts of missionaries and, to some extent, the new government in Nanking, medical schools were built, public health campaigns were initiated, local health departments were established and even the Ministry of Health was finally established in 1928. All these efforts, however, were rather futile—at best affecting only a small proportion of the urban population. Hampered by poor transportation and communication, breakdowns in central administration, lack of personnel and funds, the general health of the Chinese masses did not improve.

Since population registers and special surveys are much more likely to omit deaths than births, the collected data must always be adjusted—another very subjective exercise. According to Ta Chen, who conducted an intensive demographic survey of the Kunming Lake Region in Yunnan and supplemented his findings with data from other estimates, the 1934 national death rate in China was 34 per 1,000 and the infant mor-

*See Croizier, "Traditional Medicine as a Basis for Chinese Medical Practice," elsewhere in this handbook.

tality was 275 per 1,000 births. These figures would seem to represent reasonable medians for China, with the death rate dipping into the high 20's during the better years and rising above the birth rate, for a net population deficit, during particularly bad years.

Because of the fluctuating levels of mortality, an estimate of China's rate of natural increase for any one year would be almost meaningless, and yet one needs some perspective with which to approach the changes that have occurred during the past twenty years. Thus, as a point of reference, it is suggested that despite the wars, revolutions, and frequent floods and drought, the population of China increased on the average of one-half of one percent per year during the first half of the present century. It should be remembered, however, that because of favorable institutional and economic factors there have been many periods in China's history when her population must have increased at a much more rapid rate to have overcome recurring major disasters and to have reached almost 600 million by the middle of the twentieth century.

Family Planning—Campaigns and Problems

When the Chinese Communists took over the reins of government and set up their new capital in Peking, the size and rate of growth of the country's population was undoubtedly not of vital concern to the new leaders. Furthermore, worry about overpopulation would run contrary to Marxist ideology, which attributed human misery not to excessive population growth but to the maldistribution of income and other supposed defects in the existing social order. Since, under the new society, the productivity of the people was supposed to increase more rapidly than their number, the Communist leaders were reluctant to admit that the size of China's population could, in any sense, present a problem. They held that the wealth of the country was in the hands of the workers and peasants—and the larger number of hands could only create greater wealth.

The results of the 1953 census were completed in the summer of 1954 and only a couple of months later, in September, the first note of anxiety was expressed by a prominent member of the National People's Congress—Shao Li-tzu. To appreciate the peculiarities of Chinese Communist etiquette, it is important to distinguish that it was not an official concern, but a concern by an official. Although this statement was most cautious, he was nevertheless criticized for advocating birth control. In his own defense he insisted that the dissemination of knowledge about contraception had nothing in common with either the old or the new Malthusian theory but was necessary to improve the health of mothers and infants, to advance the education of children, to allow mothers more time for work and study, and in general to provide a happier life for all young men and women. This was to become the basic explanation of all future efforts to limit Chinese fertility, for in over twenty years there have been only a few statements admitting that a large population might have some adverse effects on the country's economic development, with Peking stoutly maintaining that "moderating the birth rate is entirely different from restricting population growth".

Despite a certain sense of indecision, 1955 and 1956 saw a gradual acceleration in the number of articles that appeared in newspapers and magazines discussing the pros and cons of birth control. By the summer of 1956 it became clear (although never official) that the birth control campaign had authority behind it and that the major responsibility for its implementation was assigned to the Ministry of Public Health. In August of that year, the Ministry issued a directive which stated that "contraception is a democratic right of the people and the government should take every step to guide the masses and to meet their demands for birth control". The final seal of approval was provided by Chou En-lai himself, who, in response to these demands by the people, included in a report to the People's Congress his own demand that health departments both disseminate propaganda and take effective measures for birth control.

The campaign, which reached its peak in the spring of 1957, was carried on with great vigor for a little more than a year. A Birth Control Research Committee was set up to "coordinate experience and research in contraception," numerous educational campaigns were launched by local departments of public health, traveling exhibits were organized, and many hospitals and clinics introduced special facilities to give advice on birth control. Publications during that period implied that virtually everyone was involved, from women's federations, trade unions, and the Red Cross Society, to cadres, school teachers and ordinary workers and peasants. Abortion and sterilization were reportedly available to couples who made joint application.

The campaign ebbed, just as it had accelerated, with overlapping articles both favoring and opposing family planning. Gradually the volume of arguments against any population controls overwhelmed the occasional reports of some family planning activities at a given commune or plant. With the initiation of communes and the Great Leap Forward in mid-1958, it became obvious that Communist China had reversed its only recently introduced policy of birth control. A large population was once more regarded as advantageous, and the vicious attacks on Malthusians, "rightists," and "bourgeois economists" who pushed birth control again shifted into high gear.

The reasons for the 1958 policy reversal naturally precipitated much speculation in the West. Was it really possible that the Chinese themselves believed the proclaimed line that the country was now short of manpower? Certainly Communist propaganda had ostensibly succeeded in convincing the masses of even stranger ideas and the manpower-shortage philosophy meshed nicely, both with the labor-intensive projects that occupied every man, woman and child during the Great Leap and with the general optimism that permeated the country as a result of a successful harvest in the previous year. Nevertheless, it is difficult to conceive that the leadership which ordained the reversal was as convinced of the labor shortage as the mass media would have us believe, for the burdens of a rapidly growing population must have been apparent to anyone with any degree of judgement.

What might have happened had the euphoria of the Great Leap persisted is impossible to say. It was predictably of short duration. In 1959 China entered an economic crisis that focused all effort on survival—a dramatic change from the grandiose plans of the year before. For the most part there was silence on the subject of population growth but, as it turned out, the abandonment of the vocal program of family limitation was not a complete reversal—it did not result in a campaign to encourage large families. On the contrary, contraceptives, not banned, were generally available, although mostly in the cities; birth control clinics continued to function; and although facilities were limited, at least in theory, abortion and sterilization continued to be legal and available for those who requested them.

Beginning in early 1962, as the country was pulling out of the economic morass of the 1959–1961 period, the Chinese resumed publication of articles encouraging family limitation to protect the health of the mother and the child. The detrimental effects of early marriage were only a part of the earlier birth control campaign; now disapproval of early marriage ("a poisonous gas given off by the rotting corpse of capitalism") became the primary emphasis of the crusade. By passing the Marriage Law of 1950 the Communists had already raised the minimum age of marriage to eighteen for females and twenty for males, but at that time the rationale for this law was not demographic; rather, it was intended to replace the traditional, early, family-arranged marriage contracts with unions decided upon by the individuals themselves. The new proposals, by different authors, to raise the optimum age for marriage anywhere from five to ten years for both men and women, were designed to limit the size of the family. None of these proposals was legally adopted, but arguments used in the campaign against "the evil wind of early marriage" were most imaginative and made fascinating reading. They ranged from fairly straightforward explanations as to why early marriage is "harmful to one's physique, health and career", to scare tactics pointing out how dangerous it is to marry before "various parts of the body have developed and matured". Simply and to the point: "Don't fall in love too early".

As the general economy showed definite signs of recovery in the mid-1960's, the flow of articles on birth control once more slackened and it would have been easy but erroneous to have concluded that optimism had again eradicated all fears of rapid population growth. Although propaganda on birth control and delayed marriage in the mass media essentially disappeared, the push for family planning became much more action-oriented being directed at the professional medical and public health personnel. Articles on the subject in professional journals increased in number, and medical conferences for obstetricians, surgeons, medical administrators, experienced practitioners of traditional Chinese medicine, and other medical personnel covered such topics as the effectiveness of the intrauterine contraceptive device (IUD) and improvement in artificial abortion techniques and sterilization methods. Similar meetings at the lower administrative levels (hsien and commune) included discussions of the practical problems involved in working with the peasants. Medical seminars not directed at birth control nevertheless usually included this subject on the agenda.

A most important role in the drive to limit Chinese fertility during this period was played by the mobile medical teams, composed of groups of urban medical personnel who were required to spend a certain part of the year attending to the medical needs of the rural population. Among the duties specifically assigned to the teams, which increased to over 1,000 by 1966, was the mission to "publicize the meaning of planned parenthood among the peasants and propagate the knowledge about birth control". To accomplish this task members of the team conducted propaganda meetings, set up exhibitions, showed films, and organized "personal testimony" meetings at which peasant women who were using IUD's or other types of contraceptives described their reactions—favorable, of course.

With the advent of the Cultural Revolution, China discontinued practically all publications and the few that continued were much too pre-occupied with political diatribes even to mention the subject of population. After some initial confusion on the part of the Red Guards as to whether birth control was "revisionist," it was finally resolved to be a Maoist idea and family planning activities initiated in the countryside during the previous years were not disturbed. As a matter of fact, the thousands of additional medical personnel who were permanently moved out of the cities during and after the Cultural Revolution must have augmented the effort in the rural areas. Moreover, as in the case of mobile medical teams, specifically mentioned among the duties of the barefoot doctors—the thousands of peasants who were given a modicum of medical training and sent out among the masses—was the propagation of birth control. This is verified by Edgar Snow who, after his 1970 visit to the Mainland, reported that barefoot doctors are also "bearers of China's effective birth control pills now in widespread use even in rural areas". The continuing push for family planning in the urban areas was evident from a January 1970 broadcast that initiated a "shock week" campaign from birth control with the announcement that "Vigorous efforts should be made to widely propogate birth control and late marriage . . . This task must be carried out in a penetrating and meticulous manner so that it will reach every household and be practiced by each individual".

Reactions and Results

What effect did all this action and, at times, inaction have on China's birth rate? Trying to convince an overwhelmingly rural, poorly motivated, superstitious population that they should delay marriage and make an effort to limit their number of offspring was not an easy undertaking. The difficulty was accentuated by the already mentioned traditional Chinese attitude in favor of large families. As an outgrowth of Confucian teachings and veneration of ancestors, and because of the very practical need for additional family labor, there existed an overwhelming desire to betget sons.

In addition to the problems of motivation and education, there were also the physical and economic problems of supplying hundreds of millions of persons in the reproductive ages with the necessary paraphernalia for effective birth control. In February 1958 one newspaper admitted in an editorial that the total supply of contraceptives in China was sufficient to meet the needs of only 2.2 percent of all persons in the reproductive ages. In other words, even had the Chinese population accepted birth control in the decade of the 1950's, given the country's economic priorities, China simply could not have provided the people with adequate quantities of contraceptives.

Thus the fairly extensive efforts to curb Chinese fertility in the 1950's probably had little effect in the rural areas and only marginal success in the cities of China. As a matter of fact it has even been suggested that there was an increase in the birth rate following the Communist takeover. Because parental consent was no longer necessary, because women were assured that they had equal rights and no longer were dependent on either the father or the husband, and because economic security eliminated economic constraints, the marriage rate theoretically could have increased. Actually, however, there is much evidence that traditional values and customs in China are not put aside that quickly and that easily. It takes more than the mere proclamation of a new Marriage Law for a Chinese girl to practice this strange, new emancipation and it seems doubtful that the new freedoms resulted in any immediate increase in marriage and fertility among the Chinese women.

Whereas during the 1950's the birth control campaign achieved only limited results, it is very probable that during the following ten years—the decade of the sixties—the Chinese managed to start a gradual downward trend in the country's fertility. Considering all the difficulties earlier described, how is it possible to suggest such a change in this short a time period?

It is, of course, most important to reach the nation's youth who are potentially the most fertile group. In China, people under thirty constitute approximately two-thirds of the population and, since by the middle and late 1960's they had spent most of their young adulthood under the Communists, they are also the most thoroughly indoctrinated. During those years China made significant strides in providing the vast majority of the youth with at least a primary level education, so that most of the people in the young reproductive ages can no longer be considered illiterate. China is poor but not indigent. Some bad crop years notwithstanding, improved food distribution procedures have, for the most part, resulted in an absence of regional starvation. Even the distribution of limited consumer goods has improved. For better or for worse, political indoctrination and mandatory study of the thoughts of Mao have served to avert the intense dejection and desperation so prevalent among many people of under-developed countries. The young people of China have been saturated with government policies that denigrate family, cultural traditions and domesticity, but uphold service and sacrifice for motherland and socialist conformity—conformity so traditional in Chinese society. Because early marriage and numerous children are un-Maoist and reactionary, there now seems to be a stigma attached to having large families. Given the climate of opinion that sees small families as part of a patriotic duty, the youth might well be willing to postpone marriage and to accept and practice some form of birth control within the marriage relationship.

Relevant here are the activities (or inactivities) of the Red Guards during the Cultural Revolution. Despite some speculation to the contrary, China is one of the few countries in which millions of teenaged boys and girls can travel, demonstrate, and sleep under the same roof without affecting the country's birth rate. In pre-Communist China, premarital sexual intercourse was regarded as extremely reprehensible, and chastity held a high place on the list of womanly virtues. This is one of the traditions of old China accepted and nurtured by the Communists and the "liberation" of Chinese women does not extend to the endorsement of free love. All evidence suggests that China's youth continue to pursue the puritanical sexual mores of the past. There was truly little need for the slogan: "Making love is a mental disease which wastes time and energy."

To be effective, the efforts to limit family size had to go hand-in-hand with readily available means for family planning, and contraceptives such as condoms, foams, jellies, diaphragms, and especially intrauterine devices and pills were made more readily available throughout the countryside in the 1960's and early 1970's. Birth control pills, so popular in the West, are a relatively new phenomenon in China. Although Chinese medical journals have reported considerable research in the field of oral contraception, the limited supply and excessive cost hampered mass acceptance and usage of this new drug. More recent visitors to Mainland China, however, have reported seeing prominent displays of oral contraceptive pills which they claim are in abundant supply in China's major cities. Given the necessary priority, China's pharmaceutical industry is certainly now capable of producing these pills in such quantities as to affect China's birth rate. The remaining questions, of course, are whether there is this priority and whether the Chinese woman—particularly in the rural areas—will adopt this method of birth control. According to Edgar Snow, who made a special effort to look into these questions during his trip to China in 1970, the developments in oral contraception have been dramatic during the past few years: the pills are manufactured in the billions, are distributed free of charge, and are widely accepted by Chinese women.

Abortion in China has never faced the moral or legal obstacles prevalent in the West. Nevertheless, although the prerequisites imposed by the regime in the 1950's were relatively loose and could easily be met by women anxious to terminate pregnancy, the lack of facilities and trained personnel made discussions relating to abortions for the most part theoretical in nature. Since then the number of induced abortions has increased significantly. In the mid-1960's numerous articles in medical journals detailed abortion procedures and reported statistical data culled from the experiences of individual doctors or medical institutions. The Chinese are also experimenting with simple methods and producing uncomplicated "gadgets" that can be used by lower medical personnel in performing abortions in the rural areas. Despite its availability, abortion is not really pushed by the regime and although there is no way to estimate its incidence, its role in family planning is not likely to be very significant.

Sterilization has never been vigorously promoted by the Chinese Communists. First, there is the problem of overcoming the universal fear of surgery. Second, although it is usually the female who is most anxious to take the necessary measures to limit the family, the vasectomy, or male sterilization, is the easier and cheaper operation. It requires the most persuasive thoughts of Mao Tse-tung to convince the average Chinese male that vasectomy is not castration and that he will not experience any loss of sexuality. Third, there is, as in the case of abortion, the shortage of hospital facilities and medical personnel to perform these operations. Despite these obstacles, sterilization has not been ignored. Articles encouraging sterilization and publicizing the cases of individuals who have undergone these operations periodically appear in newspapers and especially in women's magazines. In the 1950's, sterilization was a relatively limited urban phenomenon. Although since then the incidence of sterilization has been increasing rapidly, in all probability it is still an insignificant factor in reducing Chinese fertility.

Trying to convert the known policies and attitudes into something more tangible is a very subjective exercise. Although opinions differ as to how successful China's efforts to drop the birth rate might be, it is the contention here that despite the many obstacles impressive progress is being made. Furthermore, this conclusion based on the interpretation of published data is supported by the reports of recent visitors, many of whom made a special point of looking into family planning programs wherever they went. Consequently it is estimated that the current crude birth rate in China falls in the 30 to 35 per 1,000 range. If this estimate is realistic, it is a tremendous achievement for a country that in many ways is still underdeveloped.

Public Health and Mortality

Presumably on the basis of sample reporting areas, as in the case of the birth rate, the Chinese published a death rate in conjunction with the 1953 census activity of 17 per thousand total population—a rate that seems much too low for the conditions that prevailed in China during that time period. To evaluate this figure and to consider the trends in mortality since then, it is necessary briefly to consider Chinese policies and practices in medicine and public health during the past twenty years.

The Communists inherited serious health problems when they assumed control over the Mainland, but they placed a high priority on the improvement of the country's health conditions. Lacking personnel and facilities for treatment of illnesses, they emphasized preventive medicine and sanitation. Millions of people were vaccinated and mass campaigns were instituted to improve environmental sanitation and to encourage personal hygiene. Millions of people (including children and the aged) were mobilized to participate in the well-publicized campaign to exterminate the four pests—mosquitoes, flies, rats, and sparrows—and, in general, to clean up the cities and the countryside. With these programs, the government did succeed in greatly reducing the occurrence of major infectious and parasitic diseases.

Paralleling improvements in environomental sanitation and personal hygiene were the efforts to increase medical facilities such as clinics, hospitals, and sanatoriums, to accelerate the training of medical personnel, and to recast and enhance their traditionally low image. In pre-Communist China, the great majority of the 20,000 or so doctors practicing Western medicine in the country were trained abroad in Eruope, the United States, or Japan. But under the Mao regime, higher education in medicine kept pace with the rapid growth of education in general and despite some fluctuations in enrollment and educational philosophy, particularly during the Great Leap Forward period, it is estimated that by the end of 1966 there were approximately 200,000 persons on the Chinese Mainland with completed higher medical education.

More important, however, in terms of the country's health, was the emphasis the Communists placed on secondary medical education and, below that, on a variety of short-term medical training courses for both full-time and part-time medical and public health workers. Many of the students in these courses were recruited from the countryside, trained in nearby commune medical centers and, upon completion of their training, returned to their native villages. Obviously with their limited training they were unable to perform major surgery, but they could provide adequate medical care for the majority of the population and in this way overcome the problem faced by other developing countries—the difficulty of providing the most basic medical services to their rural population.

During the mid-1960's, in order to disperse medical aid even further to the most remote corners of rural China, Peking first introduced the mobile medical teams which included the better qualified medical personnel to tend the more serious cases during periodic visits to the communes. The second step was to transfer large numbers of doctors and other medical personnel from the cities to the countryside on a more permanent basis. And, finally, they instituted a system of politically pure "barefoot doctors" who were trained to provide first aid, give inoculations, and carry out simple health procedures, and to do all these tasks while actively participating in the production activities of their work teams.

Any discussion of medical manpower in China must also include the role of traditional Chinese medicine—an empirical healing art based on thousands of years of practical experience. After an initial tug-of-war between medical and political leaders, the latter predictably won and the Chinese Communists made an all-out effort to give traditional medicine equal status with Western medicine. In Peking's view, traditional medicine had many outstanding advantages. The training of traditional practitioners—"native doctors"—was much quicker and easier since it relied on learning from elders and "practicing while learning." However, to ensure equal status for both Western and Chinese medicine, the regime had not only to build up the validity of herb medicine but at the same time to deprecate modern medical practices. For this purpose, courses in traditional medicine were introduced in all medical schools, physicians practicing Western medicine were required to take special courses in traditional medicine and both types of doctors found themselves working side by side in hospitals and clinics throughout the country. Western medical opinion about Chinese traditional medicine differs. Some believe it to be little more than black magic; others feel that the thousands of herbs and drug potions and the healing arts of acupuncture, moxibustion, massage, and breathing therapy have lasted all these years because of their empirical value.

To consider the effects of improved health conditions in China on the country's mortality trends, it is necessary to juxtapose the health facilities and manpower with the political and economic fluctuations that cyclically affect the life (and death) of the Chinese people.

Probably as early as 1951, China's death rate, which is estimated to have been in the low thirties just prior to the Communist takeover, started its downward trend. It is inconceivable that it would have dropped to anywhere near the 17 per 1,000 reported for 1953, but it did continue to decline during the middle 1950's until the introduction of the Great Leap Forward in 1958 when it may have been as low as 22 per 1,000. During the frantic production drive that followed, millions of Chinese workers and peasants succumbed to exhaustion due to extended working hours, long political indoctrination sessions, and lack of sleep and rest. Furthermore, of particular significance in terms of health were the conditions at the numerous construction projects, which engaged scores of millions of peoples and in which many of the most basic sanitary measures were absent. Hard labor, exposure, dirt, disease and a poor diet were bound to take their toll and undoubtedly negated the favorable effects of the continuing expansion of medical facilities.

During the next three years conditions in China deteriorated rapidly. The degree of severity of the lean years following the Great Leap on the life and death of the Chinese people is yet another area of speculation. Although the serious reduction in the production of food crops between 1959 and 1961 and the food shortages that followed are part of the known record, the reports of widespread famine by refugees who entered Hong Kong during these years were probably exaggerated. Nevertheless, the death rate undoubtedly increased. By 1962 mortality should have resumed its downward trend and by the middle of the decade may have again reached the pre-Great Leap level. During the Cultural Revolution the conditions in many parts of China were again unfavorable, but because most of the turmoil and reported increases in the incidence of some diseases were limited to the urban areas, there was probably only a slight pause in the continuing decline in mortality. It is estimated that by 1970 China finally reduced its crude death rate to about 15–17 per 1,000—the level reported some seventeen years earlier.

Barring disasters, natural or man-made, China's mortality should continue downward, but very slowly. The decline of mortality in China was achieved primarily through the introduction of environmental sanitation which tended to decrease vulnerability to death, preventive medicine in the form of inoculations and injections, and a large increase in the number of public health facilities and personnel. A drop in the death rate to levels found in more advanced countries is not likely for a long time to come. China will continue to be overwhelmingly rural and the hard work and disabling accidents that occur in traditional agriculture are not conducive to longevity. The use of raw manure in agriculture will continue. Consequently, elimination of certain diseases (particularly of the digestive tract) is virtually impossible. In the long run, a continuing drop in the level of mortality would have to come about through an improvement in the quality of medical attention provided to the people—with more emphasis on the curative rather than the preventive approach. With the post-Cultural Revolution emphasis on barefoot doctors and traditional Chinese medicine, and with the drastically shortened curriculum for new medical personnel, medical care will continue to be more accessible to all, but its quality is not likely to show great improvement.

SOME ESTIMATES AND PROSPECTS

Having pondered the population data reported by the Chinese themselves and having speculated on the trends in China's vital rates, we arrive face to face with the inevitable question: Just what is the population of China? Individuals and institutions in many countries have attempted to estimate China's total population. The approaches range from outright guesses to application of the most sophisticated demographic techniques. The validity of all the estimates, however, rests in the eyes of the beholder, and *caveat emptor* hides behind every figure. Nevertheless, the most authoritative and the most widely used figures are those published by the U.S. Bureau of the Census and by the United Nations Population Division. The diversity of the figures in the table that follows speaks for itself:

SELECTED POPULATION ESTIMATES FOR THE PEOPLE'S REPUBLIC OF CHINA
(Population In Thousands)

	U.S. Bureau of the Census[a]		United Nations[b] (Medium Variant)		Orleans[c]	
Year	Number	Average Annual Growth Rate	Number	Average Annual Growth Rate	Number	Average Annual Growth Rate
1960	718,004		----		655,000	
		1.8		—		1.4
1965	782,555		695,000		701,000	
		2.3		1.8		1.5
1970	871,035		759,619		753,000	
		2.1		1.7		1.7
1975	962,480		825,821		813,000	
		2.0		1.6		1.7
1980	1,060,695		893,900		887,000	

[a] John S. Aird, *Estimates and Projections of the Population of Mainland China: 1953-1986,* U.S. Bureau of the Census, Series P-91, No. 17, Washington, 1968. Stagnation model, 5 percent undercount—the series preferred by Aird.

[b] United Nations, Population Division, Working Paper No. 30, December 1969. *World Population Prospects, 1965-85 as Assessed in 1968.* This is not an official document of the United Nations, but rather an internal working paper for informational and consultative purposes.

[c] These estimates are based on the following general assumptions: (1) The reported rates of natural increase between 1953 and 1958 were too high, primarily because of an unrealistically low death rate; (2) Starting with the late 1950s, the birth rate began on a very gradual and hesitant downward trend—a trend that will continue during the 1970s; and (3) Despite some fluctuations during the 1950s and 1960s, the overall downward trend of the death rate will also continue, but very slowly. For a detailed discussion and assumed annual vital rates, see my: "Propheteering: The Population of Communist China," *Current Scene,* Hong Kong, Vol. VII, No. 24, 1969.

Is it possible that in the near future Peking will come out with an official series of population statistics and terminate the guessing game? At this time there seems to be little prospect for such a development. Considering the cost and the effort, it is not likely that another census will soon be undertaken while the existing registration system seems still to be sputtering and, at best, able to provide only gross approximations. Under these circumstances, even should China publish some population figures, their validity would surely be questioned (especially by those whose estimates show the greatest discrepancy) and the dispute would continue.

Thus, the most likely source for improved population estimates is the information that might be obtained from more detailed knowledge regarding the status of China's medicine and public health. Peking rightly takes pride in China's accomplishments in this field and apparently is not averse to boasting about them to foreigners. Better statistics on morbidity and more first-hand information on family planning programs, especially on the receptivity of the population, should provide some of the more useful data for any future assessment of the size and rate of growth of the population of China.

NUTRITION

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About one thousand years before the birth of Christ, nutritional science began its slow pace of growth in China. During the Chou Dynasty (1122 to 249 B.C.), officers were appointed to plan and guide the dietary regiments of the ruling emperors and possibly also of the people. In the management of the sick, dietary therapy was advocated as an integral part of the treatment. During this period of time, the world's first nutritional institutions were founded in China. It was obvious that early Chinese rulers and scholars realized the importance of good nutrition and its implications in building up a stable government and society. Unfortunately, like many other branches of science in ancient China, the rudimentary development of nutritional science was rather short-lived and was not adequately pursued. Therefore, many important concepts were never verified and consolidated. As centuries passed, many of the early discoveries were often intermingled with a great deal of superstition and hearsay.

Through the centuries, Chinese societies were controlled by a minority of ruling kings or emperors surrounded by their clansmen and a handful of officers. The life and fate of a great majority of the common people, largely peasants, were in the hands of the rulers, warriors, or those who could grasp power by force. Their fate was also greatly influenced by nature, by the poverty brought about by famine, flood, drought, or epidemics of infectious diseases, and by the incessant wars waged by their conquerors. Through the centuries, Chinese writers and poets described their society with a sharp contrast of two extremes as either "smelling of wines and spoiled meats from the carmine gate" or "piling up frozen dead bodies on roads".

In the last few hundred years, with inept and corrupt governments, widespread opium addiction, epidemics of a variety of infectious diseases, big wars and little wars, famines year after year and general ignorance of sanitation, China became a great museum of diseases and poverty. In the past, China was noted for high infant mortality, short average life span, widespread incidence of infectious diseases and prevalence of nutritional deficiencies. Due to a shortage of medical and paramedical personnel, lack of a stable government and unification of the nation, there were only a few reliable vital statistics and epidemiological surveys of the incidence of various diseases. At least in certain areas of old China, the picture observed by Horn [1] shows little exaggeration:

"Poverty and ignorance were reflected in a complete lack of sanitation as a result of which fly- and water-borne disease, such as typhoid, cholera, dysentery, took a heavy toll. Worm infestation was practically universal, for untreated human and animal manure was the main and essential soil fertilizer. The people lived on the fringe of starvation and this also lowered their resistance to disease so that epidemics carried off thousands every year. The average life expectancy in China in 1935 was stated to be about 28 years. Reliable health statistics for pre-liberation China are hard to come by but conservative estimates put the crude death rate in times of peace at between 30 and 40 per thousand and the infant mortality rate at between 160 and 170 per thousand live births. The plight of women and children was bad beyond description. The men had to have what grain there was to give them strength to work in the fields. The women, especially those who stayed at home to look after the children, ate only thin gruel, grass and leaves. They were so ill-nourished that by the time they reached middle age, they were toothless and decrepit. Many adolescent girls, lacking calcium and Vitamin D, developed softening and narrowing of the pelvic bones so the normal birth became either impossible or so dangerous that six to eight percent of all deaths among women were due to childbirth. Babies were breast fed for three or four years, for no other food was available. This threw a heavy strain on the mothers, and also resulted in child malnutrition and such vitamin deficiency as rickets and scurvy."

In the 22 years of the existence of the People's Republic of China, strides have been made in eliminating a large number of infectious diseases. As stated in 1959: [2] "The backward state of health work of old China rapidly vanished and an entirely new picture made its appearance. Cholera has disappeared and notifiable epidemic disease such as typhus, relapsing fever, etc., have been brought under control. The work of prevention and treatment of parasitic diseases such as schistosomiasis, malaria, filariasis, kala-azar and ancylostomiasis, which used to be widely prevalent in our country and a serious menace to health and life of our people, has been carried out with most satisfactory results." The interplay between nutritional deficiency and infectious diseases has been well established.[3] With the control of major infectious and parasitic diseases, one would also expect to see a break in the vicious cycle which results in the development of nutritional deficiencies. With improvement of transportation, agricultural and industrial technology, and mass participation in productive work, the age-old food shortages are assumed to have been minimized. As public health measures began to be enforced, both in the basic unit of the commune in the country as well as in the regimented family unit in urban areas, and with the enrollment of the barefoot doctors into public health organizations, health programs started to be efficiently carried out and government guidelines on family planning[4] to be faithfully obeyed. In return, the general health of large masses of people was improved. We have heard from our reporters[5,6] and visiting scientists that no frank malnutrition is seen in China today. As a matter of fact, interviews with a few emigrants from mainland China also confirmed the impression that overt nutritional deficiency and acute food shortages are no longer present in China. With no major wars in the past few years and with continuous mobilization of energy to construct a utopia, China certainly has made impressive progress in education, public health, agriculture, industry, communication, and in the general standard of living for all the people. However, it is not an easy task to feed a population of 760 million people who occupy a territory equal in size to, but with less arable land than, the United States, and who use largely their bare hands and tools comparable to those used in Europe and America 50 years ago. Furthermore, with rather generous economic aid to many developing countries and with military assistance to quite a few costly revolutions, the Chinese people may need to tighten their belts in order to share their limited harvests with their friends and comrades. Even though visitors have recently seen rosy cheeks on Chinese children and strong muscles in the arms of workers and farmers, it is possible that nutritional problems will stay with China for some time.

During the 22 years of China's isolation from the world community, there have been only a few fragmentary reports available to the Western world about her scientific achievements. Moreover, with the cultural revolution, the already limited number of scientific publications reached a complete halt. For example, publication of the *Chinese Medical Journal* ceased in 1966 and other specialty journals in medicine such as the *Chinese Journal of Nutrition,* were short-lived. Nutritional publications from two well-known nutritional institutes in Peking and Shanghai and from other medical schools became scarce. Thus, we know little about their methods, statistics, or details of their successes and failures in science. In the last few years, we heard only indirectly of the explosion of the hydrogen bomb, the firing of rockets into space, the successful *in vitro* synthesis of bovine insulin, and various other developments. We have heard very little about the well-being of the people, young or old, pregnant or non-pregnant, in cities accessible to visitors or in regional areas where communication with the outside world is difficult.

We do not know how much nutritional education or programs have been undertaken for special groups such as infants, children, pregnant women or the elderly. We have the impression that severe deficiency states, such as rickets, beriberi, pellagra, scurvy, night blindness due to Vitamin A deficiency, kwashiorkor, and marasmus have completely disappeared from the scene, although we have no data to verify this. We know nothing about any large-scale surveys of people in different geographic areas to determine nutritional status. However, it is possible that large numbers of public health officers have been able to reach the rural areas and distant mountainous regions where no medical work had every been previously extended. It has been suggested that many serious health problems have been prevented as a result of their enforcement of immunization and birth control and their early recognition and treatment of diseases. Nevertheless, it is not clear how much nutritional education, if any, these paramedical personnel convey to the masses of people. Since many nutritional problems may not be as apparent as those associated with an epidemic of cholera or schistosomiasis, one wonders how much priority has been given to nutritional programs in national health planning.

We believe nutrition is a problem of all mankind. The nutritional problems which our Chinese colleagues face are important to all men. The nutritional problems in mainland China today may differ only in degree from what we are facing here in the United States. Unfortunately, lack of complete information does not permit us to critically review this subject. Nevertheless, we can undertake a limited review of five problem areas in nutrition in the hope that it will stimulate a search for answers to some nutritional questions pertinent to all mankind. Specifically, we will discuss the following: first, the importance of perinatal nutrition and its implications for pregnant women in China; next, some speculation about thyroid problems in China, since endemic goiter has been so prevalent in the past; third, the possible role of diet and neoplastic disease; fourth, a comparison of estimates of general nutritional status with the recommended dietary allowances in the United States or with FAO recommendations; and last, speculation about the status of nutritional education in China today.

I. The Importance of Perinatal Nutrition

One of the most important problems under study by investigators in various health-related disciplines today is the impact of environmental conditions, especially in early life, on the physical and mental well-being of the human organism. It has become obvious through studies in our laboratory and by others that a number of factors, among the most important of which is nutrition, contribute significantly to the development and to the optimal functional capabilities of the individual.

As early as 1789 Malthus [9] stated that the world population increases at a greater rate than food sources. The supply of food increases arithmetically whereas population growth follows a geometric progression. The decline in mortality rates due to advances in medical science and a reduction in major wars are probably the main reasons for the high rate of population growth. Birth control has been encouraged in China.[10] Despite the discouragement of early marriage and wide use of contraceptive devices under the strict supervision of health workers,[11]

TABLE I

Estimation of the number of pregnant women in China

1. Total population (mid-year) 1970*		759,619,000
2. Crude birth rate, 1965–1970*		31.1 (high estimate)
1970**		30.0 (low estimate)
3. Estimated number of births and pregnancies in 1970:		
	High estimate	*Low estimate*
(1) Live births [a]	25,143,000	22,789,000
(2) Induced abortions [b]	5,029,000	4,558,000
(3) Spontaneous abortions [c]	2,514,000	2,279,000
(4) Still births [d]	1,257,000	1,139,000
(5) Total pregnancies [e]	33,943,000	30,765,000

Notes: *Population and vital statistics report from United Nations, 1971.
**Estimated by free hand extrapolation from the past trend.
[a] Total population X crude birth rate (high estimate 33 per 1000, and 30 per 1000 for low estimate).
[b] Assuming the ratio of induced abortions to live births of 20:100.
[c] Assuming 10 spontaneous abortions per 100 live births.
[d] Assuming 5 stillbirths per 100 live births.
[e] Sum of all.

the Chinese population is still expanding. The total population in mid-1970 was estimated as 759,619,000 (Table 1). The high estimate of the crude birth rate from 1965 to 1970 was 33.1 per thousand. By an extrapolation from the past trend, the low estimate of birth rate would be 30.0 per thousand. Based on a number of assumptions (see footnotes to Table 1), it can be estimated that in 1970 there would be between 31 and 34 million pregnancies and between 23 and 25 million live births in China. Therefore, the well-being of 31 to 34 million pregnant women every year must be specially considered and a good nutritional foundation for 23 to 25 million live babies must be established *in utero*. Provision and proper guidance about good nutrition to pregnant women may also minimize the tremendous wastage of pregnancies from still-births and spontaneous abortions which can be considered as an economic loss due to the mother's absence from work and need for medical treatment.

The estimate of grain production in China for 1971 was 246 million metric tons [12] which probably is sufficient for their nationwide food rationing program, as a source of feed for the production of more expensive animal proteins as well as for the amount of aid to other nations. A worker in China is generally granted 60 pounds of rice a month while a bureaucrat receives only 30 pounds. Meat, eggs, and vegetables are not rationed, but their supplies may not be very plentiful. In general, we do not expect Chinese families to have bacon and eggs at breakfast and steak at dinner. Their fat intake is low and sources of animal protein are scarce. Assuming a daily intake of 500 grams of rice per person per day, one may estimate intakes of approximately 1800 calories, 40 grams of protein, 400 grams of starch, 120 mg of calcium and 700 mg of phosphorus. If no other food stuffs are provided, such a dietary allowance may be barely sufficient to support sedentary activity but not sufficient for the strenuous physical work in which most people must participate in the fields or factories. Such a dietary intake would be grossly inadequate for providing expectant mothers with enough calories, proteins, minerals and vitamins to meet the increased demands for growth of the foetus and her tissues during the gestation period and for production of breast milk of adequate quantity and quality needed by the infant during the critical period of physical and mental development shortly after birth. It is well known that the nutritive value of grain proteins is much inferior to that of animal proteins. The protein from rice is deficient in lysine, but lysine supplementation of rice has not been advocated in China. A qualitative and quantitative deficiency of good proteins during the perinatal period is potentially dangerous since it may cause irreparable damage to these 23 to 25 million babies. China is a very large nation in which geographical factors vary greatly from one area to the other. Despite the impressive estimates of steel, cotton, fertilizer and grain production,[13] we believe that a large portion of the population still lives in some of the less fortunate geographic areas, comparable to our Appalachian areas, where people must subsist on whatever their barren land can provide. One wonders if nutrition of pregnant women in these areas may be receiving any special attention by the Chinese leaders and nutritional experts.

II. Thyroid Disorders

Thyroid disturbances have attracted the attention of many nutritionists in the past. It has been estimated that there are still about 200 million people with endemic goiter in the world.[14] The evidence to support iodine deficiency as the cause of endemic goiter was obtained from epidemiological studies[15,16] and studies in experimental animals.[17,18] It has been unequivocally demonstrated that iodization of table salt can effectively eradicate the development of goiter in the endemic areas.[19]

The earliest reference to goiter in the Chinese literature was found in Chuang Tze written by Chuang Chow in the third century B.C.[20] In the same century goiter was recognized as an endemic disease by Lu Pu Wei in Lu Lan. The ancient Chinese also observed that goiter was present in the mountainous areas as described in Shan Hai-Ching, the book of mountain and sea, which was said to be written by Po Yi in the reign of Shi Yu during the interval of 2205–2198 B.C. The first classical description of the disease appeared in the year 610 A.D. in *Chao's General Treatise on the Etiology and Symptoms of Disease*. The early Chinese Physicians knew that seaweed (Hai Tai, Laminarias) had a beneficial effect on goiter. In the third century, Ke Hung (281–261 A.D.) prepared an alcoholic extract of Hai Tsao (Sargassum siliquastuum) for goiter. In the sixth century, sheep thyroid gland was used in the treatment of cretinism. In *The Private Prescriptions of An Official* written by Wang Tao, seven prescriptions out of 36 were found to contain seaweed or other marine products. In the twelfth century, Change Tsung Chen in his book *Literate's Care of Their Father*, even recommended soaking seaweed in the drinking water for prophylaxis of goiter. Therefore, it is apparent that recognition of the goiter problem by the Chinese was somewhat earlier than that in the Egyptian and Roman medical scripts which were probably written about 700 B.C. The use of iodine in the treatment of goiter was not recorded until the publication of Prosser in 1769.[21] The concept of iodine deficiency and its pathogenesis was first suggested by Marine in 1909.[22]

J. S. Horn stated in his book: [1] "Another example of preventive work is the prevention of goiter, which formerly affected most adults in some villages. The main cause, lack of iodine in the drinking water, has now been remedied by addition of an iodine compound to table salt. As a result goiter is now less common and in time it will disappear." We believe this is an oversimplification of the goiter problem in China. Iodine metabolism and goiter development are rather complicated problems. Even with much more active programs of goiter prevention in many centers of endemic goiters in the world, such as in the region of the Alps, of the Great Lakes in the United States, in Lima, Perù, and in certain regions in British Columbia and Canada, complete eradication of endemic goiter has not been achieved. Iodization of table salt was started in China long before the founding of the People's Republic, yet in the studies of 1950, adults in the Tushan mountain regions of Hopei Providence [23] showed a goiter incidence of 42.3% among 979 males examined and 55.4% among 971 females examined, with an average incidence for both sexes of 48.8%. The section on endocrine and metabolic diseases of Peking Union Hospital and the Chinese Academy of Medical Sciences in Peking summarized the collaborative studies [24] in seven provinces, viz., Hopei, Honan, Shansi, Kirin, Kansu, Hupeh and Hunan in which 7,585,000 individuals were examined and 592,700 goiters were found, an incidence of 7.8% (Table II). The lowest incidence, found in Kirin, was 2.8% and the highest, in Hsu Kou Hsiang in Kansu Province, was 82.3%. In one of the villages in Changchiakou, Hopei, the iodine content of the drinking water was 0.27–0.6 ug/L and the goiter incidence was 40.1%; in a second village, the iodine content was 3.44 ug/L and the goiter incidence was 33%. It was also demonstrated that about 58% of the inhabitants subsist on a water supply with less than 1 ug of iodine/L and that the goiter incidence varied from 19.1 to 40%. The distribution of iodine, however, varies tremendously and some wells in these villages were found to have iodine concentrations of about 5 ug/L. This finding does not surprise us. Percolation of the water, alkalinity of the soil, cropping of the vegetation and catalytic action of certain substances such as iron and manganese, which tend to liberate iodine in volatile form from the soils, tend to deplete the soil of iodine and influence iodine content of the drinking water.

In one study,[25] the iodine content of water, soil, and food in an endemic area of goiter in Shansi Province was given (Table III). Some correlation was found between the iodine content of drinking water and the rate of goiter. It is also of interest to note that the calcium content in the area with high goiter incidence was higher while the magnesium content was lower than those in an area with lower goiter incidence (Table IV).

We do not know whether other endemic areas have been also extensively surveyed to an extent comparable to what in Yi Hsien, Hopei

Table II—Incidence of Goiter in Eight Provinces Surveyed

Province	District	Population	No. Examined	No. Goiters	Goiter rate %
Hopei	3 areas in Changchiakou	72,670	8,536	1,249	14.6
	3 districts in Ching Lung Hsien		2,308	1,632	70.7
	Yi Hsien	326,811	326,811	49,021	15.0
Honan	Lu Shan Hsien	427,309	422,181	130,581	24.1
	Nan Yang area	6,352,418	6,352,418	391,334	6.1 (0.6–30.0)
Shansi	Tai Ku Ksien, Hsin Yuen Hsien	231,665	4,135	2,244	51.8 (33.6–60.6)
	5 villages in Chieh Hsin Hsien		2,962	705	23.8
Kirin	Li Shu Hsien		454,117	12,837	2.8
Kansu	Hsu Kou Hsiang, Kao Chia Hsiang		1,893	1,559	82.3
Hupeh	Huang Chan Hsiang		9,950	1,540	15.5 (9.0–33.6)
Hunan	Chien Yang			438,888	0.6–70.0
Average			7,585,000	592,700	7.8

Slightly modified from: Sections on Endocrine & Metabolic Diseases, Department of Medicine, Peking Union Hospital, Chinese Academy of Medical Sciences, Peking, Chinese M. J. *79*:304–325, 1959

Table III

The Iodine Content of Water, Soil, and Food and the Goiter Rate in Parts of Shansi

	Area of low endemicity		Area of high endemicity	
	Iodine ug/L or kg	Goiter Rate %	Iodine ug/L or Kg	Goiter Rate %
River water	6.53	26.1	3.59	56.4
Spring water	3.88	40.2	2.53	59.0
Shallow well water			3.42	63.7
Deep well water	7.53	35.0	3.46	58.3
Stream water	2.58	19.8	4.19	60.6
Soil	4025	33.6	3395	60.6
Corn	263.6		132.7	
Millet	244.4		156.7	
Sorghum	295.6		176.3	
Wheat	160.8		140.7	
Soybean	160.8		123.5	

(Han, S. C., et al., M. J. Shansi 2:10, 1958)

Table IV

Mineral Analysis of Water Supply in Parts of Shansi

	Area of low endemicity mg/L	Area of high endemicity mg/L
Iodine	0.00513	0.00350
Manganese	Trace	Trace
Calcium	59.67	88.80
Magnesium	20.13	6.38
Fluoride	0.12	0.10
Chloride	20.67	19.10
Carbonate	10.96	11.80
Total Hardness	10.38	13.06

(Han, S. C., et al., M. J. Shansi 2:10, 1958)

and Nan Yang, Honan where the total population of six million people were examined. It is well known that endemic goiter is widely distributed in China and that mountainous districts and inland areas are those usually affected to the highest degree. Data from the interior part of China were not available for this report. In Yunnan province, the incidence of goiter was found to be as high as 80% among the total adult population in some areas.[26] The iodine content in the salt in these areas was only 22 parts per 1000 million as compared to a content of 5100 parts per 1000 million in Szechwan. We would be very doubtful that all endemic goiter has been completely eradicated in these areas even though the program of supplementation of salt with iodine had begun in 1941.[26]

It is known that the requirements for iodine are related to many physiological and environmental factors. The requirement is high during adolescence, and particularly during pregnancy, lactation and even menstruation. The measurement of thyroid enlargement of a population without regard to age, sex, or physiological status is therefore somewhat misleading. A consideration of these variables would be appropriate.

From metabolic balance studies,[27] it was well established that iodine deficiency in endemic goiter in man was due to dietary deficiency of iodine rather than to excessive urinary and fecal losses. It should be pointed out that not all subjects in an endemic area with iodine deficiency will develop goiter. Most individuals in these areas will excrete less than 40 ug of iodine per day and have a plasma inorganic iodide below 0.08 ug per 100 ml.[28] However, complete correlation of dietary iodine deficiency and urinary iodine excretion may not always occur in some endemic areas.[29] From field studies in Thailand, Follis[30] believed that an iodine content of less than 50 ug/mg creatinine in a random urine sample was an index sensitive enough to suggest iodine deficiency. Data on the kinetics of iodine uptake, using radioactive tracers, were obtained in many field studies on endemic goiter in many parts of the world. However, this type of study has not been carried out in the endemic area of China. More recently, increases in immunoreactive thyrotropin were found in serum of some patients with endemic goiters.[31, 32, 33] This finding is probably a reflection of adaptation to low iodine intake by a hypersecretion of thyrotropic hormone, which may increase the efficiency of the iodine-trapping mechanism of the thyroid in order to maintain normal thyroid hormone levels. We believe that future surveys should be extended to include detailed analyses of food, water, body fluids, tissues removed at operation or autopsy, and possibly also iodine kinetic studies in different age groups with deficiencies of different severity and with different responses after treatment. Information about thyrotropin levels in responses to TRF (thyrotropin releasing factor, l-Tyroglutamyl-l-histidyl-l-proline amide) to evaluate the hypothalamic-pituitary axis in individuals from endemic areas will also be useful.

In addition to iodine deficiency, the amounts of other minerals in water and food must be also considered. High calcium[34] and fluoride[35] content in the diet have produced goiters in experimental animals. High incidences of goiter in England and Scotland were thought to be attributed to the high calcium content of the drinking water.[36] In the studies cited above in Shansi province, where a high incidence of goiter was found, the calcium content of the drinking water was also higher than that from the areas with a low incidence of goiter. More extensive analyses of this kind would be necessary to further clarify this relationship.

The list of known goitrogens is lengthening. Cauliflower, turnips, soybean, peaches, pears, spinach, carrot and strawberries are known examples. Since Chinese herb medicines have been very much popularized since the cultural revolution, we do not know how many of these herbs would bring about disharmony of the "yin and yang" of our thyroid gland. Cow's milk and milk products are not popular as infant foods in China, at least not in rural areas. Most milk substitutes are made from soybean. It was reported that soybean milk may produce goiter in children and that this development can be prevented by an increased iodine intake.[37] A continuing search for and isolation of naturally occurring goitrogens in certain endemic areas is very important.

Associations with cretinism and deafmutism were said to be frequently found in patients with endemic goiter in the Himalayan areas [38] but were not found elsewhere.[39] Cretinism was very common in areas of goiter endemic in Yunnan province.[26] In one mountainous district in Hunan, the incidence of goiter among 619 inhabitants was 77.7% [40] and that of cretinism was 1.7%. In the areas of Kansu province with a total population of 422,181, goiter was found in 31% of the 130,581 individuals examined but the rate of cretinism was only 0.33%.[41] Hyperthyroidism was not common in Yunnan but was high in the cities along the China coast. For example, toxic goiter represented 25% of the cases of thyroid enlargement in Changchow, 65% in Peking, 78% in Canton and 100% in Shanghai.[26] It is our impression that Chinese immigrants in the eastern part of the United States also have a high incidence of thyrotoxicosis. It is impossible to have reliable statistics since the sample size is rather small and the immigrants came from various parts of Mainland China and have stayed here for variable amounts of time. It is not clear whether this trend of high incidence is related to iodine deficiency at some time in their life or is related to some unknown environmental factors.

The high cancer rate in Bern and Lebanon where endemic goiter is prevalent was not seen in other endemic areas.[42, 43, 44] Patients with fist- or head-sized colloid goiter could be found easily in Kunming and in neighboring cities in the Yunnan province before 1945. There was no mention about the incidence of thyroid neoplasms in case of endemic goiter surveyed in China.[24, 25, 26] In Taiwan, among 2,943 autopsies performed between 1946 and 1963, carcinoma of the thyroid was encountered in only two cases, representing an incidence of 0.1%, in contrast to 9 cases of thyroid cancer among 766 autopsies from Columbia Presbyterian Medical Center from 1953 to 1954, with an incidence of 1.2%.[45] In approximately the same period, namely from 1949 to 1962, thyroid cancers were found in 496 patients of a total of 27,000 cases entered in the tumor registry at Memorial Hospital in New York.[46] Regardless of the percentage incidence, thyroid cancer in endemic areas of various parts of China probably is not a serious problem.

In summary, we believe that the goiter problem has not been completly eradicated in Mainland China. More extensive epidemiological and nutritional surveys in various parts of interior China, using more sensitive biochemical, immunological and radioisotopic methods, would be very rewarding.

III. Nutrition and Cancer

Nutritional habits have been long thought to affect the pathogenesis of cancer in man. In experimental animals, caloric, protein, or fat intake, imbalance of essential amino acids, or deficiency in certain vitamins or minerals can influence the induction or growth of tumors.[47] Dietary deficiency, particularly protein deficiency, has been shown to increase host susceptibility to a variety of carcinogens[48] including aflatoxin.[49] It is also known that dietary manipulations in animals may greatly alter the drug metabolizing enzymes in the smooth membrane of the endoplasmic reticulum of liver[50] and possibly also of the gastrointestinal tract[51] which may thus potentiate[52] or inactivate[53] a large number of carcinogens. With the exception of an association between kwashiorkor and hepatoma in Mozambique, Uganda and South Africa,[54] epidemiological evidence relating nutrition to cancer cannot be readily obtained. However, the marked differences in the incidences of different types of cancer in different geographic areas as reported elsewhere in this publication prevent us from ignoring the possible role of nutrition in the pathogenesis of various types of cancers. Obviously, differences in the dietary habits in such different geographic areas must be considered as one of the possible environmental factors in the pathogenesis of neoplasms in different anatomical locations. With the reported gradual improvement in transportation and with it the movement of large segments of the population from one area to another in China during the last few years, we wonder whether the trends in geographical differences in various cancer incidences will eventually disappear.

With most infectious and parasitic diseases under control, Chinese health workers are now faced with the challenge of eliminating cancer, rheumatic heart disease, coronary artery disease and hypertension. As pointed out by Dimond after his recent trip to China,[55] "Cancer is a major dread, and there is an increased incidence in the nasal passages, esophagus and liver." Of course, it is always difficult to determine whether these observations represent a real trend of increases of incidences of these neoplastic diseases or merely a reflection of improvements in diagnostic skills, statistical accuracy and extension of better medical care to wider areas of the nation.

In China, cancer of the uterus, particularly cancer of the cervix, represents 14.7% of all cancers.[56] On the basis of statistics reported on 1959 it was the malignancy of highest incidence in four large cities, Peking, Tientsin, Sian and Shanghai. There was no evidence to suggest that overweight or a change in basic nutrition played any important role in the pathogenesis of this neoplasm. It is of interest to point out, however, that studies by Wynder et al.[57] demonstrated an increased risk of developing endometrial cancer in overweight individuals. The incidence of endometrial cancer increased among the Japanese when they moved to Hawaii and California and their fat consumption increased from 10 to 40% of total calories and changed from primarily unsaturated fat to saturated fat.[58] It would be of interest to find out whether the mass movement of an urban population to a rural area in China today would slow down the trend of an increased incidence of endometrial cancer which may have resulted from urbanization of life styles and perhaps overnutrition.

Carcinoma of the esophagus is one of the most prevalent types of cancer in North China. According to the vital statistics from Peking and Tientsin for the years from 1958 to 1960, the incidence of carcinoma of the esophagus was second highest among all cancer deaths.[56] In the male population, esophageal cancer was first in order of frequency for all deaths due to malignancy. Using the people's commune as the basic unit, all people over 30 years of age were interviewed and all persons with discomfort in swallowing food were examined thoroughly. In four provinces with high esophageal carcinoma, namely in Shantung, Hopei, Shansi and Honan, the highest rate was that Lin Hsien of Honan[57] with an incidence of 67.26 per 100,000 and the lowest was that from the Yentai district of Shantung, viz., 0.32 per 100,000. Rates were higher in the rural and mountainous areas than in the cities.

In this rather extensive study, involving over seventeen million inhabitants, no nutritional history was given. However, it is of interest to note that a family history of cancer of the esophagus was found in 61.4% in Lin Hsien, Honan where the annual incidence of cancer of the esophagus in 1960 was 96.9 per 100,000; 24.0% in Shantung province with an annual incidence of 3.24 per 100,000 and in patients in Shansi province with a rate of 19.69 per 100,000. In the epidemiological studies by Wynder[59] and Schwartz,[60] high correlations between alcohol consumption and cancer of the oral cavity, extrinsic larynx, and esophagus were noted. The percentages of alcohol drinkers among patients with cancer of the esophagus in this study from North China varied from 28.8 to 45.1%.[61] In Feicheng of Shantung, the incidence of cancer in 1960 was 77.8 per 100,000 but the percentage of alcohol drinkers was only 28.8%, which is lower than the incidence of alcoholic drinking in the entire Shantung province. Furthermore, the highest incidence of cancer of the esophagus was found in Lin Hsien, Honan, but there was practically no alcoholic drinking among the population. Certainly, alcohol alone does not seem to be a very important factor in the pathogenesis of cancer of the esophagus in North China.

In riboflavin deficient mice, atrophic changes and hyperkeratosis were found in the esophagus.[62] Wynder thought that such a degenerated esophagus may be more susceptible to environmental carcinogens. As a matter of fact, riboflavin deficiency is not the only condition which brings about degeneration of the upper alimentary tract. In our previous studies in rats,[65] we demonstrated that pyridoxine deficiency can bring about decreases in vitamin B^{12} absorption, intrinsic factor production and gastric acid secretion. Likewise, iron deficiency [64] may also cause such changes. It is not clear whether any of these deficiencies may make individuals more susceptible to certain carcinogens in Honan, Shansi, Hopei and Shantung with incidences of cancer among the surveyed population of 41.05, 19.69, 8.14, and 3.24 per 100,000, respectively.[61] To what degree the difference in dietary habits between the North and South could be responsible for differences in the inci. ence of cancer of the esophagus, which was the second most frequent malignancy in Peking for the year 1964 but only the fourth most frequent neoplasm in Shanghai in the year 1965, is not clear at present.

Cancer of the stomach in China is probably not as frequent as in Japan. It is, however, the second most common malignancy of the gastrointestinal tract and represents about 40 to 50% of all gastrointestinal cancer. In studies in the United States, a relatively high incidence of cancer of the stomach was attributed to the early loss of teeth.[65] A reduction in the intake of potatoes and an increased consumption of fresh fruits and vegetables were reported to be associated with a decreased incidence of cancer of the stomach in this country. In China, periodontal diseases are very common, but serious dental caries with early loss of teeth is not frequent.

Cancer of the colon and rectum represents only 10 to 20% of all cancer of the gastrointestinal tract in China. In the United States, the incidence of cancer in this location is 60 to 70%. The sharp increase in the incidence of colon cancer among the Japanese immigrants in Hawaii and California suggested that changes in dietary patterns may have been responsible for the increased incidence.[66] Furthermore, a positive correlation between colon cancer and arteriosclerotic heart disease was demonstrated and presumed to be related to the fat intake.[67]

Cancer of the nasopharynx is a disease very common in South China. In the past few years, about 12,000 cases were reported in 47 cities.[68] According to the tumor registry in Shanghai in 1965, this was the eighth most frequent malignancy in that region. Low levels of Vitamin A and carotene in serum were found in patients with nasopharyngeal cancer in Kenya.[67] There is so far no data from China to suggest this relationship among Chinese patients. The incidence of this disease in the second or third generation in California has decreased markedly.

Primary cancer of the liver was the 5th most common malignancy according to the tumor registry of Shanghai in 1965. An association between protein malnutrition and hepatoma was common in patients in South Africa[54] and severe malnutrition and alcoholic cirrhosis were common in patients with hepatoma in the United States.[69] Apparent nutritional deficiency and chronic alcoholism were not apparent in the Chinese patients from any of these studies. It was well demonstrated that parasitic infestation such as with *Clonorchis sinensis* was present in approximately 60% of all cholangiocarcinoma in Hong Kong[70] but not in liver cell carcinoma. It was also suggested that schistosomiasis japonicum may be related to hepatoma.[71] However, areas with a high incidence of hepatoma, such as Hong Kong or Taiwan, are not endemic areas for schistosomiasis. The distribution of hepatoma along the China coast was found not related to endemicity of schistosomiasis. Furthermore, with the reported eradication of schistosomiasis in China, the incidence of hepatoma appears to be increasing.[55] Therefore, nutritional deficiency, secondary to parasitic infestation, does not seem to play any important role in the pathogenesis of hepatoma in China.

In experimental animals, nutritional factors play very important roles in the induction and growth of chemically induced hepatoma. For example, choline deficiency in rats resulted in cirrhosis and hepatoma.[72] Diets low in protein and riboflavin increased the rate of development of dimethylaminoazobenzene-induced hepatoma,[73] whereas administration of cysteine, methionine, or choline often retarded tumor development.[74] An imbalance of amino acids may also increase carcinogenesis in rats since addition of lysine to gluten or zein increased the incidence of dimethylaminoazobenzene-induced hepatoma in rats.[75] Of many naturally occurring carcinogens, such as cycad seeds,[76] yellow rice contaminated with *Penicillium islandicum*,[77] bush teas,[78] senscio alkaloids,[79] and wheat or peanut meal contaminated with fungus *Asperigillus flavus*, aflatoxin B1,[80] the last one probably has received the most attention in the past few years. Aflatoxin-containing meals have been shown to be hepatoxic to many species of animals and susceptibilities vary greatly with age, sex, nutritional status, species and bread. Young animals are more susceptible than adults. Animals during late stages of pregnancy are also very susceptible.[81] Hepatoma was produced by feeding aflatoxin-containing meals to rats, ducklings, trout, guinea pigs, and monkeys. The susceptibility was greatly increased with protein deficiency and the development of hepatoma was often associated with the presence of previous liver damage.[82] Since *Asperigillus flavus* grows in an environment with high temperature and humidity, contamination with aflatoxin of animal and human foodstuffs is particularly common in tropical and subtropical areas where the hepatoma happens also to be prevalent. In Taiwan, some asperigillus species are used to make soysauce. It has been stated that some individuals may consume about one liter of soy sauce per month.[83] Aflatoxin extracted from commerically available soy sauce and approximately equal in amount to that ordinarily consumed per week per person caused hepatic parenchymal hemorrhage and bile duct proliferation in a one-day-old duck.[83] Although there is no unequivocal evidence that aflatoxin is responsible for the high incidence of hepatoma in man in certain areas of the world, the significance of mycotoxins and possibly of other naturally occurring carcinogens in the etiology of human disease cannot be overlooked, particularly in populations with suboptimal nutrition.

IV. General Nutritional Status

In a previous section, we stated that with a rice ration of 30 pounds per month, each person would get 1800 calories, 40 grams of protein, 400 grams of starch, 120 mg of calcium and 700 mg of phosphorus. The food intake of a middle class family in the Peking area was estimated to be 2500 calories per person per day[84] which does not differ from the recommended values. For example, the National Research Council recommended 2800 calories for men and 2000 calories for women.[85] Even a completely vegetarian diet supported adequate growth in experimental animals.[86] Food and nutritional problems in China were carefully analyzed by Buck.[87] Arable land was estimated to be about 11% of the total surface, i.e., about 35 million acres.[87] On the basis of incomplete data, it is estimated that the food intake per capita per day during the period of 1935 to 1957 was: 500 grams of grain, 4 grams of sugar, 140 to 350 grams of vegetables and fruits, 12–16 grams of meat, 13 grams of fish, 7–8 grams of fat, and total calories about 1830 per day.[88] We do not know precisely the protein intake of the average person in Mainland China. In Taiwan, it was estimated that protein intake was 57 grams per day, with only 25% from animal sources.[89] It is known that the efficiency of production of animal protein from plant sources is rather low.[90] Because of this and because the percentage of arable land is low, it may be very difficult for the average Chinese to change his diet from one with a low amount of protein of poor quality to one which includes a high amount of animal protein which has high nutritive value.

We have already emphasized the possible impact of good protein in the maternal diet on the physical and mental development of the offspring. The fat in the Chinese diet contributes only 10 to 20% of the total calories. Such a low fat content may be advantageous in delaying the development of obesity, hypertension, arteriosclerotic heart disease and endometrial carcinoma. In the Chinese diet, vegetables contribute about 220 mg and cereal products 100 mg of calcium. Milk or milk products with high calcium contents are generally not available to the average Chinese, even to the newborn in the rural areas. It is estimated that retention of 400 mg of calcium per day is necessary for adequate mineralization of the growing skeletal system and approximately one gram of calcium per day is necessary for such retention. Therefore, 300 to 400 mg of calcium per day is probably not sufficient, particularly during pregnancy and lactation. In adults with adequate parathyroid function and sufficient exposure to sunshine to convert provitamins in skin to Vitamin D, body homeostatic mechanisms may adapt to low calcium intake, and show no evidence of deficiency. In old people, where homeostatic functions may be defective, a low intake of calcium may cause problems. The calcium intake of the Chinese appears to be low and could be increased by the consumption of more meat, fish, poultry, and milk products. Even with erratic intakes of meat and eggs, the supply of fat-soluble vitamins in the Chinese diet is probably sufficient. If our assumption is correct that the supplies of fresh vegetables and fruits are ample, Vitamin C and folic acid intakes probably will be adequate. We do not know whether vitamin enrichment of cereal products has been carried out in China. In the old Chinese society, only poor farmers would eat partially polished rice and most thiamine is contained in the bran. With modern improvements in cooking utensils, it is no longer necessary to discard the vitamin-rich rice water in the process of making steamed rice. Therefore, we believe that the intake of the B-vitamins is probably adequate in the Chinese diet. As for iron intake, it is probably not difficult to obtain 10 mg of iron per day in the diet to meet the requirement of 1 mg of iron per day for men and 2 mg per day for woman. However, it is known that the availability of iron compounds from different foods is not uniform and that animal foods are superior sources of iron. In old China, iron deficiency anemia was often caused by hook worm infestations. With the eradication of this parasite, and the lack of clay-eating habits among the Chinese, the iron requirement could be easily met. In general, we believe that the diet for the average Chinese person is not inadequate. The increased intake of proteins of high quality and of calcium for special age groups during specific periods require consideration. We hope that data from quantitative analyses of food intake of different age groups from various geographic areas and assessment of nutritional status with respect to protein, fat, minerals, and vitamins of these groups of people will be available in the near future.

V. Nutritional Education in General

In the United States, nutritional sciences have not been well incorporated in the medical curriculum. Very few medical students have been exposed to basic nutrition. We doubt that nutritional education of the medical and paramedical personnel in mainland China is adequate. Before the pre-liberation period, there were only about 20 to 35 thousand Western-trained physicians[91] and perhaps less than 10 nutritionists in all of China. With shortening of the duration of medical education, and the involvement of medical students in many political and social activities, these students must spend their already limited time in digesting the vast amount of material on various medical subjects, and have very little or no time for studying nutrition. In the new curriculum of medical education, only one coordinated course, which combines anatomy, physiology, biochemistry, Chinese traditional medicine, and Political Education, will be given the first nine months. Reinforcement of basic science, incorporated with clinical experience, may be added in later months, with the total duration of medical education equal to three years. How much nutritional knowledge can be acquired by the students with such limited time is really questionable. Checking all books on medical and nutritional subjects in the Chuan Kuo Hsin Shu Mu (Chinese National Bibliography, Peking) from 1958 to 1966, we found translations of the major textbooks in Medicine, Surgery, Radiology, Radiotherapy, Physiology, Biochemistry, Anatomy, and Radiation Physics commonly used in this country. However, no translation of any classical nutritional textbook was available. There were 16 monographs on general nutritional subjects. These were: "Food and Nutrition" by Fan Wen-Yuan; "Practical Nutrition of Children" by Su Tsu-Fei; "Contributions by Modern Native Physiologists and Modern Chinese Nutritionists" by Wu Hsiang; "Nutrition for Women and Children" by Yeh Kung-Shao; "Common Knowledge on Nutrition" by Chen Shu-Chi; "Common Knowledge of Nutrition" by the Chinese Academy of Medicine; "Food and Nutrition" by Huang Li; "Common Knowledge on Nutritional Hygiene" by Pang Wen-Chen; "Our Food and Nutrition" by Yu Ku; "Tables of Food Ingredients" by Shung Yan Wei Sheng Yen Chiu Yuan; "People's Food and

Nutrition" by Chuang Yung-Chi; "Food Chemistry" by Lin Kung-Chi; "Food Hygiene in Food Preparation" by Fei Jun; and "Food Poisoning" by Hou Hsiang-Chuan. As for journals, *Ying Yang Hsueh Pao* (*Acta Nutrimenια Sinia*) was started in 1956 but lasted for only three years. Nutritional literature in 85 different medical journals published before the cultural revolution was also scarce. Therefore, we believe that nutritional education through books and journals in China is grossly inadequate.

Conclusion

There is little doubt on the basis of scientific achievements, public health measures and reduction of illiteracy and ignorance, that the society of China has improved considerably in the last 22 years. With improvements in agricultural and industrial technology, transportation and nationwide planning, food shortages have been reduced. With the reported eradication of major infectious and parasitic diseases, the general health of all classes of people has probably improved. Severe malnutrition has supposedly disappeared. However, the task of feeding an expanding population of over 750 million people, who subsist on a limited amount of arable land, is not easy. The provision of good nutrition to pregnant women, in order to prepare a solid foundation for the proper mental and physical development of their offspring, is the most important challenge to the leaders and nutritional workers in China. Despite the reported improvement in the nutritional status of the people, they are now faced with less apparent yet equally important nutritional problems. For example, control of goiter, which is so prevalent in the interior and mountainous areas of China, and studies on the interrelationship of nutrition and various neoplastic diseases, should now receive more attention. Efforts should be made to find out more precisely the nutritional status of Chinese people at various ages and from different geographic areas and to find the means of bringing their intake of various nutrients to optimal levels.

We believe that a study of the nutritional problems in mainland China is a new challenge to workers in the United Sates. Our paper cannot provide adequate coverage of various subjects and our viewpoints undoubtedly are somewhat biased at times. We do hope this analysis of certain segments of great interest will illustrate the complexities and the importance of these problems.

Progress in science cannot be achieved by one individual, one group, or even one nation. We hope that more material on nutritional research from the People's Republic of China will be made available to us in the near future. Our Chinese colleagues working in nutrition would probably like to share some of our thinking and eventually join the fight against hunger threatening the human race and against diseases which may be correctable or preventable by nutritional means.

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INFECTIOUS AND PARASITIC DISEASES

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INTRODUCTION

In the past the Chinese frequently referred to themselves as the "weaklings of eastern Asia." While it may have also referred to the conditions of nonmedical domains of China in the past hundred years, the term may be appropriate for a country plagued for centuries by a wide variety of communicable diseases. The number of these diseases is so large that it is impossible to discuss all of them in this chapter. Hence ten of the diseases which in the author's judgment are of major importance on the Chinese mainland today were chosen. This selection inevitably had to be based on the author's own *judgment*, because medical publications have been nearly nil since the Cultural Revolution of 1966. The information contained herein was obtained mostly from medical articles which appeared before the Revolution, and partly from news and notes scattered among nonmedical publications, which are sufficient only to provide the most sketchy of the current picture.

The scope of the health problem as it existed in the early 1950's was unknown to the Chinese themselves. It was only gradually revealed after years of concentrated effort in nationwide surveys of existing diseases, their geographical distributions and the number of patients. At the same time, numerous institutions were established throughout the country, many of which were strategically located and specifically commissioned to study a particular infectious disease in relation to its mode of transmission, the life cycles of its causative agents, and the biology of its vectors, and to develop practicable control measures. Whether or not progress in these lines of work was in fact satisfactory, the government did set a target date for the "eradication of five most menacing parasitic diseases," i.e. schistosomiasis, malaria, filariasis, kala-azar, and ancylostomiasis, as part of its National Programme for Agricultural development in 1956.

It is debatable whether these goals have ever been reached, yet evidence is abundant that many infectious diseases, parasitic or nonparasitic, have been brought under control. Cholera and smallpox have been literally wiped out. Sabin vaccine was produced domestically and used in a large scale vaccination program in 1960, resulting in a drastic reduction in the incidence of poliomyelitis and the disappearance of the peak of seasonal incidence in the following years.[1,2] The control of measles seemed quite satisfactory with the production and clinical use of a live vaccine in 1963-64.[3,4] Venereal diseases are probably the first infectious diseases brought under control as the byproduct of the change in the socioeconomic structure. Among the parasitic diseases, kala-azar is without doubt the most successfully combatted, although evidence indicates that the incidence rose after an initial drop in the late 1950's.[5] It should be stressed that even the diseases which are still prevalent in China, such as the ten chosen for discussion in this chapter, are decreasing in incidence. These ten diseases are tuberculosis, leprosy (Hansen's disease), trachoma, viral encephalitis, schistosomiasis, malaria, filariasis, clonorchiasis, paragonimiasis and ancylostomiasis.

It is the intention of the author to provide a general picture of each infectious disease as it exists in China. Specific emphasis is placed on the distribution and prevalence of the disease, major achievements in research, both basic and clinical, and specific control measures. Information readily obtainable from other sources, such as symptomatology, unless deemed of particular interest, is not within the realm of this discussion. It should be noted that two previous publications are available for additional information.[6,7]

Tuberculosis

Before 1949, the status of tuberculosis in China was quite obscure. Studies in a few major cities showed the prevalence rate to be 3–9% of the population. Based on this figure, the minimum number of patients at this time can be estimated at 15,000,000.[8] The mortality rate per 100,000 for tuberculosis was 230 in 1949. A decade of antituberculosis campaigning brought about a decline in the prevalence rate to 1% in the cities, and the mortality rate to 46/100,000 in Peking in 1958,[8] still a considerably high rate compared to 6/100,000 in the U.S. in the same year. Further reduction in the mortality rate was seen through 1963. This disease, despite this remarkable drop in incidence, was still the number one killer in China in 1958.[9]

It is more prevalent in urban than in rural areas. Samples of tuberculin test surveys in 300,000 children 15 years of age or under carried out from 1950 to 1956 in the Shanghai area show a steady increase in infection rate from infancy (Table 1). Similar rates of infection were reported from different localities throughout the country.[10] It is also clear from this table that the prevalence of infection, as manifestated by tuberculin test, did not decrease during the period from 1950 to 1956.

Table 1. Prevalence of tuberculin positive reactions in children in the Shanghai area, 1950–1959*

	Percentage of positive reactions in different age groups					
	Urban (yr)					Rural (yr)
	1	1–4	5–9	10–14	15	15
1950	5.9	18.9	53.2	76.4	82.9	71.5
1952	5.3	25.0	57.3	80.4	87.0	70.3
1956	5.3	20.8	47.1	60.9	91.8	62.1

*Adapted from Wei et al.[10]

In addition to pulmonary tuberculosis, tuberculous meningitis is quite common among children. Representative results from a series of studies in 1964 show that tuberculosis accounted for 5.8% of the total number of pediatric patients hospitalized. About one third of these cases were meningitis.[11] In fact it was urged that cases of aseptic meningitis be managed as tuberculous in nature until proved otherwise. The diagnosis of tuberculous meningitis was said to be facilitated by using the fluorescent Na diffusion rate test.[12] Tuberculous pleurisy and peritonitis on the other hand were common medical conditions encountered in adults. The former accounted for 3.2%–7.5% of hospitalized adult patients, and over half of them fell in the 16–25 year age group. The latter was responsible for 0.55% of all adult patients or 1.3% of those hospitalized in medicine, and was twice as common in the female than in the male.[13] Other conditions frequently encountered are bone, renal and miliary tuberculosis. Silicotuberculosis is probably of particular importance. Silicosis is one of the most important occupational diseases in China. One study showed that 27% of the workers in a brick factory had silicosis; 30–40% of these cases were complicated by tuberculosis.[14] The rate of complication with tuberculosis steadily increases as silicosis advances in severity, and it is believed that silicon oxide exerts an inhibitory effect on the body defenses, resulting in the activation of old foci of tuberculosis.

China was up-to-date in treatment of tuberculosis during the 1950's. The chemotherapeutics in use included streptomycin, isoniazid derivatives, p-aminosalicylate, viomycin, cycloserine and thiosemicarbazone.[8] Among various types of tuberculosis, silicotuberculosis responded to chemotherapy most poorly.[13] Artificial pneumothorax and pneumo-peritoneum were extensively used as auxiliary methods of treatment. Surgical treatment included various kinds of collapse therapy and lobectomy or pneumonectomy, which was started in 1951.[15] Traditional medicinal herbs and acupuncture were widely applied, with the latter said to be especially effective for symptoms of neurofunctional origin, such as anorexia and night sweating.[16]

A nationwide program of BCG inoculation was initiated in the mid-fifties. The immediate goal of the program was to vaccinate 1) all newborns and 2) all healthy children under fifteen who were tuberculin negative. By 1964, it was claimed that more than 90% of newborn infants had been vaccinated. The logistic support, especially that of manpower, required by this enormous program was partly met in some localities by the short-course training of teachers of nurseries or elementary schools in tuberculin testing and BCG inoculation. In 1960 there were six biological products laboratories producing PPD and BCG. In addition to the conventional BCG, lyophilized vaccine was experimentally produced in 1956, the stability of which was said to be highly satisfactory.[8] The drop in the incidence of tuberculosis in BCG-inoculated as compared to uninoculated children has been well documented.[8, 11, 17]

Facilities for tuberculosis treatment, although increased significantly during the preceding years, were in the author's view still inadequate in 1960. There were 236 tuberculosis clinics, hospitals or sanatoria with a total of 36,000 beds. In addition, about 10% of the beds in general hospitals were reserved for tuberculosis patients. Of particular interest is a new type of nursery termed "Recuperation Nursery" which appeared in Tsintao, Shantung, in 1960, providing isolation, therapy and education for 1- to 6-year old urban children with active pulmonary tuberculosis. The number of doctors directly involved in anti-tuberculosis campaigns were said to have increased from 100 before 1949 to 2,700 in 1959.[8]

Education of the public in the mode of transmission and methods of control of the disease has been actively carried out. Routine roentgenological examination, however, does not seem to be available for the majority of the people.

Leprosy (Hansen's disease)

Leprosy (Hansen's disease) is distributed mostly in the tropics and subtropics. The disease has been recorded since ancient Chinese history, along with the cruelties to which leprosy patients have been subjected. It is estimated that about half of the 12,000,000 to 20,000,000 world total of cases are in India and China. Roger and

Muir estimated in 1946 that the total number of patients in China was 1,000,000.[18] Accurate information is unavailable. Even the Chinese official figure given in 1951, 1,200,000 minimum, was accompanied by an acknowledgment that many cases could have been unregistered.[19] According to Yü,[19] the inaccuracy of this figure is reflected in the classification of the patients. Representative data show that 47.7% of the cases belong to the tuberculoid type, with the remaining 52.3% lepromatous. These figures differ significantly from those generally accepted by international leprosy investigators, i.e., 70% tuberculoid, 20% lepromatous and 10% unclassified, suggesting failures in detecting tuberculoid leprosy cases.

The distribution of the disease in China is also related to climate, rain and humidity, consistent with that observed in other parts of the world (Fig. 1). Not a single province or district is free of the disease. Among the 26 provinces and autonomous districts, Kwangtung, Kwangsi Chuang, Shantung, and Fukien have the highest incidence. The total number of patients in Kwangtung alone was estimated at 600,000.[19] One out of a thousand people in Kwangsi Chuang, a region with a population of nearly 20,000,000, was a leprosy patient in the 1950's.[19] In Shantung province, the prevalence rate was 4–12 per 10,000 persons, depending on the region, and the total number was at least 33,200. There were probably around 2,000 patients in each of the two

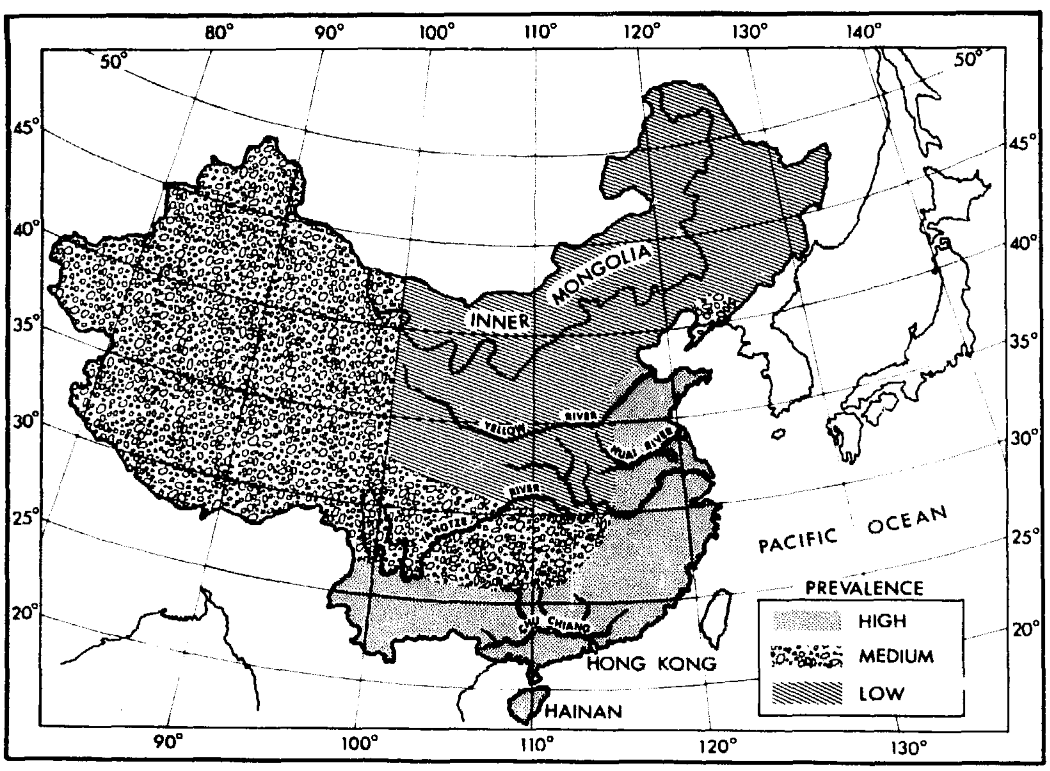

FIGURE 1. Distribution of leprosy in China. Adapted from Yü.[19]

large regions in the northwest, Sinkiang Uighur and Tsinghai, and only three cases were reported in Inner Mongolia, the area of lowest incidence.[19] It is more common in males than in females with a ratio of 3.6:1, and the peak incidence is seen in the 20–39 year age group.[20] The onset of the disease is usually in young adulthood and the primary lesion is most common in the lower extremities.[20]

One of the achievements claimed in the field of diagnosis of Hansen's disease is the papain-digestion-flotation method. The method essentially is the release and concentration of mycobacteria from involved tissues for better microscopic detection. It was said to have increased the positive rate by a factor of at least six as compared to the conventional method of detection.[21] However it is not clear which staining procedure was followed in the actual detection of the microorganisms. A technique has also been described which used the viscera of leprosy patients who died in advanced stages as the source of lepromin.[22] This method was claimed to be much simpler and more productive than the conventional method which uses lepromatous lesions of skin as the source.

Two major steps were taken toward the control of leprosy. One was the intensive campaign of the early 1950's to register patients in order to provide a clear picture of the extent of the disease. In areas of high endemicity general surveys were carried out, while in those of moderate endemicity, only sampling surveys were performed. A large number of personnel were given courses on the method of history taking and techniques of various examinations for this purpose. The other step taken was the education of the public on leprosy in order to bring patients to seek medical assistance on their own initiative. The dramatic effect of this campaign was described by Yü.[19] Before 1949, leprosy patients who came to seek treatment at a hospital in Shantung rarely came within a year of onset of the disease, and in fact in most the disease was too far advanced to give a satisfactory response to therapy. After a decade of public education, 20% of the patients seeking help came within a year of onset and some even came to request examinations merely because they had contact with leprosy patients.

Despite these efforts, only modest progress was made by the end of the 1950's. Only 151 clinics and control centers were established throughout the country.[23] Leprosaria, either expanded or newly established, totaled 56. In addition, 703 so-called "leprosy villages," apparently a commune type lepra colony with dual functions of therapy and production, were set up. In this connection, it is interesting to note a study which led to a conclusion that a certain amount of physical labor could be beneficial to the course of leprosy.[24] By 1959, only about 60,000 patients had been admitted to these facilities and of these 6,000 had been discharged after satisfactory improvement.[23] Patients with tuberculoid leprosy are generally handled at the out-patient clinic and those with lepromatous leprosy are isolated. Diaminodiphenylsulphone is the drug of choice. However, traditional medicinal herbs and acupuncture are widely used as supplementary therapeutic methods. The former are said to be more effective in restoring nerve functions than western medicine and the latter is said to be highly effective for neuralgia.[23]

It must be emphasized that the nationwide BCG vaccination program launched in the early 1950's had dual objectives of controlling tuberculosis and leprosy. No follow-up report is available, however, and it is not known whether China has discarded this unpromising program.

Trachoma

Trachoma, although not a killer in its own right, is certainly the most prevalent and disabling infectious disease in China. The estimated nationwide rate of infection was reported as 50% of the population in 1958, and depending on the locality, it could be as high as 90%.[25] On the basis of these figures, the total number of patients would be a staggering 300,000,000. The disease was distributed corner to corner throughout the country, including Tibet where 88% of the hospitalized patients with eye disease had either trachoma or its complications. The general pattern of distribution was that it was more prevalent in the north than in the south, in the west than in the east, among the poor than among the wealthy, in the countryside than in the city, in smaller cities than in larger cities. It was thus most prevalent in the northwest and least prevalent on the east coast.[26] It has a peak incidence in the 11–30 year age group,[27] and is more common in females than in males. Representative studies show that trachoma is responsible for 45% of the impairment of vision and 25–45% of blindness in China.[25, 27] The transmission of the disease is greatly facilitated by the habit of Chinese in sharing towels and other toilet articles in homes or in public.

However, China has contributed to the understanding of trachoma as much as she has suffered from it. In 1957, T'ang et al. succeeded in cultivating the causative agent.[28] They were able to select the proper antibiotics and concentrations to selectively suppress the growth of bacteria contaminating the conjunctival washings from which the agent was to be isolated. This success enabled them to study further the agent's growth characteristics in various cells,[29] and its physicochemical properties.[30] The impact of this breakthrough is quite obvious. In the ensuing years, different strains of this agent were isolated by investigators all over the world, with T'ang's method, and subsequent studies of this agent led to a practical and efficient program of control.

Attempts were also made to develop a vaccine. Both active and inactivated vaccines were experimentally produced and tried in monkeys in 1964.[31] Complement-fixing and hemagglutination inhibiting antibodies appeared in response to both vaccines, but a sustained effect was not obtained. The live vaccine was said to be significantly better than the inactivated vaccine, but results of further study are not available.

Intensive public education was initiated in the 1950's. It was a direct attack on the chain of transmission with the slogans "one person one towel" and "running water for washing face" (face washing used to be done by using a basin which was shared by many persons). Besides, numerous mobile units and a network of antitrachoma stations were set up to examine and treat patients. These facilities were staffed by medical professionals, paramedical personnel and medical aides in schools and factories who had been given short courses on anti trachoma campaigning. Two lines of work must have contributed considerably to the shaping of the mass control program. One is the simplification of the clinical classification into two stages from the conventional four stages, i.e., trachoma (Tr.) I, the progressive, and Tr.II, the regressive stage.[26] The other is the revelation of the need of continuous drug therapy for a period of time after clinical cure, resulting from combined pathological and clinical investigation.[26]

Details of the current status of trachoma are not available, but evidence indicates that the disease is still not under proper control.[32]

Japanese B Encephalitis

This disease is reported to be transmitted chiefly by *Culex pipiens* var. *pallens*, and *Anopheles hyrcanus* var. *sinensis* and is widespread throughout the country. The occurrence of epidemics is strictly seasonal, being closely related to the mosquito breeding cycle, and the peak incidence is seen in July and August.[33] In addition to their role as vectors, some claim that mosquitos transmit the virus vertically and therefore may be important reservoirs themselves. Various hoofed animals, especially pigs, are also natural reservoirs of the virus. In a series of studies conducted in the Peking area, 100% of the pigs were found to possess neutralizing antibody.[33]

There is usually a period in early summer with sporadic cases before an outbreak. Approximately one-third of the cases are under 10 years of age, and one-half between 10 and 20 years of age. Subclinical infections are quite common. A large-scale serological survey shows that 67% of adults between 20 and 30 years of age and 80% of persons over 30 are immune to the disease.[33] In the Peking area, 20 to 30% of the population have detectable complement-fixing antibodies after an epidemic season, indicating recent infections.

The incubation period is 10–14 days. The disease has a gradual onset characterized by headache, fever, dizziness, vomiting, somnolence, neck stiffness and various neurological signs.[34] There are usually more severe cases and deaths during the first half of an epidemic than in the second half, and the most common cause of death is paralysis of the respiratory center.[33] The mortality rate was around 30% before 1949 but dropped considerably in recent years.[34] Approximately 11% of the patients are discharged from the hospital with sequelae.

The diagnosis can be made with little difficulty on a clinical basis and with serological tests. Measures of control described below for malaria are applicable also to Japanese B encephalitis.

Schistosomiasis

There is only one species of *Schistosoma*, *S. japonicum*, in China. The number of cases of schistosomiasis was estimated at 10,000,000 in 1959. The disease was endemic in areas south of the Huai River and east of the Langtsang River, involving 3,000 square miles covering 12 provinces,[35] and was threatening the health of 100,000,000 people. It was especially rampant along the great Yangtze River with the prevalence rate there reaching 60% in some villages. The only known intermediate host of schistosomes in China is *Oncomelania hupensis*. The spread of this snail corresponds with that of the disease and surveys have shown that wherever there is *O. hupensis* there are also human cases of schistosomiasis. Many domestic and wild animals have also been found naturally infected; the most important of these are cattle.[36, 37]

In the 1950's, at least forty-two schistosomiasis institutes were set up to extend a broad-spectrum research program. The areas of research interests ranged from the studies of modes of contracting the disease specific to various types of farmland, and factors influencing the hatching of schistosome eggs in human and animal feces, to copulation, oviposition, multiplication and hibernation of snails.[37] Results of these studies probably contributed significantly to the mapping of control measures of schistosomiasis.

Most of the patients (62.9%) were in the 31–50 year age group. The incubation period was around 40 days. Acute phase schistosomiasis was characterized by fever and general symptoms of acute toxemia.[36] Leukocytosis, especially that of the eosinophilic cells which may account for 88% of the total, was almost a constant finding.[36] In fact, absence of eosinophilia was indicative of graveness of the disease and poor prognosis.[37] One of the late manifestations of schistosomiasis was liver cirrhosis. Schistosomal hepatic cirrhosis differed pathologically from portal cirrhosis in that there was fibrosis in the periportal areas with normal architecture of the hepatic lobules and without apparent or marked nodular formation.[36] However, clinical manifestations of hepatic failure were uncommon, and liver cirrhosis or deterioration of hepatic functions could be halted by splenectomy and/or antischistosomal chemotherapy.[36] Another important late manifestation of schistosome infections was endocrine disturbance, characterized by reduced tolerance to cold, loss of body and pubic hair, decreased libido and dwarfism.[36, 38, 39] This was due primarily to the suppression of pituitary functions by toxic secretions of adult worms and miracidia within the ova or secondarily to the functional disturbances of the liver and intestine following repeated infections during childhood.[37] The dwarfism was reversible upon appropriate antischistosomal treatment.[37, 38, 39]

During the acute stage, ectopic lesions occurred more frequently in the lung and brain than in any other organ.[40] Studies also showed higher incidence and an average of a 9.8-year earlier onset of colonic cancer among schistosomiasis patients than in the normal population.[41] The duration of schistosomiasis before cancer varied from five to 20 years.[41]

As is true for other major parasitic diseases, two methods were available for the diagnosis of schistosomiasis. Immunological diagnosis was made with the ova antigen prepared from infected rabbit liver. However, the onset of a skin reaction was late after infection and persisted long after a successful treatment, rendering skin tests useless in the diagnosis of acute cases and the assessment of the effects of the treatment. For early diagnosis, both the cercarial membrane reaction and circumoval precipitating tests were said to be more practical.[37] A highly sensitive indirect hemagglutination test was also available but studies concerning its time of onset seem incomplete. Also in use was a complement-fixation (CF) test which gave a somewhat lower (86.3%) positive rate. However, the combination of the CF test and skin test could increase the positive rate to nearly 100%.[43] The causative agent could be detected either by stool examination or rectal biopsy. For the former, best results were obtained by combining the sedimentation and hatching techniques. The hatching time required was considerably shortened by increasing the incubation temperature to 40°C.[35]

Schistosomiasis is extremely hard to treat and complete cure is difficult to attain. Drugs in use were mainly the antimonials. However, China has also been diligent in the search for new parasiticides. Perhaps the most important discovery in antischistosomal chemotherapy is the new drug furapromidine, also known by its code number F30066, which is an orally effective, nonantimonial therapeutic agent.[44] Chemically, it is N-isopropyl-3-(5-nitro-2-furyl)-acrylamide (Fig. 2).

It is said to be dramatically effective in acute schistosomiasis, although its effect in chronic cases is somewhat disappointing.[44, 45] Long

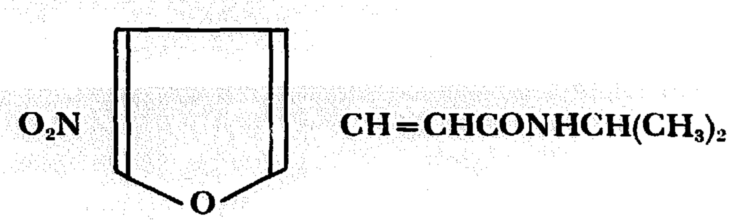

FIGURE 2. Chemical structure of furapromidine.

term use of this drug for 1.5–2.5 months at a daily dose of 50–80 mg/kg body weight given in four divided doses had an 81.4% egg conversion rate and immediate therapeutic results (probably judged by clinical improvement) were put at 83.8%. The drug is not without side effects, which disappear readily upon the termination of the medication.[45] However, no information is available beyond the stage of clinical trail. A more conventional medical treatment with tartar emetic at a dose of 12 mg/kg body weight with a maximum total dose of 700 mg in 2–3 days was considerably more convenient in mass treatment than previously practiced longer course treatment and was as effective and as safe. In addition to the medical approach, splenectomy is often used in cases with apparent hypersplenism and ascites.[44, 46] Traditional herb medicine and acupuncture are used for some aspects of symptomatic treatment.[37, 44]

Control measures can be summarized in three categories: a) Eradication of the source of infection: patients and infected cattle were to be treated by the "three-day tartar emetic" method.[44] Parasite ova in night soil, an important fertilizer Chinese cannot afford to discard, were to be killed by storage with urine or the addition of chemicals.[37] b) Education of the public: the public was informed of the mode of transmission of schistosomiasis and of protection methods, including the use of repellents of cercaria on lower extremities.[35] c) Eradication of the intermediate host: molluscacidal chemicals were produced to eliminate snails,[37] streams were drained and various water conservancy projects were initiated.

The current status of schistosomiasis is quite disappointing. Abundant evidence indicates that, despite two decades of intensively fought antischistosomal campaigns, the disease has not been brought under control. Each year hundreds of thousands of people are mobilized to eliminate snails in endemic areas. According to recent information, the area of schistosomiasis endemicity has not diminished significantly from that of the early 1950's.[47]

Malaria

There were about 30,000,000 malaria patients in 1959.[36] The distribution of malaria is shown in Table 2. All four types of malaria are present, of which falciparum and vivax are the two most prevalent.[37] In general, vivax malaria was widely spread throughout the endemic areas while falciparum was mainly concentrated in the south.[37] The disease plagued areas south more than those north of 32°N, with an especially tight grip on areas south of 25°N, which include China's most well-known malarial breeding grounds such as Yunnan, Kweichow and Hainan. Several species of anopheline mosquitoes responsible for the transmission of malaria have been identified and their distribution has been well studied (48, Table 2). Of particular importance among these are *Anopheles sinensis* and *A. lesteri* which breed mainly in rice paddy fields and their seasonal role as vector corresponds well with the cycle of rice cultivation. Although malaria is endemic in all parts of China, outbreaks of epidemics do occur as the result of arrivals of nonimmune migrants to an area of endemicity or introduction of a species to an area in which it is not endemic. A typical outbreak of the latter type took place in 1953 in the Northeast when demobilized servicemen returning from Korea imported falciparum malaria, a type not indigenous in the area at the time.[37]

A nationwide antimalarial campaign, consisting of the treatment of patients and the control of vectors, was launched in 1956,[48] resulting in a steady drop in the incidence of malaria throughout the country. Today, China boasts domestic production of all antimalarial drugs, including chloroquine, primaquine, chloroguanide and others. The ideal course of individual therapy of vivax malaria was said to be 15 mg of primaquine base for 14 consecutive days combined with a 0.6 gm base of chloroquine on the first day. The rate of relapse of malaria after such a course of treatment was reported to be inversely dependent on the patient's age.[48] The relapse could be effectively checked by a second course of treatment, up to a total of 225 mg of primaquine. The duration of the interval between the two courses had little effect on the efficacy of the treatment. Shorter versions of these courses developed to suit mass treatment were: a) two courses of 180 mg of primaguine given in 8 days, or b) two courses of 120 mg of primaquine given in 4 days. Both of these two mass therapies were carried out during the non transmission seasons in order to prevent reinfection and to eliminate as many sources of infection as possible in one strike. This mass therapy program was especially hard pushed in areas where spraying operations were considered too costly.

Benzene hexachloride (BHC) is mass produced in China and house

Table 2. General picture of malaria in China*

Area	North of 32°N	25–32°N	South of 25°N	Northwest
Transmission duration	3–6 months	6–8 months	almost perennial 9–12 months	3–6 months
Parasite (*plasmodium*) species present	mainly *vivax*	*vivax, falciparum* and *malariae;* ordinarily *vivax* most prevalent; during high seasons *falciparum* becomes outstanding	all species present; mixed infections very common	*vivax* prevalent; *falciparum* in Sinkiang
Vector (*Anopheles*) species operating	*sinensis; messeae* probably north of 45°N	*lesteri,* the chief, and *sinensis,* the secondary vector: *minimus* and *candidiensis* in certain hilly districts only	*minimus,* the chief, and *candidiensis* secondary vector in hilly districts; *sinensis* inefficient vector in plains; *balabacensis* important in jungle areas of Hainan	*sinensis* in all malaria foci; in Sinkiang *sacharovi* also present
Geographical distribution	mainly near rivers and lakes	widely spread	widely spread	only present in low-lying damp areas
Prevalence (spleen) rate	less than 10%	10–50% in hilly regions; less than 10% in plains	50–100% in hilly regions; 10–50% in plains	less than 10%

*Adapted from Ho.[15]

fumigation with this agent is done throughout the country during the active season to kill adult mosquitoes. In its powder form, BHC at an appropriate dosage is said also to be effective in eliminating larvae of *A. sinensis* and *A. lesteri* in rice fields.[48] However, the insecticidal effect of BHC does not last as long as that of dichlorodiphenyl-trichloroethane (DDT).[37] China has also had large scale programs of BHC or DDT spraying of households. However, because of fund shortages, the spray program had not been extended to all parts of the country by 1965.

Other sanitary measures were also taken to eliminate breeding places of mosquitoes. These measures included filling and drainage of ditches and other sources of stagnant water. Several suburban areas of Peking, formerly well-known as breeding grounds for mosquitoes, are said to be mosquito-free.[37]

Filariasis

Filariasis is endemic in areas south of 37°5′N and involves at least 13 provinces. The number of patients was estimated at 40,000,000. In areas of high endemicity, the prevalence rate could be over 30%, such as in Shantung,[37] or even over 50% such as in some parts of the deep south. A large number of cases are clinically asymptomatic until late in the course, and the proportion of such cases is especially high among children.[49]

Filariasis is caused by the nematode *Wuchereria.* Two species, *W. bancrofti* and *W. malayi,* have been identified in China. Both bancroftian and malayan filariasis are endemic in all provinces except Kwangtung and Shantung in which only bancroftian filariasis occurs. As a rule, bancroftian filariasis is distributed mainly in the low-lying plains and malayan filariasis in the water-rich hilly districts of South China. The chief mosquito vectors of bancroftian filariasis are *C. pipiens* var. *pallens,* distributed north of 30°N, and *C. pipiens* var. *fatigans,* south of 30°N. Malayan filariasis is chiefly transmitted by *A. hyrcanus* var *sinensis,* which infests mainly the area between 32°N and 25°N and also transmits malaria in the area.[48] In addition, *Aedes togoi* may serve as a secondary intermediate host for both species of *Wuchereria* in some areas along the sea coast.

While acute symptoms offer little basis for distinguishing bancroftian for malayan filariasis, late manifestations do show considerable grounds for differentiation. Malayan filariasis is characterized by more common elephantiasis of the extremities, especially of the lower limbs, and relatively rare elephantiasis of the genital organs or chyluria. In bancroftian filariasis, on the other hand, 90% of the cases sooner or later show elephantiasis of genital organs as well as that of extremities, and chyluria is quite common.[36, 37] It should be noted, however, that mixed infection with both parasites does occur. The pathogenesis of lymphangitis in filariasis is manifold. It may be induced by adult filarial worms per se or their secretions, or secondary bacterial infections, for which *Streptococcus* is believed to play an important role.[50] Lymphangitis often follows physical exertion and thus is more frequent in spring and summer. It is more severe in malayan than in bancroftian filariasis.[37]

Studies have also revealed that microfilarial periodicity is under the control of the activity of the vagus nerve, or in other words, is directly under the influence and control of the activity of the cerebral cortex.[51]

For immunodiagnosis, the antigen prepared from *Dirofilaria imitis*, the dog heart worm, is used for both skin and CF tests. Positive reactions in these cases were said to be 90% and 87% respectively.[37] These tests, which are clearly superior to blood examination in the diagnosis of filariasis, have not been used for mass survey because of logistic problems in the mass production of the antigen.

Hetrazan is the drug of choice. A therapeutic program suitable for mass treatment has been developed.[52] For the malayan filariasis, 1.0 or 1.5 gm of hetrazan at night in quite effective. For bancroftian filariasis, which requires repeated medication, the suggested program is 0.5 gm twice a day for three days, with a total of 3 gm. The short course treatment, in its safety or efficacy in killing microfilariae and adult filaria worms, is said to be comparable to the longer 7–21 day conventional courses of treatment.

The measures of filariasis control are similar to those of malaria control and, therefore, will not be repeated.

A few words for kala-azar at this point may not be entirely inappropriate, since it was one of the original five parasitic diseases the Chinese strived to control. This disease, caused by *Leishmania donovani*, was distributed mainly in central China, especially the vast plains along the Yellow and Huai Rivers, with an estimated number of half a million cases. The intensive mass therapy campaign in the early 1950's, assisted by the intensive anti-sandfly program, led to a rapid decline in incidence. However, resurgence in the incidence was reported in the early 1960's,[5] indicating a partial failure in attaining a long-standing severance of the infection chain.

Clonorchiasis

Clonorchiasis, formerly known to be endemic only in some areas of Kwangtung and Kwangsi Chuang along the Chu Chiang (Pearl River), is widespread throughout the country, including Liaoning, Szechuan, Hopei and Shantung.[37, 53] The prevalence rate varies from village to village, and could be as high as 40% in some highly endemic areas.

This disease is caused by *Clonorchis sinensis* (liver fluke), the only species known to exist in China. Man is infected by eating raw or partly cooked parasitized fresh water-fish. An interesting feature in the epidemiology of this disease is the relationship of the degree of endemicity and age distribution to the custom of eating fish. T'ang et al. pointed out [54] that the peak of age incidence of the disease is in the middle-age adult group and that the disease is highly endemic in areas, such as Kwangtung, where people have the custom of eating raw fish. In the endemic areas which were discovered after 1949, where the custom of eating raw fish is not prevalent, the disease is lower in endemicity and its peak incidence is seen in children under 15 years of age. For example, in Fukein, which belongs to the newly discovered endemic areas, 80% of the cases are seen in the 1–15 year age group.[54] According to statistical data obtained in Hong Kong, which are also believed to be applicable to Kwangtung, 40% of the autopsy cases over 40 years of age have clonorchiasis and the mean age incidence of the disease is 45.[55]

A variety of snails serve as the first intermediate hosts of the parasite including those of genera *Parafossaralus* and *Bithynia*. The secondary intermediate host includes various kinds of freshwater fish, of which grass carp is the most important in Kwangtung. Man is infected when fish containing encysted metacercaria is ingested. Besides man, dogs and cats also are important natural reservoirs of *Clonorchis*.

The disease is confined to the hepatobiliary system. It is characterized by a gradual onset of anorexia, abdominal pain located in the right upper quadrant simulating that of choledochitis or acute cholecystitis, abdominal distension, loss of weight, diarrhea and hepatomegaly. The blood picture usually shows marked eosinophilia.[56]

A study conducted in Kwangtung shows that 39% of hospitalized cases of cholecystitis were due to clonorchiasis.[56] These cases often require surgical intervention at some stage of the disease. For example, in the same study, it was shown that 4.8% of all the hospitalized surgical patients were cholecystitis cases and in about 50% of them the ailment was due to clonorchiasis. Late stage clonorchiasis often leads to liver cirrhosis. A higher incidence of hepatoma among clonorchiasis patients has also been reported.[56]

Diagnosis of the disease by stool examination is simple in technique but mild cases often escape detection. The stool examination is repeated at least three times in the same individual in mass surveys. An intradermal test with antigen prepared from adult *Clonorchis* was introduced by Chung et al.[57] and has been widely used. However, highly diluted antigen must be used to avoid cross reaction with *Schistosoma* and *Paragonimus*.[56]

Chemotherapy of clonorchiasis is unsatisfactory, especially in chronic cases. In fact, drugs may only depress the reproductive system of the flukes without killing them. Relapses are commonly seen in treated cases.[37] Chloroquine was considered to be the best chemotherapeutic agent available in the early 1960's but the long course and large dose required rendered it impractical in mass treatment.[37] Oral hexachlorophene, given at a dose of 20 mg/kg/day for three consecutive days, was reported to be highly effective against the parasite. Parasite ova disappeared from the stool in 41% of the cases in two to three weeks along with expulsion of a large number of adult worms. In this particular study, relapse or reappearance of ova in the stool did not occur during the four-month period of follow-up.[58] Hexachloroparaxylol was also used but the results seemed less satisfactory than with hexachlorophene. Untoward reactions of these drugs have been well described,[56, 58] and it is not clear whether these drugs have ever been used in a large scale therapeutic program.

Some of the steps taken for the control of clonorchiasis, including elimination of snails and disposition of night soil, are part of the general campaign to eliminate four pests (snail, mosquito, rat and sparrow) and five major parasitic diseases. The Chinese authorities now insist on the composting of human manure before it is used in fish ponds. Hazards in eating uncooked fish and the need of improvements in environmental sanitation were stressed in public education. These multifaceted efforts have probably to some extent broken the cycle of and reduced the incidence of clonorchiasis. This conclusion, given by Gibson and Sun, was based on their observation of the sharp drop in the presence of metacercarial cysts of *Clonorchis* in recent fish exports from Kwangtung to Hong Kong.[55]

Paragonimiasis

Paragonimiasis, caused by the lung fluke *Paragonimus*, is wide spread in at least fifteen provinces. The areas in which it has been reported extends from Liaoning in the Northeast to far south in Yunnan, with central China as the most highly endemic area, where the prevalence rate was 67%[59] in some villages. In the Northeast where paragonimiasis was discovered in 1955, 47% of the population in the Sung-hua Chiang area are infected. More than half of the cases are in the 11–15 year age group.[59]

Chinese scientists claim that two species of *Paragonimus, P. westermani* and *P. Skrjabini* are existent, and the diseases caused by these two parasites are said to be distinguishable on clinical grounds. In general, *P. skrjabini* is limited to Szechuan, Kiangsi, Yunnan and some parts of Kwangtung, while *P. westermani* is distributed in the remainder of the endemic areas.[59, 60, 61] Besides man, both domestic and wild animals are important natural reservoirs. The first intermediate hosts are operculated snails of various genera, and the second intermediate hosts include a wide variety of fresh-water crabs, such as cray-fish.[37]

The incubation period is three to six days and the onset usually insidious.[59] The most common symptoms of the disease caused by *P. westermani* are productive cough, hemoptysis and chest pain. However, the patient's sense of well-being is usually not significantly impaired. These symptoms may be preceded by a certain period of abdominal pain and distension, diarrhea or pus and blood in the stool. Marked eosinophilia is a constant finding. In *P. skrjabini* infection, pulmonary symptoms are less severe and hemoptysis less frequent but eosinophilia and pulmonary effusion are more marked than in *P. westermani* infection. Migratory subcutaneous swellings caused by travelling worms are more common in *P. skrjabini* than in *P. westermani* infection.[60]

According to one study, *Paragonimus* involved the brain in 11% of the cases.[60] The clinical manifestations of the brain involvement are headache, epileptic seizures and other symptoms simulating meningitis or brain tumor. The route of travel of adolescercaria of *Paragonimus* from the lung to the brain has been studied in detail.[62]

Pathologically, *P. skrjabini* cysts, unlike those of *P. westermani*, are completely devoid of parasite ova. In fact ova of *P. skrjabini* are difficult to find in sputum, pleural effusion, cerebrospinal fluid and subcutaneous swellings.[60] However, cysts of *P. skrjabini* are more numerous than those of *P. westermani* in the pathway of *Paragonimus* adolescercaria from abdominal to the pleural cavity, i.e., the abdominal surface of the diaphragm and the anterior border and the subdiaphragmatic surface of the liver.

The diagnosis of pulmonary paragonimiasis is not a simple matter in a country with highly prevalent pulmonary tuberculosis. As a result paragonimiasis patients are often mistaken for and treated as tuberculosis patients. Although careful roentgenological examinations in skillful hands may differentiate paragonimiasis from tuberculosis,[63] the diagnosis of paragonimiasis relies primarily on the demonstration of parasite ova in the sputum or an intradermal or CF test with antigen prepared from adult worms obtained in artificially infected animals. Both of these immunological tests are said to be highly specific with positive rates reaching nearly 100%. The skin test, therefore, was used in the mass survey of paragonimiasis.[64] The same antigen is also used in the detection of antibody in the cerebrospinal fluid of patients with central nervous system involvement. The positive rate was reported to be 83.3%. Besides, abnormal electroencephalographic findings of brain paragonimiasis may help in establishing the diagnosis.

The drug of choice for paragonimiasis, bithional [2,2′-thiobes 4,6-dichlorophenol)], is produced in China.[44, 60] A so-called 20-day-course treatment, with 1 gm of this drug given orally in three divided doses a day every other day totalling 30 gm, is a standard program. The relapse rates after this treatment were said to be 2.8% in pulmonary and 4.4% in cerebral paragonimiasis. For patients with cerebral paragonimiasis involvement, a combination of bithional and emetine is desirable.[60]

The control measures for paragonimiasis are similar to those for clonorchiasis and therefore will not be repeated.

Ancylostomiasis

Ancylostomiasis, or hookworm disease, is a highly endemic parasitic disease involving at least 15 provinces. Areas of highest endemicity are those along the Chu Chiang, the Yangtze River and the coast. The incidence is highest among young adults. Even among children, the prevalence rate may reach 50% in areas of high endemicity. It is generally more prevalent in the south than in the north. The only regions spared of the disease are the northwestern parts and Inner Mongolia.[37]

Two hookworms, *Ancylostoma duodenale* and *Necator americanus*, have been identified. Patients in most areas are infected with both parasites. In the south, however, the disease is predominantly due to *N. americanus*. The total number of patients was estimated at 100,000,000 in 1959.[37]

Clinical investigations have revealed that besides creeping eruptions, pulmonary symptoms consisting chiefly of dry cough but with occasional blood-streaked sputum containing larvae are quite common in the early stage of the disease. Chronic cases are characterized by anemia, malnutrition and loss of weight.

Results of investigations show that hookworm ova develop and hatch into larvae only in soil with suitable temperature.[37] Thus, unlike past belief, rice fields play an insignificant role in the transmission of hookworm disease. The disease is acquired mainly through the cultivation of dry land crops, especially those which need frequent fertilization, such as sweet potatoes, corn, tobacco, vegetables, and mulberry and fruit trees. Therefore, the infection season is closely linked to the cultivation cycle of various crops.[37]

In addition to methods of detection of parasite ova in the stool similar to those applied to schistosomiasis, an intradermal test for ancylostomiasis apparently proved to be highly suitable for mass survey.[37, 66] The test, which employs antigen prepared from adult hookworm, is said to be highly specific and is positive in 99.5% of hookworm cases.

Bephenium hydroxylresorcinol was mass-produced in 1960[44] and widely used as the therapeutic agent. A new drug, the bephenium salt of gallic acid, developed in 1963, was said to be quite satisfactory in the preliminary trial,[44] but the result of large scale field trials are not available. The search for better therapeutics for ancylostomiasis was quite active in the early 1960's.[44]

Readers are referred to the section on schistosomiasis for the control measures for ancylostomiasis.

Conclusion

Parasitic diseases, as is clear from this discussion, constitute the major threat to the health of Chinese people. According to the data compiled in 1959, the total entries of parasitic diseases was an incredible 280,000,000.[36] This means that one out of every two to three persons dwelling in China at the time might have had a parasitic disease, although this was not necessarily so because mixed infection with more than one parasitic agent was a common occurrence. On the other hand, the credibility of Chinese statistical data has always been questioned on the ground that scientific procedures of data collection are not rigidly followed. Such a deficiency often leads to an underestimation rather than an overestimation and thus the actual number of parasitic disease entries may have been well over 280,000,000. Therefore, it seems logical that Chinese authorities have directed more concerted efforts to the so-called five most menacing parasitic diseases than to tuberculosis, ranked number one as the cause of death, or to trachoma, ranked number one in prevalence.

Despite failures in some aspects of health work and relatively slow progress in the control of infectious diseases, the prospect for greater success in the near future could be quite good. The greatest guarantee for this success is seen in the ability of Chinese medical professionals to keep themselves up to date in the medical sciences and the striking success in the improvement of environmental sanitation, which have caught even the most experienced eyes of recent visitors to China.[67] It is, in fact, remarkable that such a high degree of success could have been achieved amid the chaos of the postwar period involving a quarter of the world's population. There is no doubt that China has the will and perhaps the capacity to bring these devastating communicable diseases under control, and rescind the title of "the weakling of eastern Asia."

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CANCER RESEARCH ORGANIZATION AND PREVENTIVE PROGRAMS

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INTRODUCTION

Since the founding of the People's Republic of China in 1949, Western investigators have shown a keen interest in its public health activities. Popular and scholarly reports on the health revolution in New China have appeared under such provocative captions as "Barefoot Doctors," "Great Leap Forward",[1] and "From Village to Commune".[2] The revolutionized medical services in the People's Republic have been documented by a British surgeon in a book-length account,[3] based on the author's first hand experience. The book reflects his familiarity with the grass-roots operation of the services and the underlying political ideologies. Other aspects of health and medicine in the new regime, ranging from the barely noted subject of medical education and manpower[4] to the much publicized practice of acupuncture,[5] have been described in these publications.

Certain sectors of the health revolution in New China have been slighted. In Western circles, little attention has been directed to the achievements in organizing research and preventive programs in chronic diseases. Such a *tabula rasa* has been unfortunate, particularly in consideration of an increasing life expectancy in New China. The present paper is directed forward filling that gap, although its scope of inquiry is confined to a single but significant group of chronic morbid conditions, namely, malignant neoplasms.

Organization of Cancer Research

Since China entered the area of modern medicine in the early 1900's, cancer has continued to command strong interest among members of Chinese medical professionals. A series of papers on "Cancer in China" was delivered before the 19th Biennial Conference of the Chinese Medical Association in 1929. During this conference a resolution was made urging the League of Nations to consider forming a special commission. The purpose of such a commission was to investigate the regional distribution of cancer in China and neighboring countries and its possible relation to racial differences in diets and ways of living.[6] The first Tumor Clinic was initiated in 1932 at the Peking Union Medical College.[7] Three years later, the Association conducted a survey of tumor incidence (benign and malignant) in hospital patients.[8]

With the founding of the People's Republic, the concern with malignant neoplasms has greatly intensified. An account of some such activities is given below.

General Organization and Activities. The importance of cancer research was clearly indicated in the national 12-year plan for scientific development proclaimed in 1956. The proliferation of agencies devoted to cancer studies showed the impact of the program (Appendix A). In experimental tumor research alone, there were about 24 agencies engaging in such activities until 1959, notably the Tumor Institute, the Research Institute of Experimental Biology, the Research Institute of Pharmacology, and the Research Institute of Experimental Medicine, all in the Academy of Medical Sciences. The Research Institute of Experimental Medicine consists of six tumor research units: Tumor Etiology, Tumor Therapy, Tumor Immunology, Tumor Metabolism, Human Tumor Heterologous Transplantation, and Human Tumor Tissue Culture. Research in epidemiology of cancer is mainly conducted by the various medical colleges throughout the country.

Since 1958 several research institutes in the Academy have collaborated closely in cancer investigation. In the same year a special choriocarcinoma study section began in the Academy. A Cancer Research Unit at the Szechuan Medical College was founded in 1958, followed by the organization of the Academy's Committee for Cancer Research, and similar committees in Shanghai, Tianjin, Chengtu, and other cities. A National Cancer Conference was held in Tianjin in 1959 and the "Collected Papers" of the Conference were published the next year. Included in these papers was a statistical study of about 277,000 surgical specimens of tumors from 36 medical colleges in 26 districts in China.[9] About this time, a conference was held on esophageal malignancy for four provinces and one city, followed by two conferences on cancer of the nasopharynx in 1960 and 1961.

In recognition of the Soviet accomplishments in the areas of cancer research and anti-cancer organization, a team of Chinese scientists was sent to the U.S.S.R. in 1960 to learn from its experiences.[10] Two years later the Chinese cancer scientists submitted 33 papers to the Eighth International Cancer Congress covering such areas as carcinogenesis, epidemiologic and pathologic aspects of cancer, the biology of cancerous cells, and the new drugs in experimental use against cancer.[11] In 1964, 104 papers were delivered before a cancer conference of Chung Shan Medical College following the ceremonial dedication of Huanan (South China) Cancer Hospital in Canton.[12] A translated edition of *Treatment of Cancer and Allied Diseases: Tumors of the Head and Neck* by Pack and Ariel [13] appeared in 1964,[14] six years after the publication of the original work in Britain. The second National Cancer Conference was held in 1965 and the third one in 1969. A second conference on esophageal cancer at the provincial level was held in 1972 in Lin County, Honan.

We have no full knowledge of the formal organization of clinical cancer research. However, there are a 300 bed Tumor Institute in the Academy of Medical Sciences and the Tumor Hospital at the Shanghai First Medical College, established about 1950. The Huanan (South China) Cancer Hospital, dedicated in 1964, has 140 beds and consists of formal Departments of Radiology, Internal Medicine, Gynecology, Chest and Abdomen, and Head and Neck. Two other tumor hospitals were established in Hangchow (Chekiang province) and Taiwan (Shansi province). The Tumor Department at Tianjin Hospital has the status of a hospital.

Epidemiologic and Morphologic Studies. A detailed review of epidemiologic aspects of cancer will be published separately.[15] Some morphologically relevant information is presented below.

The histologic classification of some 18,000 microscopically examined specimens (mainly those of the former Peking Union Medical College) is presented in Table 1. One comment seems in order, i.e., an apparently low frequency of Hodgkin's disease. Special mention is made of a study based on 1,979 necropsies from 38 medical colleges throughout the country during the period 1950–1957.[17] Included here is information on the geographic distribution of histologic types for several primary sites,

Table 1. Percentage Distribution of Carcinomas by Histologic Type and Sex, Peking Union Medical College, 1917–1957

Histologic Type	Males	Females	Sex Unknown
All Malignancies	7,446	9,966	846
Carcinoma	5,137 (69.0)	8,151 (81.8)	491 (58.0)

Table 1. (continued)

Histologic Type	Males	Females	Sex Unknown
Squamous cell carcinoma	53.9	64.1	45.2
Transitional cell carcinoma	3.1	0.7	4.7
Basal cell epithelioma	2.4	0.9	3.9
Carcinoma of simplex	15.8	18.0	24.6
Adenocarcinoma	17.1	12.8	16.9
Papillary adenocarcinoma	1.0	2.1	0.8
Lymphoepithelioma	4.7	0.6	3.7
Embryonal carcinoma	2.0	0.2	0.2
Carcinoma *in situ*	+	0.6	...
Sarcoma	598	309	101
	(8.0)	(3.1)	(11.9)
Fibrosarcoma	57.5	61.2	70.3
Synoviosarcoma	5.0	2.3	5.9
Myxosarcoma	4.7	3.9	8.9
Chondrosarcoma	5.0	3.2	1.0
Osteosarcoma	12.7	9.7	12.9
Neurofibrosarcoma	15.1	19.7	1.0
Lymphoma	525	167	37
	(7.1)	(1.7)	(4.4)
Lymphosarcoma	54.5	47.9	59.5
Reticulum cell sarcoma	32.4	41.3	27.0
Hodgkin's disease	13.1	10.8	13.5
Other malignancies	1,188	1,339	217
	(15.9)	(13.4)	(25.7)
Giant cell sarcoma	7.3	3.7	6.0
Gliosarcoma	2.1	0.5	4.1
Neuroblastoma	1.3	1.0	0.5
Melanotic melanoma	7.3	5.4	8.8
Ameloblastoma	6.7	1.6	2.3
Mixed tumors, salivary gland type	26.9	17.8	22.1
Wilm's tumor	0.4	0.4	0.5
Teratoma	4.8	28.6	4.6
Chorioepithelioma	0.1	11.7	0.5
Other	16.7	15.6	26.7
Unspecified	26.4	13.7	24.0

Figures in parentheses indicate percentage of this broad group among all malignancies.

\+ Less than 0.1 percent

... None

Source: Reference 17

with additional data on age and sex. References for the morphologic classification of selected tumors are cited below: brain tumors;[18, 19] lymphoepithelioma;[20] adamantinoma;[21] nasopharynx;[22-24] liver;[25] lung;[26] female genital organs;[16, 27-30] spinal cord,[18] and skin.[31]

Experimental Tumors. Between 1949 and 1952, research in experimental tumors was conducted by the Physiology Department of the Peking Union Medical College and the Research Bureau of Sanitary Engineering, Academy of Medical Sciences. Since 1943 tumor experimentation has been extended to some 20 other agencies, as mentioned earlier. A wide range of studies was initiated covering such areas as tumor development, tumor metabolism, tumor immunology, tumor transplantation, and tumor therapy.

A notable experiment in tumor therapy is the use of *actinomycin K.*, which was isolated in 1957 from *Streptomyces melanochromogenes*, obtained from the soil in South China.[32, 33, 34] When used experimentally with nitrogen mustard, the drug showed a marked inhibitory effect on animal tumors.[35] The drug reportedly was tried on Hodgkin's disease patients with encouraging results. Readers interested in the findings of this and other experimental tumors may consult the reports in *Selected Papers on Cancer Research* [11] and the review articles by Hu and Yang,[35] Chien,[36] and Yang et al.[37]

Recently, the use of *kengshenmycin* along with other therapeutic agents commonly known in Western literature (Table 2 and Appendix B) was reported to be effective in the treatment of malignant trophoblastic tumors.[38] This drug reportedly had relatively low toxicity and gave favorable results in pulmonary metastasis.

Independently developed by the Chinese scientists, *actinomycin K* and *kengshennycin* are known in Western literature as *actinomycin D.**

Promotion of Traditional Anti-Tumor Medicine. In accordance with the strong emphasis on integrating Western medicine with the art of herb healing,[39] cancer studies directed to the *materia medica* of China have been greatly intensified since 1955. In that year the Institute of Epidemiology in the Academy of Medical Sciences began to screen anti-tumor herb drugs of simple formula. Subsequently, intracorporeal screening for anti-tumor compounds and simple traditional formulas in experimental animals was initiated in the Research Institute of Experimental Medicine, the Research Institute of Pharmacology (both in the Academy of Medical Sciences), and in a number of medical colleges, including Peking, Tianjin, Chungking, Wuhan, Hopei, and Hupei. Some of the experimental results were reported in the three review articles quoted earlier.

The emerging convergence of traditional and Western medicine with respect to the knowledge of tumors is clearly reflected in the contents of a section in *Handbook for Barefoot Doctors*,[40] a publication of the Re-

*See C. P. Li: *Anti-Cancer Agents Newly Developed in China*, chap. 4, unpublished manuscript; and Shenghai Municipal Tumor Hospital, *Prevention and Treatment of Tumors*, Appendix 5, Hong Kong.

search Institute of Traditional Medicine of Hunan Province. For example, the information given for the seven common Chinese cancer sites (nasopharynx, stomach, rectum, liver, lung, breast, cervix) and also for osteosarcoma is generally consistent with Western clinical experience (Appendix C). Of particular interest is the recognition of osteosarcoma, a discussion of which is presented in another paper.[15] However, esophageal malignancy, a cancer site of high risk characteristic in the Chinese population, is missing.

The Anti-Cancer Campaign

Much of the anti-cancer campaign success in New China was attributable to the unique operational model adopted, i.e., mass social mobilization or patriotic health organization. A good example is the activity of the Youth Anti-Cancer Shock Brigade. The Brigade was formed in the mid-1950's by the Second Communist Youth League Branch of the preclinical departments in the Academy of Medical Sciences,[35] consisting mainly of members from the Pathology Department. The organization of the Brigade and the constant support of the Party eventually led to the establishment of the Committee for Cancer Research of the Academy referred to previously, and to the formulation of an ambitious five-year plan for the conquest of cancer.

Analysis of Microscopically Examined Data. As a politically oriented and patriotically motivated work force, the Brigade engaged in extensive analysis of microscopically examined material. However, the published data *per se* are generally limited to frequency distributions of broad cancer sites and/or histologic types by sex, with occasional tabulations by age and other characteristics. In 1958, the Brigade examined the records of 27,149 tumor cases from 150,000 surgical specimens spanning a 38-year period. These specimens were from Department of Pathology of the Academy collection but were mainly those of the former Peking Union Medical College. By working round the clock, the task of examination and tabulation (about which we have no full knowledge) reportedly was completed within eight days![16] Also in 1958, members of the Brigade prepared a pathomorphologic analysis of 1,895 cases of cervical cancer, which led to the development of a morphologic classification system.[41]

Subsequently, the new Peking Medical College assumed the task of analyzing 12,678 tumor records, including 2,906 cases of cervical cancer. Eight other medical colleges followed suit. They gathered data from five institutions on 100,000 tumor cases of all sites.[35] At the Shanghai First Medical College the pathology staff members and medical students completed in 20 days a morphological analysis of 220,650 surgical specimens, of which 28,824 were malignant neoplasms.[42]

It must be emphasized that the above analytical findings have added greatly to our knowledge of cancer morphology and epidemiology in China to date. In the 1930's only a few studies of limited scope were published.

Cancer Screening Program and Survey. A cancer screening program and survey were carried out at a different level of operation under the provocatively phrased "Give Cancer Its Deathblow" campaign. Using the standardized procedures set by the National Tumor Conference, mass examinations for cervix uteri malignancy were conducted between 1958 and 1960 in 20 large and medium size coastal and inland cities. Two cities were in Inner Mongolia.[43] An intensive public education program urged citizens to take advantage of the examination. The medical teams, consisting of physicians, interns, nurses, and technicians, were given special training for the task. In consonance with the new regime's "grass roots" approach to health care, these examinations took place in neighborhood hospitals or clinics, and in the health offices of factories, schools, and other institutions. In some instances examinations were conducted in people's homes during evenings. As a result, 1,693 cases of cancer of the cervix uteri were detected in over one million women aged 25 and older.

Other examples are cited. In a community of 100,000 population in Peking a survey of 8,127 women over 30 years of age was completed in less than six weeks.[44] Within a two-year period about 31,000 female textile workers throughout the country had participated in the screening program.[45]

During the period 1958–1960, a mass survey of the prevalence of esophageal cancer was initiated by the Committee for Cancer Research of the Academy of Medical Sciences, in collaboration with the medical institutions in four northern provinces.[46] The study covered a population of 17 million in both urban and rural areas. The people's commune was a survey unit for the latter. In order to ascertain incidence and mortality rates, annual follow-up surveys in two consecutive years were conducted in selected areas.

While the total size of the population covered in the mass survey and screening program in the entire country remains unknown, figures for eight cities and four provinces alone indicate that over four million persons were reached during 1958–1959.[47]

Cancer Registration. The Gynecologic Malignancy Registry for the Nanking area was established in July, 1957. During a five and a half year period 1,419 cases were registered.[26] Beginning in January, 1958 a Cancer Registry was inaugurated in Shanghai under the local joint sponsorship of the Health Department and the Statistics Bureau. About 19,000 malignancies were recorded for the years 1958 and

1960.[48,49] Incidence rates for each year were computed on the basis of general population.

Cancer Education. Cancer education has always played an important role in the anti-cancer campaign, as clearly manifested in the various information materials prepared for the public. These include *A Popular Discourse on the Prevention of Tumors,*[50] and *Malignant Neoplasms,*[52] all written in layman's language. As noted earlier, the educational campaign contributed much to the success of cancer screening programs.

Cancer Therapy. Information on cancer therapy in New China is extremely limited. The reported efficacious use of *actinomycin K* and *kengshenmycin* in the treatment of Hodgkin's disease and malignant trophoblastic tumors, respectively, was noted earlier. Other therapeutic achievements were reported by several authors.[11, 35–37] Of particular interest is the apparent progress since the founding of the People's Republic in the treatment of malignant trophoblastic tumors (Table 2). The mortality figure of choriocarcinoma decreased from 89 to 57 percent during 1949–1965, and that of chorioadenoma decreased from 26 to 13 percent. Since 1965 the mortality figure has decreased to 39 and 5 percent, respectively. More detailed information is contained in Appendix B.

Additional crude statistics on therapeutic results are presented in Tables 3 to 5 and Figure A to indicate recent advances in this area. Naturally, these figures are not strictly comparable with corresponding data available for Western countries for such reasons as differences in definition (i.e., staging), coverage, selection of patients, and medical advances. The 5-year observed survival rates for patients in all stages of cervical cancer who were receiving radiation therapy (not shown, based on data presented in Table 3 for the three hospitals), ranged from 53 to 75 percent. This is similar to a 51 percent rate for U.S. registered cases for the years 1950–1954.[72] Other 5-year survival figures for cervical cancer patients receiving radiation or surgical therapy were also comparable (Table 4).

In the case of cancer of the esophagus (including gastric cardia), a decrease in surgical case fatality from 18.4 to 6.0 percent was noted for Fu Wai Hospital during 1947–1961 (Table 5). A similar low rate was shown in Table 3 for several other cancers and reportedly paralleled those being recorded at the same time in Western literature. The 5-year survival rate following resection of squamous cell carcinoma of the esophagus was 23.7 percent[60] (Figure A). (Data from Fu Wai Hospital, Peking, 1940–1960.)

Since 1958 traditional drugs and acupuncture have been used intensively in cancer therapy. Reportedly great progress in the treatment of

Table 2. Therapeutic Results of Treatment of Malignant Trophoblastic Tumors, Fan Ti Hospital, Peking, 1949–1968

Period	Type of Treatment	Total		Choriocarcinoma		Chorioadenoma	
		Number of Cases	Deaths (Percent)	Number of cases	Deaths (Percent)	Number of Cases	Deaths (Percent)
1949—July 1958	Surgery[a]	64	62.5	37	89.2	27	25.9
Aug. 1958—1965	Combined chemotherapy and surgery[b]	238	37.4	131	57.3	107	13.1
1966—1968*	Combined chemotherapy and surgery[c]	279	20.4	126	38.9	153	5.2

*Includes deaths up to November, 1970

[a] Some patients received deep x-ray irradiation and/or chemotherapy (nitrogen mustard and nitromin).

[b] The main chemotherapeutic agent was 6—Mercaptopurine (6MP), with occasional use of Methotrexate (MTX). Since 1964, 5 Fluorouracil (5 Fu) and Kengshenmycin (KSM) were used in a few cases.

[c] The chief therapeutic agents were 5Fu and KSM; 6 MP and MTX were used occasionally.

Source: Reference 38

Table 3. Five-year Results of Radiation Therapy for Patients with Cancer of the Cervix, by Stage, Specified Hospitals and Years

Five-Year Status	Peking Union Hospital 1952–1953		Shanghai Tumor Hospital 1950–1953		Tianjin Central Obstetrical and Gynecological Hospital 1948–1954	
	Number	Percent	Number	Percent	Number	Percent
All patients	112	100.0	987	100.0	243	100.0
Stage I	11	9.8	57	5.9	15	6.2
II	84	75.0	682	69.1	90	37.0
III	17	15.2	190	19.2	138	56.8
IV	..	..	22	2.2	..	..
Unknown	..	..	36	3.6	..	..
Surviving	59	52.7	219	22.1	137	46.1
Cured	40	35.7	206	20.8	112	46.1
Stage I	8	72.7	27	48.0	14	93.0
II	28	33.3	14	2.1	54	60.0
III	4	25.5	30	15.8	44	32.0
IV	..	..	..	..	..	..
Unknown	..	..	5	14.0	..	..
With cancer	19	17.0	13	1.3	..	..
Deceased	24	21.4	375	38.0	106	43.6
Withdrawn alive	29	25.9	393	39.9	25	10.4

Source: Reference 44

Table 4. Five-Year Survival Figures for Patients with Cancer of the Cervix, by Stage and Type of Therapy, Specified Hospitals and Years

Radiation	Overall	Stage I	Stage II
245 cases at Tianjin Obsterical and Gynecological Hospital, 1952–1962	46.5%	93.0%	61.0%
2,171 cases at Shanghai Tumor Hospital, 1950–1956	42.8%	70.4%	42.9%
398 cases at Shanghai Obstetrical and Gynecological Hospital 1952–1956	55.3%	86.6%	53.0%
Surgery			
92 cases (Meigs-Okabayashi method), Shanghai Municipal First People's Hospital, 1957–1960	..	93.7%	55.5%
154 cases at Tianjin Central Obstetrical Hospital and Shanghai Municipal First People's Hospital, 1963–1964	88.3%	95.1%	62.5%
225 cases at the First Hospital, Peking Medical College, 1949–1964	..	93.6%	62.5%
1,181 cases in Shanghai, Tianjin, and Wuhan, 1965	..	95.0–100.0%	62.0–77.0%
757 cases at Shanghai Tumor Hospital, 1951–1961	..	95.2%	50.0%

Source: References 53–59

Table 5. Surgical Case Fatality by Selected Cancer Sites, Specified Hospital, and Years

Tumor	Source of Data	Surgical Case Fatality (Percent)
Esophagus	1,562 cases at 18 hospitals, about 1950–1959	10%; 3–5%, 1956–1959 (30–40% before 1949, 12–25 cases)
	161 cases, Fu Wai Hospital and Cancer Hospital, Peking 1960	6.4%
	202 cases, First Hospital Peking Medical College, 1957–1962	4.9%
	210 cases, Provincial Second Hospital, Shangtung	12.5%
Esophagus (including gastric cardia)	152 cases, Chinese Union Medical College, 1947–1954	18.4%

Table 5. **(continued)**

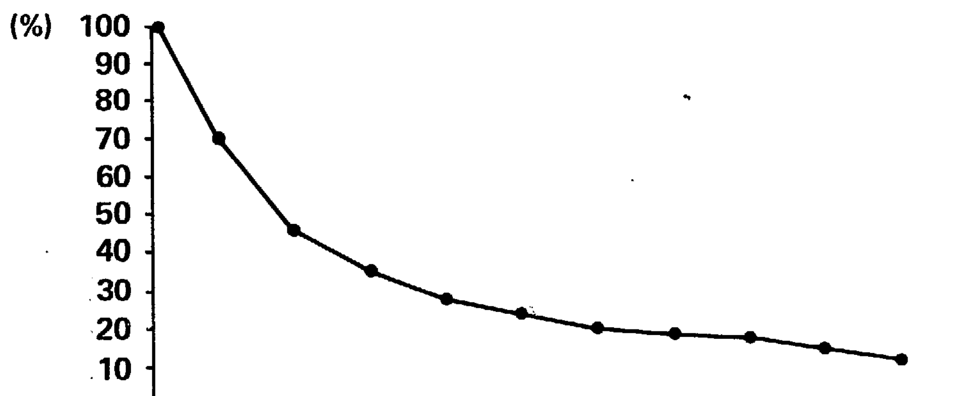
Tumor	Source of Data	Surgical Case Fatality (Percent)
	Fu Wai Hospital, Peking 1947–1961	9.1%
	209 cases, 1947–1951	18.6%
	181 cases, 1952–1956	11.1%
	649 cases, 1957–1961	6.0%
Esophagus and stomach	112 cases (incl. 52 cases of total gastrectomy), Peking Union Hospital, 1948–1958	10.7% (12%, 1921–1941, incl. 2 total gastrectomies out of 25 cases)
	66 cases, Chang Chun Medical College Hospital (NE China) about 1960	1.6%
Stomach	895 cases, three hospitals in Shanghai, 1949–1959	6.7%
	83 cases, Chung Shan Hospital, Shanghai First Medical College, 1950–1955	2.4%
Colon	102 cases, Chung Shan Hospital, Shanghai First Medical College 1950–1956	3.9%
Rectum	47 cases, Peking Union Hospital, 1948–1958	0% (22.5%, 1922–1941)
Liver	66 cases, 1970	14.8%
	130 cases, Chung Shan Medical College Hospital, Canton, 1941–1961	25.4%
Pancreas and duodenum	66 cases, 1960	14.8%
Lung	129 cases (88 total pneumonectomy and 41 lobectomy cases), about 1959	10.0%
Breast	2,549 radical mastectomy cases in 10 cities, 1951–1960	0.2%
Kidney	61 cases, about 1959	4.9%
Cervix	780 cases (1st and 2nd stages) in six large cities, 1949–1960	0.6%
	92 cases, Shanghai First People's Hospital, 1957–1960	2.2%
	757 cases, Shanghai Tumor Institute, 1951–1961	0.7%
Brain	22 cases, about 1959	13.6%

Source: References 18, 36, 44, 56, 61–65, 67–71 cancers of esophagus, stomach, colon, and breast was made as a result of combination of traditional and Western medicine. In patients with cervical malignancy, reports said that some traditional drugs reduced cyclical changes in a manner similar to radiation therapy. The drugs were said to promote substantial relief of pain and distress in many advanced cases.[66] The report of the Conference on Esophageal Cancer, involving four provinces and one city, said over 50 percent of patients treated with herb medicine were cured.[36] In view of the usual poor prognosis of this malignancy in Western countries, such a high figure invites close scrutiny.

The herb drugs, which have been used as antineoplastics, are said to be numerous, and are partly listed in a recent paper.[73] Two drugs, *lithospermum officinale* and *pei yao* (produced in Yunan province), reportedly were beneficial in treatment of choriocarcinoma.[66] The efficacy of these drugs can be established only through standardized use and controlled clinical trails on an extended scale.

Conclusion

The reported achievements in organizing cancer research and preventive programs in the People's Republic of China are largely attributable to the mass-social-organization model adopted. Admittedly, our current knowledge of New China's progress in these areas is extremely limited. We look forward with interest to more information in future years.



Year after operation	1	2	3	4	5	6	7	8	9	10
No. of cases followed	245	193	139	98	76	73	70	63	58	53
No. of survivals at follow-up	171	88	48	28	18	15	14	12	9	6
Survival rate (%)	70.0	45.6	34.5	28.6	23.7	20.5	20.0	19.0	15.5	11.3

Fig. A. Survival rate of patients at 1–10 years after resection of squamous cell carcinoma of the esophagus, Fu Wai Hospital, Peking, 1940–1960.

The massive statistical results of the Chinese anti-cancer movement should interest students of cancer epidemiology, since they provide useful information for gaining new insights into this disease. The findings of a companion study, based on such materials, are presented in a separate paper.[15]

Appendix A. List of Known Organizations Engaging in Tumor Research

Organizations in the Chinese Academy of Medical Sciences

- The Tumor Institute (350 beds)
- The Research Institute of Experimental Biology
- The Research Institute of Pharmacology
- The Research Institute of Experimental Medicine
  - The Research Institute of Tumor Etiology
  - The Research Institute of Tumor Therapy
  - The Research Institute of Tumor Immunology
  - The Research Institute of Tumor Metabolism
  - The Research Institute of Human Tumor Heterologous Transplantation
  - The Research Institute of Human Tumor Tissue Culture
- The Institute of Epidemiology
- The Committee for Cancer Research
- The Research Bureau of Sanitary Engineering
- The Choriocarcinoma Study Section

Other Organizations

- The Committee for Cancer Research in Shanghai, Tianjin, Chengtu and other cities
- The Tumor Hospital, Shanghai First Medical College
- The Huanan (South China) Cancer Hospital, Canton (140 beds)
  - Department of Radiology
  - Department of Internal Medicine
  - Department of Gynecology
  - Department of Chest and Abdomen
  - Department of Head and Neck
- The Hangchow Tumor Hospital (Chekiang province)
- The Taiyuan Tumor Hospital (Shansi province)
- The Tumor Department, Tianjin Hospital
- The Cancer Research Unit, Szechuan Medical College
- The Physiology Department, Peking Union Medical College
- Medical Colleges in Tianjin, Chungking, Wuhan, Hopei, Hupei, and other areas

Appendix B.

Excerpts from

Progress in the Treatment of Malignant Trophoblastic Tumors During The Last Two Decades in the Peking Fan Ti Hospital

(Scientific Report, 1971)

During a period of 20 years from 1949 to 1968, a total of 581 cases of malignant trophoblastic tumors, consisting 294 cases of choriocarcinoma and 287 cases of chorioadenoma destruens, were admitted into this hospital.

The therapeutic results in 3 different periods is shown in Table 1. (See Text Table 2).

Diagnostic criteria and clinical staging.

Clinical diagnosis was based on history, physical examination, roentgenological examination of the lungs and determination of the urinary chorionic gonadotrophin. In some of the patients treated by chemotherapy alone for the preservation of fertility, hysterosalpingography and occasionally pelvic arteriography were performed. Electroencephalographic examination was made in all cases suspected of brain metastasis. When metastasis of the liver was suspected, hepatoscanning was performed.

Pathologic diagnosis was mainly based on the uterine specimens and autopsy materials with the exception of a few taken from surgically removed vaginal, pulmonary metastatic nodules or other materials. The final diagnosis in most cases was based on pathologic examinations.

The criteria of clinical staging are: Stage I: the lesion is limited to the uterus; Stage II: the lesion has extended outside the uterus but within the genital organs; Stage III: pulmanory metastasis; Stage IV: generalized metastases to the brain, liver, kidney, spleen, intestine, skin, etc.

The therapeutic results in relation to the clinical staging in 3 periods are shown in Figure B.

Therapeutic methods.

The methods of administration of different chemotherapeutic agents are listed in Text Table 2.

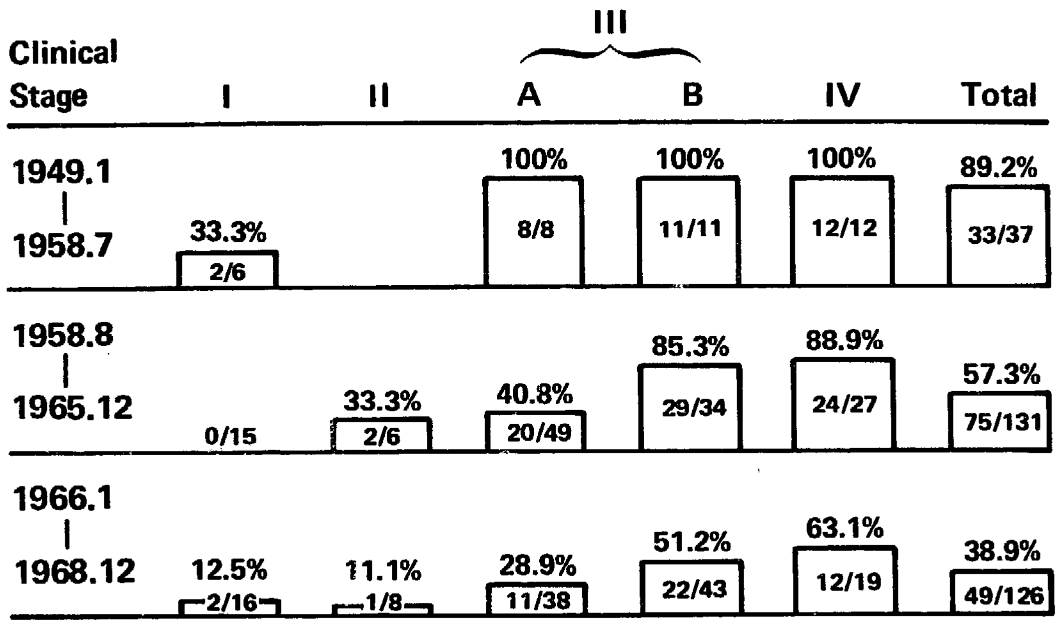


Fig. B. Comparison of mortality rate in relation to clinical staging.

Table 2. Method of administration of chemotherapeutic agents

Agent	Route	Daily Dosage	Duration of course (days)	Interval between courses (weeks)
6MP	Oral	6.0–6.5mg kg in 2 divided doses	10	3–4
MTX	Oral	0.45–0.5mg kg in 2 divided doses	5	3–4
	i.v. drip	10–15 mg	6–8	2–3
	Intrathecal	10–15 mg each time		
5Fu	i.v. drip	25–30mg kg	10	2
	Local injection	250–500 mg each time	10	2
KSM	i.v. drip	300–400 meg	10	2
5Fu& KSM	i.v. drip	5Fu 23–25mg/kg KSM 300 meg	8–10	3

Appendix C. Primary Cancer Sites Commonly Seen in China

Excerpts from

***Handbook for Barefoot Doctors*, Chapter 6, Section 7, Table 3. See reference 40**

Primary Site	Clinical and Demographic Characteristics
Nasopharynx	Usually seen in the youths and young adults; feeling by patient of presence of some foreign body in the nasopharynx; nasal discharge mixed with bright red blood; rapid loss of weight, swelling of lymph node in the neck; frequent headache; numbness of the head and neck region.
Stomach	Usually accompanied by long history of ulcers; loss of appetite and indigestion; hiccuping; loss of weight; anemia; weakness; development of localized lump; bleeding in the upper digestive tract or passing of dark tarry stool; obstruction appearing in the advanced stage; metastasis to the lymph node of the left clavicle.
Rectum	Usually seen in females middle aged and above; relatively slow worsening of the disease; change in bowel movement in the initial stage; bloody, mucous stool becoming thin; feeling of fullness in the stomach; diarrhea; in the advanced stage pain developing in the lower abdomen and metastasis to the sacrum; lump can be felt by digital examination.
Liver	Usually seen in middle aged males; rapid worsening of the disease; great loss of weight and appearance of other symptoms within weeks; most patients have constant pain in the upper right abdominal area near the liver; jaundice in the advanced stage, accompanied by fever, anemia, ascites, etc.; swelling and hardening of the liver in most cases, along with development of nodes on the surface.
Lung	Usually seen in old males; chronic coughing; bloody discharge; chest pain or hemothorax in the advanced stage; swelling of lymph node in the lung; metastasis to distant organs by the blood stream.
Breast	Usually seen in females aged 40 and over; localized swelling or fixation of lump in the breast; retraction of nipple; orange-peel appearance of skin; painless and solitary in the beginning, followed by metastasis to the armpit or further distant area or by erosion.
Cervix	Usually seen in females aged 40 and over; possible association with cervicitis; increasing flow in menstruation; frequent passage of blood-tinged discharge; most often metastasizing to the cavity organs; pain in lower abdomen and the lower back.
Osteosarcoma	Usually seen in the upper and lower limbs of young persons; worsening localized pain in the evening; sleeplessness; loss of

Primary Site	Clinical and Demographic Characteristics
	appetite; rapid loss of weight; atrophy of the affected limb; swelling in the node; skin becoming locally distended and shiny; prominent veins; localized bursting pain; low fever; metastasis to the lung.

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MENTAL DISEASES AND THEIR TREATMENT

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INTRODUCTION

The material in this paper is based on observations made during a one-month visit by my husband and me to the People's Republic of China in September-October 1971 as the guests of the Chinese Medical Association.

To understand in depth a society whose history, culture and organization is vastly different from one's own is impossible in such a brief period of time. What we did attempt was to get a glimpse of some of China's problems, goals and solutions. Looking at mental health facilities is a particularly difficult task since many of the premises involved in psychiatric care differ greatly from ours in the West. For those of us trained in Freudian thinking, the task involves putting our assumptions to one side, for a time, and examining a very different view of man and his psyche. Of crucial importance in the Chinese view of man is the belief in man's ability to change, given a sympathetic environment and "education and re-education." Underpinning this view, and in fact running through all activities in the society, is politics. As our Chinese hosts frequently told us, "We put politics in command." And as we shall see, politics is in command in the area of mental health.

The organization of Chinese society today must be considered in any discussion of mental health. It seems to be a society of great consensus; similar customs and mores apply to vast numbers of the population. Basic needs such as food, clothing, housing, jobs, education and medical care are now guaranteed to essentially the entire population, albeit at a minimal level. No one is left to fend for himself; the population both in the cities and in the countryside is divided into small units characterized by both self-reliance and mutual help. The individual is expected to work hard and participate extensively in local affairs but is also cared for by his family, neighbors or associates at work when he is in need of such care. In addition, there is no doubt little tolerance for asocial or anti-social behavior and great pressure is undoubtedly applied to assure conformity to the approved way of life.

Our view of Chinese mental health services was extremely limited. We visited the psychiatric department of the Third Peking Hospital and the Shanghai Mental Hospital. We talked with doctors, nurses and members of the Revolutionary Committees of both hospitals at some length. We also were able to gather general information on the structure of Chinese society and its relationship to mental health from our hosts of the Chinese Medical Association.

The "Bitter Past"

Long before Western psychiatric theories entered Chinese medical thinking, there were 2 divergent streams of thought which explained mental illness: the philosophical or medical approach, and folk beliefs and folk medical practices. Both of these streams of thought had great impact on modern Chinese psychiatric thinking.

To look initially at the philosophical or medical body of thought, according to ancient Chinese medical writings, all disease including mental illness was caused by an imbalance of two forces: the Yin and the Yang. According to Ilza Veith, "These two forces which stand for the negative and the positive, the dark and the white, the moon and the sun, the noxious and the beneficial, also denote the female and male elements, both of which are ever present in man and woman alike. Disease arises when the proportions of the two elements begin to vary from the normal." [1] The imbalance between the Yin and the Yang was thought to be caused by deviation from the Tao, or the "Way," which provided the guide for all morality and human conduct. The Tao can be further thought of as being an "ethical superstructure" that "provided for all eventualities in life and for all essential types of interpersonal relationships." [1] Once transgression against this ethical superstructure occurred, the way to a return to health was through a return to Tao.

While there is no supernatural element in the philosophical or medical explanations of mental illness, the popular or folk beliefs about the origins of mental illness are almost entirely based on supernatural causes. And while the believers in Tao saw the mind and the body as indivisible, popular beliefs saw the mind and the body as separate entities. Spirits and demons were thought from earliest times to be responsible for many of the ills that befell man. Spirits were thought to be everywhere, ". . . in the water, the caves, the trees and graves, they lurked in the soil and under rocks. They swarmed about the homes of men, in populated as well as in isolated regions and, according to many tales, their favorite abodes were the privies, where man is alone and helpless and flight difficult." [2] Once a demon or spirit entered a person and made him ill, they needed to be exorcised. The first exorcists were members of a priesthood called *Wu* which to the present day has the meaning of wizard, witch, expeller of demons. *Wu* is first encountered in the "Rites of the Chou dynasty" (1122–255 B.C.) and it came eventually to be synonomous with the word for physician, *Wu-i* meaning "magical physician." [2] The *Wu* who might be either male or female was thought to be able to cure because he had a greater proportion of Yang than ordinary people. To exorcise the spirit or demon that had entered the sick person, the *Wu* might put the patient into a deep sleep, might dance around the ill person, and was likely to inflict wounds upon himself as a method of cure.

Among the spirits which might enter a person, the spirits of the dead were greatly feared, particularly those who had not had proper funeral observances or those who had died through violence. It was thought that the spirits of the dead could steal the souls of the living particularly while the living were asleep and the soul was occupied with dreams. Since the spirits of the dead were thought to be so powerful, much of the work of the medical priests was in attempting to appease their hostility. One particular group of spirits were thought to be especially powerful, the T'ien Ku, otherwise known as "Celestial Dog." They were thought to be able to speak to their victims, inflict amnesia upon them, and particularly disturb young sons.

The fox was also thought to have great powers both in the folklore of China and of Japan. He was thought to be so powerful that he could not only bring on mental disease but also could impersonate those who could cure mental illness, thereby causing massive confusion. During the Han Dynasty and the Han period of literature (206 B.C.–280 A.D.) the fear of foxes was widespread.[2] The fox seems to have played a great role in sexual seductions and assaults, sometimes occupying the bodies of young women or sometimes of men. The following passage from the *Hsuan-chung-chi,* written in the first few centuries A.D. demonstrates the power the fox was thought to have:

> "When a fox is 50 years old, it becomes a beautiful female . . . or a grown-up man who has sexual intercourse with women. Such beings are able to know things occurring at more than a thousand miles distant; they can poison men by sorcery, or possess them, and bewilder them, so that they lose their memory and knowledge. And when a fox is a thousand years old, it penetrates to heaven, and becomes a Celestial Fox." [2]

Since the mentally ill person was thought to be possessed by a spirit or demon or fox, the onset of illness was swift and the cure might be equally sudden. The *Wu* by his ministrations could exorcise the demon suddenly; swift exorcism led to a belief in the curability of mental illness which has seemed to carry through to the present. The theory of possession by demons also leads logically to the attachment of no blame to the patient himself thereby reducing the stigma attached to mental illness.

Other popular beliefs about the origin of mental illness were that one might have been guilty of a misdeed in one's previous life, that one's ancestors might have offended the gods who are now punishing the offspring, that the god of the wind is using the insane man's home as a temporary residence and that his spirit is living in the ill person's body, that some organ inside the body is deformed or has lost its function, or that the circulation of blood within the ill person is running in the opposite direction from that of the normal person. It was felt that mental control was through the heart and if the heart loses control, the body is then without direction.[3]

These were some of the prevalent beliefs of the causes of mental illness when the first mental hospital was opened in Canton in 1897. Although it started with only thirty beds and increased in size to 500 beds, it was closed in the 1930's.[1] The first Department of Neurology was established in 1921 at the Peking Union Medical College, 10 years after that medical school was established.[4] The growth of psychiatry and neurology in China from 1921 to 1949, when the Communists took power was very slow; in 1948 there were approximately 1,000 beds for psychiatric patients in all of China.[4]

In 1949 there were only 4 psychiatric hospitals in China, one each in Peking, Shanghai, Canton, and Nanking; patients were often cruelly treated, bound to their beds and barely given any psychiatric care.[4] By the 1930's and 1940's, most people suffering from mental illness were still being kept in their homes with their families; if they were found in the street doing anything wrong they might be "thrown into prison and treated as if they were criminals. If they are harmless and wander in the streets, they are mocked and laughed at and are often stoned." [3b]

Estimates of the incidence of mental disease in China in the mid-1930's have ranged from as low as one person in every thousand or 400,000 mentally-ill people to one in every four hundred or one million to one million two hundred and fifty thousand.[3c] Widespread poverty, violence, starvation, and the brutalizing effect these conditions had on family life made for fertile ground for mental illness. The cruelty to which women were subjected, being sold into marriage at a young age, having to serve her husband's family, being brutally treated by her husband and particularly by her mother-in-law, and bearing many children, most of whom might well die, drove many women to suicide and undoubtedly drove others to mental illness.

Prior to 1949 venereal disease was an important cause of mental illness. The earliest estimates of the existence of prostitution in China are from the Chow Dynasty in 650 B.C. Venereal disease appears to have been introduced during the time of the Ming Dynasty from 1488 through 1521 A.D. and started from Kwangtung Province and spread to the north.[3d] At the time of Liberation the prevalence of syphilis was said to be ten percent in the national minority areas and five percent in the cities.[5] Although there was some effort to control and treat venereal disease, medical techniques were hindered by the popular belief that venereal disease was a logical punishment for misdeeds.[3e] It was not until Liberation that the houses of prostitution were closed and venereal disease systematically rooted out and treated.

Another major cause of mental illness prior to 1949 was drug addiction. It has been estimated that there were 300,000 addicts in Peking alone in the mid-1930's.[6a] In 1935 the Nationalist government launched a six-year program aimed at "the total suppression of the chronic use of morphine and heroin" within two years and opium within six years. Compulsory treatment was inaugurated, including two to three weeks of hospitalization followed by hard labor in Peking and Nanking to build up the addict's physical condition. There were a large percentage of relapses and in 1937 addicts began to receive severe punishment, some recidivists were executed and others sent to prison.[6b]

From Liberation to Cultural Revolution

From the time the Communists took power on the mainland in 1949, which they call "Liberation", until 1965, the government put great stress on medical care. By 1952 when the Chinese Society of Neurology and Psychiatry, affiliated with the Chinese Medical Association in Peking, was established, there were only 100 neuropsychiatrists in China and by 1967 this figure had risen to 436.

By 1957 the number of psychiatric beds had been increased to 20,000 and new methods of treating mentally ill patients had been introduced. Isolation and the binding of patients were prohibited and work therapy was introduced. Before the Cultural Revolution all of the medical schools in China were teaching courses in psychiatry and neuropsychiatric research was being carried on widely. From 1958 through 1961 electroencephalographic research was being carried on as well as research into schizophrenia.[4] Psychiatric services were spreading at an even greater rate in China in the latter 1950's and early 1960's. There have been reports of treatment of mental illnesses in the autonomous regions of Inner Mongolia and in Urumchi, which is the center of the Sinkiang Uighur autonomous region.[4]

Before the Cultural Revolution, traditional medicine including acupuncture, ignipuncture, breathing exercises, and the use of herb medicines as well as Western medicine were used for the treatment of mental disease. Acupuncture will be dealt with in greater detail later in this paper. Ignipuncture is "treatment by means of thermal excitation through various methods of cautery and burning at empirically determined points of the body." [4] Sometimes acupuncture and ignipuncture were combined in a course of treatment which is then called Chen chu and dates back 2,000 years in the treatment of psychoses, neuroses and headaches.

The breathing exercises used were similar to those used by Buddhist monks and therapeutic results have been obtained after regular use of breathing exercises, morning and evening for several months.[4]

The Current Scene

Since the Cultural Revolution there has been increased emphasis in all branches of medicine on combining traditional medicine with Western medicine. While the Chinese have been combining traditional and Western medicine since 1949 in other branches of medical care, the psychiatric sphere seems to have concentrated more on Western methods of treatment and to have neglected traditional techniques from the time of Liberation until 1965. Using the slogan "Let the past serve the present and let the foreign serve China", Western-trained doctors have been revamping their psychiatric services to include traditional methods and political techniques adopted by the society at large since the Cultural Revolution.

As in all other institutions in China since the Cultural Revolution, the psychiatric hospital is now run by a Revolutionary Committee containing the three-in-one combination of the People's Liberation Army, cadres (political workers) and members of the mass. The mass includes those people who work in any institution; in a mental hospital it includes the doctors, nurses, cleaning help and auxiliary workers. The Revolutionary Committee also often includes another three-in-one combination of aged people, middle-aged people and young people. The Revolutionary Committee at the Shanghai Mental Hospital, which was founded in 1958, is made up of 15 members, 11 men and 4 women. The hospital has 13 wards, five for women and 8 for men comprising a total of 916 beds. The staff includes 61 doctors and 169 nurses. The methods currently being used in treating mental illness include collective help, self-reliance, drug therapy, acupuncture, "heart-to-heart talks," follow-up care, community ethos, productive labor, and the teachings of Mao.

Collective help. With the participation of members of the People's Liberation Army in the administration of hospitals since the Cultural Revolution, some psychiatric hospitals are using the Army model of organization and are dividing the patients on the wards into divisions and groups so that they can become a "collective fighting group instead of a ward." Within these "fighting groups" the patients who are getting better are paired with newer and sicker patients so that they can help each other with "mutual love and mutual help."

Self-Reliance. The patients themselves are encouraged to investigate their own disease, to investigate their symptoms and to understand their treatment. They are encouraged to study themselves in order to recognize their own condition and to prevent their own relapse.

Drug Therapy. Seriously ill patients are given chlorpromazine (Thorazine) though evidently in smaller doses than before the Cultural Revolution. Insulin shock and electric shock therapy have been eliminated since the Cultural Revolution.

Acupuncture. Three kinds of acupuncture are used for certain forms of schizophrenia. 1) acupuncture needles placed in the temples or behind or in front of the ear hooked up to a battery box for 3-5 minutes at a time, once or twice a day for a 40 to 45 day course; 2) acupuncture of the ear; and 3) acupuncture on the body, on the legs and the arms for relief of excitement, catatonia, and depression. This third form is generally done from 15 to 20 minutes three times a day.

"Heart-to-heart talks." A psychiatrist meets with patients individually or in small groups at regular intervals to discuss the patients' problems and to help them understand their illness more completely. We were told that the most important form of treatment is the relationship between the psychiatrist and the patient.

Follow-up care. After the patient is discharged he is followed up every two weeks and then monthly in the out-patient department. Sometimes a doctor or a nurse from the staff of the hospital will make a home visit. Before discharge a doctor will have visited the patient's place of work and will make sure the patient returns to a job which is best for his mental health. His job has been kept for him until his return but it may be that another task within his work unit would better suit his mental health needs. Often the patient is kept on chlorpromazine after discharge but on a smaller dosage.

Community ethos. Every neighborhood, both urban and rural, is organized under the direction of a Revolutionary Committee, again made up of members of the People's Liberation Army, cadres, and the mass (the people who live in the neighborhood). The elected members of the Revolutionary Committee provide the social services, mediate disputes, do marital counseling, and in general look after the people in the neighborhood. When a patient is about to be discharged from a mental hospital he is under the "special concern" of members of the Revolutionary Committee in his neighborhood as well as his family and friends and this community concern plus the assurance of his job and family waiting for him helps ease the transition from hospital to community.

Productive labor. As in the larger society where all members are encouraged to do productive labor, in the hospital they are also encouraged to do what we in the West would call occupational therapy. Patients were seen folding bandages and preparing medications for the out-patient department, and doing work for a local factory such as making the covers of toothpaste tubes. The factory pays the hospital for the work done by the patients and the hospital then uses this income to provide special services for the patients.

The Teachings of Chairman Mao Tse-tung. Running through this entire gamut of treatment techniques is the philosophy of Chairman Mao. Inspired by his maxim, "Heal the wounded and rescue the dead," patients and workers alike study his writings, "On Practice," "On Contradiction," "Where do correct ideas come from?" and the three constantly-read articles, "Serve the People," "In Memory of Norman Bethune" and "The Foolish Old Man Who Removed the Mountains." Patients are organized into study groups to study daily these writings. They are encouraged through these writings to understand "objective reality" rather than functioning on the basis of "subjective thinking." They "arm their minds with Chairman Mao's thought during their stay in the hospital in order to fight their disease."

The Patients

In the psychiatric department of the Third Hospital in Peking which has two wards, one male and one female, including 90 beds, we attended a performance given by the patients. The performance was given in a large room which they call their club and was attended by perhaps 50 patients, wearing red pajamas, and red and white striped robes. Four patients gathered around a table to tell us and the other patients "How I used Chairman Mao's thought to conquer difficulties." First, a 32 year old man with the diagnosis of paranoid schizophrenia spoke; he had been in the hospital for three months:

> "At the time of the last spring festival I had a quarrel with my wife. She said she wanted to divorce me and I was surprised. I returned

to work but I was suspicious of my wife and kept thinking that she would divorce me. At that time my wife was not working in Peking and I asked to have her transferred to Peking and asked her to send my letters back. We quarrelled a lot because I insisted that she wanted to divorce me and she said that she did not.

"During my early period of admission I did not know that I had mental trouble. Gradually I recognized that something was wrong in my mentality and I gradually recognized that I had to make a case analysis of the causes of my disease in order to facilitate treatment and prevention.

"My trouble was that I had subjective thinking which was not objectively correct. My wife had not written letters wanting to divorce me; my wife actually loves me. My subjective thinking was divorced from the practical condition and my disease was caused by my method of thinking. I was concerned with the individual person; I was self-interested. I haven't put revolutionary interests in the first place but if I can put the public interest first and my own interest second I can solve the contradictions and my mind will be in the correct way. From now on I will study Chairman Mao and apply his writings."

The second patient who spoke was a 38 year old grey-haired man with a friendly open face.

"My main trouble is suspicion. I think my ceiling is going to fall down; when big character posters are up I think it is criticism of myself; and when somebody is gossiping I think they are talking about me.

"After I was admitted to this hospital I gradually recognized my illness. As Chairman Mao says, when we face a problem we have to face it thoroughly, not only from one side. When I am discharged from the hospital, the doctors have said that I should have some problem of investigation in my mind. When I am in touch with people they have suggested that I make conclusions in my mind after investigation not before investigation, in order to see if what I suspect to be true is just subjective thinking or is objectively correct. By studying Chairman Mao, we can treat and cure disease."

This patient was treated with chlorpromazine, 12 mg at noon and 14 mg in the evening. He also received consultation from a traditional doctor and was treated with traditional medicines.

The third patient who spoke was a woman in her twenties.

"I was a graduate of junior middle school and in 1969 was sent out to work in an outlying province. I was admitted 5 months ago to this hospital but I am getting all right now. My main trouble is auditory hallucinations. I hear something in my ear saying, 'What is below your pillow?' I found old magazines on the subject of a biological radio apparatus and I came to the ridiculous conclusion that a special agent is investigating me by means of this biological radio apparatus. I became agitated and heard loud speeches in my mind which gave me a very bad headache. During the midst of my torture I was sent to the hospital and received medication. My headache is much better but I still have hallucinations.

"The doctors organized a study class of Chairman Mao's works and I joined the study class and studied the five works. I studied my hallucinations and gradually recognized that they were non-existent. I found that investigation is like a pregnancy and solving problems is like delivering a baby. As I investigated my problem I gradually recognized that the biological radio was non-existent. Now I still have some hallucinations but after ten minutes I recognize that they are not real. Now whenever I have hallucinations, I study the works of Chairman Mao and attract my mind and my heart so I will get rid of my trouble.

"My treatments consist of acupuncture, medicine, herb medicine, and study. Also I am considering what happens in the whole world. I talk with doctors and patients; I do physical exercises; I have not completely recovered yet but I have faith I will get better and will win the struggle."

The fourth patient, a young woman who was a middle school graduate with a diagnosis of schizophrenia, had been hospitalized for two months but had been discharged when her disease improved. She returns periodically for a check-up and on the morning we visited the ward she had been invited back to talk with the new patients and to help teach them how to arm themselves with Chairman Mao's thought. She was dressed in street clothes and told us the following story:

"I was a senior middle-school graduate in 1967 but my health was not good at that time. I had heart trouble and arthritis and was not sent out to work like my classmates. Last April I was called to have a discussion with regard to my work and I got my mental trouble at that time.

"I was born in the new society and therefore have not suffered as people did in the old society. I was educated for more than 10 years and then rested at home for 2 years due to my illnesses. Thus I was divorced for 12 years from practice, class struggle and revolutionary experience. I was a 'hot-house flower.'

"I knew that sick people were kept in Peking and not sent out to remote areas and I thought day and night about where I would work. I had a fixed opinion that I had to work here in Peking, not elsewhere. I didn't want to eat and I didn't want to drink. I dreamt of being a People's Liberation Army woman at that time and had suspicions and fantastic ideas whenever I saw a member of the P.L.A. or a P.L.A. car I thought it would take me to the People's Liberation Army.

"During my early period of admission I could not manage myself. I threw pillows through windows and had to be fed. I thought I was going to be poisoned here and thought I had to struggle against the hospital. When other patients sang Army songs I thought the P.L.A. was here already. Gradually I realized that the doctors and nurses were here to serve the patient. They washed my hair and clothing and I gradually realized that this is a hospital. I then participated in a study group and studied the Five Constantly-Read Articles for two weeks. I learned that my hallucinations and suspicions were not real and found that studying in a study class was a good way to solve one's problems. I understood that one has to have knowledge before experience and then try to understand objective reality.

"When a member of the P.L.A. visited the hospital I thought it was for me and I raised the issue in my study group. The doctors told me it was just a visit by that member and it was not for me and I believed them.

"I was discharged over three months ago and although my new job was supposed to be arranged July 1, it has not been arranged yet but I now have full faith in the Communist Party and the Government and know that they will arrange a job for me later on. Until then I will continue to take my medicine and have close contact with the medical people in this hospital."

The doctors at the Shanghai Mental Hospital felt that schizophrenia was the most common diagnosis of their patients. Over 50% of the patients are schizophrenics. The department also admits a small percentage of patients who have physical illnesses with psychiatric complications such as those patients with disturbed liver function, epilepsy and heart diseases. They felt that paranoia was the most common form of schizophrenia and that depression, catatonia and post-partum depression were relatively rare. Suicide was also thought to be quite rare now. Both the Shanghai Mental Hospital and the psychiatric ward of the Third Hospital in Peking reported that the most common age of onset of mental illness was from 20 to 30 years old. This corroborates the findings in the 1930's as well when, in one study of mental illness, 40% of the patients' onset of illness was from 20 to 30 years.[3f]

In a study done in the late 1950's involving a group of 2,000 schizophrenics, it was found that 50% of the patients were between the ages of 21 and 30; only 1.3% were under 15 years of age; and over 7% were more than 40 years of age.[4] Over 46% of the schizophrenics were paranoid, 24% were "unclassified", 15% were suffering from hebephrenia and 11% were suffering from catatonia.[4]

The Personnel

Before the Cultural Revolution most psychiatrists attended medical school for five years and during the fifth year interned in a department of psychiatry in a teaching hospital specializing in psychiatry, internal medicine, and neurology. They would then remain in a psychiatric department of a hospital, learning the field further through doing "practical work," making rounds, attending lectures and treating patients under the supervision of residents. A psychiatrist was considered trained when the senior doctors in his department felt he was adequately trained; there was no examination or fixed period of training. As medical schools have just reopened since the Cultural Revolution, a new pattern has yet to be established. The percentage of women in psychiatry at the present time is thought to be over 50%.

Nurses are trained under the same basic principles. Again before the Cultural Revolution they graduated from nursing school, during which they would have some psychiatric studies. They then had on the job training in the psychiatric ward to which they were assigned, which included practical work and some lectures.

The works of Freud are not and have not been used in the study of psychiatry since 1949; the works of Pavlov, however, have been studied, particularly during the period of Russian influence, but our hosts told us that without "considerable environmental and class struggle" the application of Pavlov's theories will not be effective.

Hospital Life

At the Shanghai Mental Hospital a Mao Tse-tung study class meets every afternoon for two weeks from 2 o'clock to three thirty. Eleven patients dressed in brown uniforms sit around a table with one member of the People's Liberation Army and one member of a Mao Tse-tung Propaganda team who works in the hospital and takes part in the study class when he is free. One health worker is also present who is in charge of the patients' study group in this ward. They are studying the third Constantly-Read Article, "The Foolish Old Man Who

Removed the Mountains." One patient tells the content of the parable, the story of an old man who had a mountain on his property and wanted it removed. He and his sons started to remove it with shovels and his neighbors scoffed at him. But he insisted that if his sons and his sons' sons worked to remove the mountain, it could be done. He explained that they should all learn the spirit of the parable and put it into practice in order to strengthen their will and conquer their illness. Two of the patients sitting around the table are wearing red arm bands since they are on duty and their main task is to propagandize Mao's thought when new patients come into their ward. They tell new patients their experiences and help them get used to being on the ward. The patients who are on duty rotate so that everyone in the ward has a chance.

Patients live two, four, eight or sixteen to a room, depending on the severity of the condition. There were a few rooms with a single patient and some of these were locked. The rooms are furnished very simply with beds, bureaus, and posters or slogans on the walls. The patients make their beds and sweep the floors with the help of the health workers. The daily schedule was up on one wall and was as follows:

5:00– 5:30 A.M.	Get up and make beds
5:30– 6:00	Breakfast
6:00– 6:30	Occupational therapy
6:30– 7:00	Military training (Fridays)
7:30– 8:30	Study Chairman Mao's works
8:30–10:00	Heart-to-heart talks (Monday, Wednesday, Friday)
8:30–10:00	Study class (Tuesday, Thursday Saturday)
10:00–10:30	Treatment
10:30–11:30	Lunch, free time
12:00– 1:30	Nap
1:30– 2:00	News
2:30– 3:30	Study class
3:30– 4:15	Physical activities (Monday, Wednesday, Friday)
3:30– 6:30	Visits from relatives (Tuesday, Thursday, Saturday)
4:30	Supper
Evening	Television
9:30	Bed

Exhortatory messages were on the walls as well. Lin Piao's quotation read: "Read Chairman Mao's Works. Listen to Chairman Mao. Work according to Chairman Mao's teachings. Act as Good Fighters for Chairman Mao." In another room of the Shanghai Mental Hospital a poster was on the wall, entitled, "How to Prevent Disease Relapse." The first two items read:

1. Mental Disease is curable.
2. Being a psychiatric patient, you still have to study Chairman Mao's works hard.

The third point dealt with acupuncture and the fourth point read: "Sometimes you will have symptoms. Don't worry. If you get treatment right away, relapse can be avoided."

In the patients' activity room they were playing Chinese chess, ping-pong, doing occupational therapy, and reading small comic-like books. There was a loudspeaker playing a lively song from a modern revolutionary opera. Slogans hung across the room: "Hold High the Red Banner of Mao's Thought" and "Warmly Celebrate the Founding of the People's Republic of China." Those patients who are doing particularly well in their "struggle against their illness" have short essays written about them by the doctor and other patients and these are posted on the wall. Also posted is the list of the patients who are paired together to help each other, the sicker with the healthier.

The average length of hospitalization currently in the Shanghai Mental Hospital is 70 days. The doctors felt that the relapse rate of schizophrenia before the Cultural Revolution was a problem—40% of the patients were likely to have two or three admissions. Currently they are emphasizing reeducation "right before the patients are discharged on how to deal with the environment and contradictions within the environment." They have also been conducting follow-up studies on relapse and have found in one ward which was studied for one year that 18.3% of the patients suffered from relapse. Relapse was interpreted to mean the need for re-admission or outpatient treatment. In a one year's study of another ward they studied 37 cases and found one case of relapse; this case was treated by treatment in the home and in the outpatient department. They felt that the most important factor against a high relapse rate is the Mao Study Class "to arm them with Mao's thoughts to better deal with the environment."

Acupuncture is considered a major method of treatment in the lowering of the relapse rate. The doctors at the Shanghai Mental Hospital have divided the criteria for success of acupuncture treatment into four levels: 1) cure—disappearance of symptoms with the patient "managing everything by his own mentality;" 2) much improved—disappearance of symptoms and the patient "mostly managing by his own mentality;" 3) improved—with some remaining symptoms; and, 4) unimproved. They have recently studied 157 cases of schizophrenia for one year and found that 74.3% of the patients were cured and much improved. They further found that 97.4% fell in the first three categories, that is, cured, much improved and improved. Without acupuncture treatment they find a 70% relapse rate.

Because of the recent disclosures of the political use of psychiatry in the Soviet Union, the process of psychiatric hospitalization seemed an important one to understand. The doctors at the Psychiatric Ward of the Third Hospital in Peking say that hospitalization is nearly always through persuasion, through the persuasion of relatives, friends, and colleagues at work. Admission to the hospital is generally a joint effort by the family and the authorities of the unit in which the patient works and usually they all agree on the need for hospitalization. Occasionally commitment is by force but this was thought to be exceptional.

After admission the patient needs to be persuaded by the personnel to remain and receive treatment. The technique of welcoming new patients by old patients and the old patients helping the new patients to adjust was considered important in this beginning phase of hospitalization. As the patient recovers slightly he sometimes must be persuaded to stay in order to get a thorough improvement. The doctors maintain that the patients never leave the hospital against the advice of the physician and feel this is because the physicians obtain the cooperation of the members of the Revolutionary Committee where the patients work and of the patient's family. They stressed that the patient respects the opinions of the authorities where he works and if the doctor, the patient's family, and the members of the Revolutionary Committee all agree, the patient is likely to abide by their suggestions.

Summary

Currently the treatment of mental illness in the People's Republic of China is a process involving multiple techniques: traditional and Western medicine, group and individual relationships, professional and non-professional help, mutual help and self-reliance, and in-hospital and community involvement. Since the Cultural Revolution new models of organizing patients in mental hospitals in order to "raise the patient's initiative to fight his disease" are being extensively tried. The writing and thinking of Mao Tse-tung underlies all of these efforts.

Several basic characteristics of Chinese society are critical to the handling of mental health:

1. The society is an extraordinarily cohesive one and the effects of this cohesion have not begun to be explored with regard to the incidence and treatment of mental illness.

2. The organization of the society into small groups in which mutual help and local participation are emphasized must be seen both as an effort at preventive mental health and as an adjunct to the treatment of mental patients.
3. The belief in the malleability and perfectability of man through "education and re-education" is the foundation on which many of the new techniques such as Mao Tse-tung study groups are based.
4. Although the Chinese are attempting to fashion their own brand of mental health services through using their social structure and their traditional medicine, they incorporate Western techniques, such as drug therapy, when they feel they are useful.

Throughout the Chinese medical care system, as well as in other facets of life, their pragmatism and willingness to experiment are highly evident. Thus, the treatment of mental illness in China is likely to be a changing picture which we in the West would do well to observe.

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☆ U.S. GOVERNMENT PRINTING OFFICE: 1973 O—472-888

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service National Institutes of Health

DHEW Publication No. (NIH) 73-67