OTS: 60-41,604

JPRS: 5837

31 October 1960

Reproduced From
Best Available Copy

PUBLIC HEALTH AND MEDICINE IN THE CHINESE PEOPLE'S REPUBLIC

By Chin Hsin-chung
and
I. G. Kochergin

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

RETURN TO MAIN FILE

Distributed by:

OFFICE OF TECHNICAL SERVICES
U. S. DEPARTMENT OF COMMERCE
WASHINGTON 25, D. C.

~~Price: $6.00~~

U. S. JOINT PUBLICATIONS RESEARCH SERVICE
1636 CONNECTICUT AVE., N. W.
WASHINGTON 25, D. C.

20000504 127

OTS: 60-41,604 JPRS: 5857

31 October 1960

PUBLIC HEALTH AND MEDICINE IN THE CHINESE PEOPLE'S REPUBLIC

By Chin Hsin-chung
and
I. G. Kochergin

Distributed by:

OFFICE OF TECHNICAL SERVICES
U. S. DEPARTMENT OF COMMERCE
WASHINGTON 25, D. C.

~~Price $6.00~~

U. S. JOINT PUBLICATIONS RESEARCH SERVICE
1636 CONNECTICUT AVE., N. W.
WASHINGTON 25, D. C.

JPRS: 5837
OSO: 4674-N

PUBLIC HEALTH AND MEDICINE IN THE CHINESE PEOPLE'S REPUBLIC

[Following is the complete translation of the book by Chin Kuin-chung and I. G. Koshergin entitled "Zdravookhraneniye i Meditsina v Kitayskoy Narodnoy Respublike" (English version above), Moscow, 1959, pages 1-267.]

TABLE OF CONTENTS

FIRST PART

Achievements of Public Health

	Page
Chapter I. Source of Power of Public Health	1
Chapter II. Public Health before the Victory of the People's Revolution (1927-1949)	14
Chapter III. Fundamental Principles of Public Health	48
Chapter IV. Sanitary-Antiepidemic Service and the Control of Infectious Diseases	59
Chapter V. Therapeutic-Prophylactic Care of the Population	93
Chapter VI. Medical Care of Workers at Industrial Enterprises	122
Chapter VII. Sanitation Education	145
Chapter VIII. Protection of Motherhood and Childhood	154
Chapter IX. Medical Education in the Chinese People's Republic	166
Chapter X. The Development of the Pharmaceutical Industry and of Apothecary Affairs in the Chinese People's Republic	176
Chapter XI. Physical Culture and Athletics	186

SECOND PART

Medical Science

Chapter I. The Planning of Scientific Research Work	189
Chapter II. Some Problems of Experimental and Clinical Medicine	206
Chapter III. Problems of Experimental and Clinical Oncology	228

Chapter IV. Problems of Thoracic Surgery and Vascular Surgery 240
Chapter V. Parasitic Diseases 279
Chapter VI. Virus Diseases 366
Chapter VII. Drugs 376

THIRD PART

The Chinese People's Medicine

Chapter I. Historical Outline of the Development of Ancient Chinese Medicine 392
Chapter II. Principal Methods and Treatment Principles of Chinese People's Medicine 406
Chapter III. Clinical Experience of the Chinese People's Medicine in Recent Years 444
Chapter IV. Recent Scientific Investigations in the Chinese People's Medicine 461

Chapter I

Source of Power of Public Health

The Chinese People's Republic was proclaimed 1 October 1949. The victory of the Chinese people attained under the guidance of the Communist Party of China represents a new very great triumph of Marxist-Leninist doctrine, a world-wide-historical proof of the invincibility of Marxism-Leninism.

The victory of the Chinese popular revolution proved to be possible only as the result of the Great October Socialist Revolution in Russia, which signified a fundamental turning point in the world history of mankind.

"The volleys of the October Revolution," said Mao Tse-tung, "have brought us Marxism-Leninism. The October Revolution has assisted the progressive elements of the world and of China in using the proletarian world outlook for determining the fate of the country and revising our own problems. The conclusion was to take the road of the Russians". (Mao Tse-tung. The Dictatorship of the People's Democracy. Gospolitizdat, 1949, pages 5-6).

After the victory of the Great October Socialist Revolution

in Russia the doctrine of Marxism-Leninism began to spread among the Chinese revolutionary intelligentsia. The "4 May movement" in 1919 accelerated the alliance of the working movement in China with Marxism-Leninism and prepared the groundwork for the creation of the Communist Party of China. (The "4 May movement" was begun as a protest against the decision of the Paris World Conference to give former German concessions in Shantung to Japan. This protest brought about a cultural revolution directed at raising the cultural level of the country, the result of which consisted of reforms in the old Chinese language; the spoken language was proclaimed the official tongue. As a result of the "4 May movement" the extensive spread of the doctrine of Marxism-Leninism was begun).

Mao Tse-tung regards the period 1919-1921 as an important step in the development of the national revolutionary struggle of the Chinese people, as a period which prepared the condition for the creation of the Chinese Communist Party.

"The 4 May movement" accelerated the development of a new culture in China. A progressive group of intelligentsia grew out. The student youth actively studied the achievements of

progressive European thought, culture and science. A Russian language faculty was created at Peking University. The truth about the Soviet Union was greeted in China with tremendous attention and interest.

The Communist movement in China arose against the strong basis of a growing working movement and a national-freedom struggle. In July 1921 the Communist Party of China was created, which was a tremendous event in the history of the country.

The victory of the Great October Socialist Revolution in Russia and important changes in the political circumstances of China exerted a very strong influence on the political activity of Sun Yat-sen and his party -- the Homindan. By means of the Communist Party of China a reorganization of the Homindan was accomplished.

The collaboration of the Communist Party and the Homindan led to the establishment of a single national front in the country. In January 1924 the first national congress was held which adopted a new program -- the so-called "program of three policies": alliance with the USSR, alliance with the Communist Party of China, and support for workers and peasants.

In January 1925 the Fourth Congress of the Communist Party of China was convoked. The congress solved the problems of organizational preparation for the new revolutionary development of the popular movement. In May of the same year extensive strikes of Shanghai workers, directed against the English and Japanese imperialism, rapidly grew into a tremendous revolutionary storm which involved the entire country.

In July 1926 the United National Front started a campaign in the north for the purposes of uniting the country and crushing the power of the imperialists and their servants. The Communist Party played an outstanding part in the organization of the campaign in the north. The communists conducted political work in the army. They showed themselves to be courageous warriors. The units which they led were the most distinguished during the campaign.

In September 1926 the Northern Campaign Army occupied Hankow. In March 1927 the Shanghai workers created an uprising, aiding the Northern Campaign Army in occupying Shanghai. The workers' and peasants' movement obtained its greatest development in the country. The number of workers

who entered trade unions reached 2,800,000, and the number of peasants entering the peasant unions amounted to 9,500,000. The victory of the Chinese National Revolution signified a blow against imperialism and its agents in China.

On 24 March 1927 American and English ships began to shell the peaceful city of Nanking. About 1,000 persons were killed and wounded. In Shanghai 20,000 foreign troops were concentrated. The United States and England began open warfare against the Chinese people. At the same time, they had an influence on the Chinese bourgeoisie.

The pressure of the imperialistic reaction and the anxiety of the bourgeoisie over the growth of the workers'-peasants' movement led to the fact that the bourgeoisie went over to the imperialists and betrayed the revolution.

On 12 April 1927 Chiang Kai-shek, doing the work of American and other imperialists, led a counterrevolutionary coup d'état in Shanghai and Nanking. At the order of Chiang Kai-shek demonstrations of Shanghai workers were shot and mass arrests and malicious murders of communists were carried out.

The revolution of 1925-1927 collapsed because of the

treachery of the Homindan, which was converted into a party of the reactionary bourgeoisie supported by the power of foreign imperialism.

In characterizing the heroic struggle of the communists of that period Mao Tse-tung noted the following: "... however, the Chinese Communist Party and the Chinese people could not be frightened nor subdued nor exterminated. They arose from the ground, washed the blood from themselves, buried their dead comrades and again continued to fight". (Mao Tse-tung. The Coalition Government. Selected Works. 1953, Vol 4, page 469). Actually, the Communist Party of China continued to fight for national independence and for democracy under the circumstances of the most severe terror. The prolonged and heroic struggle of the Chinese people under the direction of the Communist Party of China for liberation of the country from imperialistic invaders and from the reactionary Homindan clique led to the complete victory of the revolution of China in 1949.

China is the largest country in the world with respect to its population and territory (about 10,000,000 square kilometers). With respect to its size, China is much larger than the United

States of America, more than two times larger than India, 18 times larger than France and 26 times larger than Japan. The total length of the boundaries of China is 26,000 kilometers, including 11,000 kilometers on the sea. In the North and Northwest almost 10,000 kilometers of the Chinese People's Republic borders on the Soviet Union and the Mongolian People's Republic; in the Northeast, it borders on the Korean People's Democratic Republic; on the Southwest, on the Democratic Republic of Vietnam. In the Southwest and West China borders on Afghanistan, India, Nepal, Bhutan, Sikkim, Burma, and Laos.

The Chinese climate is distinguished by great contrasts. In the northeastern provinces there is a dry cold winter and a short summer. In western China there is a continental rigorous climate. The provinces located near the sea are subject to the influence of oceanic monsoons; it is warm there and even hot, and the winter is short and warm. In the region of Peking the summer is long and is not very hot. Southward from the Yangtze the climate is chiefly a maritime subtropical one. The island of Hainan and the southern part of Taiwan province are Chinese tropics famous for everlasting summer

and profuse vegetation.

The climate of the eastern part of China is favorable for agriculture. On the northern Chinese plain the climatic conditions make it possible to reap three harvests in two years; in the river valley of the Yangtze, one rice harvest and one wheat harvest per year; in the South of China, two rice harvests or cotton harvests and one grain harvest per year.

The annual temperature levels decrease from the North to the South (Table 1). The 24-hour temperature amplitudes are particularly great in the western part of China. For example, on the uplands of Tibet on summer days the temperature drops to 15-10°; at night, even in July, there are frosts.

The Chinese People's Republic is a multinational government. The majority of the population consists of Chinese. In addition, on the Chinese territory there are a large number of nationalities. Chinese ethnographers distinguish six groups: Han -- the Chinese; Man -- the Manchurians; Mon -- the Mongols; Khuay -- a group of other Turkish peoples coming from Islam; Tszan -- Tibetans; Myao and Yao -- the population group of southern and southwestern China.

Table 1

Mean Seasonal Temperatures and Precipitation at Various Meteorological Stations of Eastern China

Climatic province	Station	Mean temperature		precipitation in mm.
		coldest month	warmest month	
Northeastern	Харбин Harbin	—19,7°	+23,1°	541
	Дальний Dalny	—5,0°	+28,2	612
North-China	Тайюань Taiyuan	—7,3	+25,4°	583
	Пекин Peking	—4,3	+26,4°	637
Central-China	Шанхай Shanghai	+3,2°	+27,0°	1,141
	Чунцин Chungking	+7,9°	+27,2	1,000
South-China	Кантон Canton	+13,1°	+28,6°	1,677
Plateau	Цюнчжоу Chiungchow (о. Хайнань) (1)	+17,9°	+28,9°	1,568
Yunnan	Куньмин (2)	+9,7°	+20,2°	1,095

1) Island of Hainan

2) Kunming

The popular regime made the first scientific census of the population in the history of China (574,205,940 persons were included directly on the census; 27,732,095 persons -- the population of Taiwan and Chinese beyond the border -- were counted indirectly). In all, on 30 June 1954 601,720,000 persons, that is almost 602,000,000, were counted. Therefore, the populations of China amounts to one-fourth of all mankind.

Among the 574,820,000 inhabitants of the Chinese People's

Republic (1952), more than 500,000,000 are Chinese (93.43 percent) and about 36,000,000 persons (6.06 percent) are national minorities. Men amount to 51.82 percent of the entire population in China; women, 48.18 percent. Forty one and eight hundredths percent of the entire population is less than 18 years of age; 1,851,312 persons are from 80-99; 3,384 persons are 100 years old or over. The oldest inhabitant of the country was 155 years.

The rural population of China amounted to 86 percent in 1954; the urban population, to 14 percent. In recent years, many new cities have appeared -- industrial centers. The interrelationship of the rural and city population is changing from year to year (Table 2).

The data presented concerning the census of the Chinese People's Republic population does not include any information on Chinese living beyond the border, students studying beyond the border and the population of the island of Taiwan.

The population density of China is inhomogeneous: in places, it amounts to 800 persons; in some cases, even to 1000 persons per square kilometer; the average density in the middle and lower course of the Yangtze River amounts to about 450

persons; in the area of the central Chinese plain, about 300 persons per square kilometer. At the same time, in many areas the population amounts to only scores of persons per square kilometer. Such extensive areas of China as Inner Mongolia, Tibet, Tsinghai, have a very sparse population, on the average, one to five persons per square kilometer.

Table 2

Population Census of Chinese People's Republic (in Thousands)

(1) Year (2) Entire population (3) In (4) cities (5) country (6) In percentages of entire population (7) urban (8) rural

(1) Год	(2) Все население	(3) В том числе		(6) В процентах ко всему населению	
		(4) городское	(5) сельское	(7) городское	(8) сельское
1949	541 670	57 650	484 020	11	89
1950	551 960	61 690	490 270	11	89
1951	563 000	66 320	496 680	12	88
1952	574 820	71 630	503 190	12	88
1953	587 960	77 670	510 290	13	87
1954	601 720	81 550	520 170	14	86
1955	614 650	82 850	531 800	13	87
1956	627 800	89 150	538 650	16	84

The average population density for all of China amounts to 61 persons per square kilometer.

Demographic indices of China before the liberation were characterized by a comparatively high birth rate and an equally

high death rate. According to individual sources, before the power was put into the hands of the Chinese people the birth rate amounted to 35 per 1000, on the average; the death rate, 25 per 1000; the natural increase in population, 10 per 1000. The improvement in the standard of living and the improvement in medical care bore notable fruit during the nine years of existence of the people's democratic order in China. The condition of health of the Chinese people improved, which is evidenced by the favorable demographic indices. According to statistical data of the Ministry of Internal Affairs of the Chinese People's Republic for 1953 the mortality rate decreased to 17 per 1000; the natural increase in the population reached 20 per 1000. According to statistical data in recent years, the birth rate in individual cities reached 40 per 1000; the death rate decreased to nine per 100 and in various rural localities the birth rate amounted to 34-35 per 1000 and the death rate, to 11-13 per 1000. The death rate of suckling children in the first year of life in Peking decreased from 117 per 1000 born in 1947 to 17.9 in 1958.

Like the other peoples of the world, the Chinese people in their development has traversed a period of a primitive-communal order, epochs of slave-owing and feudal societies. In characterizing

the developmental process of the Chinese people, Mao Tse-tung wrote the following: "Although China is a government of great people and although it is a government with tremendous territory, numerous population, a many-centuried history rich in revolutionary traditions and an excellent historical heritage, after the transition from the slave holding order to the feudal order it entered a prolonged period of retarded economic, political and cultural development". (Mao Tse-tung. Selected Works. Vol 3, 1953, page 138)

At the time of victory of the popular revolution the public health situation in the country was in a very serious condition. Everywhere, epidemics raged. The Homindan sanitary organs were ineffective. The therapeutic institutions during the period of the war had been subjected to severe destruction by the Japanese invaders.

With the establishment of the popular regime its main tasks in the field of public health were the following: an intensive struggle against epidemics of infectious diseases, restoration of therapeutic and sanitary institutions destroyed during the war, the preparation of new medical personnel, the consolidation of physicians of the popular and modern medicine, et cetera.

Chapter II

Public Health Before the Victory of the People's Revolution (1927-1949)

Social-Economic Conditions

The Chinese people has been for long years under the yoke of feudalism, under the oppression of foreign imperialism, has been mercilessly exploited and kept down. The main mass of the people lived in poverty; the sanitary status was very low, and frequent outbreaks of epidemic diseases were observed. Social diseases were widespread because of the severe material conditions and inadequacy of medical aid.

When the reactionary Homindan came to power in 1927 the situation of the masses of people not only did not improve; it became even worse.

After the counterrevolutionary coup in 1927 the Chinese Revolution 1925-1927 sustained a temporary defeat. The tasks confronting the country remained unresolved: the oppression of imperialism, the semi-feudal order, and the rule of militarists in the country had not been eliminated.

For 20 years the dictatorial regime of ChiangKai-shek was directed at maintaining a semi-colonial situation and a semi-feudal order in China. Mao Tse-tung defined this regime as a semi-colonial and semi-feudal dictatorship.

The Fascist band of Chiang Kai-shek shed the blood of Chinese workers and peasants, smothered the progressive intelligentsia, attempting to eradicate the revolutionary movement in China.

The contradictions and the struggle between the imperialistic countries for influencing China complicated and exacerbated the fight between various groups of Homindan militarists. As far as the ChiangKai-shek cliques were concerned which ruled in the Nanking government, it had sold out to American imperialism from the very beginning, which it served for more than 20 years, assisting American monopolists in plundering and destroying China.

Two very important factors underlay these continuous wars and the separation of the country: lack of integration of the national economy and the imperialistic policy of cutting up China. Therefore, imperialism retarded the industrialization of China and particularly the development of the national heavy industry.

I. V. Stalin said that "... the main threads of industry in China - the railroads, factories and plants, mines, banks, et cetera - are at the disposal of foreign imperialists". (I. V. Stalin. On Opposition. Moscow - Leningrad, 1928, page 424).

According to the statistical data of 1933-1934, about 950,000 persons in China worked at the large factories and plants in ferrous metallurgy and on the railroads. The great majority of the population was occupied in agriculture.

In his work "Examination of the Composition of the Population and a Classification of Them in the District of Hsing-k'ueh in the Province of Chiang-hsi" Mao Tse-tung wrote that in 1931 86 percent of the entire population of this area was engaged in agriculture; seven percent in home industry; three percent in petty trade, and four percent of persons were not working. The information of this selective investigation was characteristic also of the general composition of the population of the entire country during the period of the Homindan government. Thus, according to the data of the "Statistical Collection of China" in 1935 87 percent of the population of China was engaged in agriculture.

Therefore, China until the end of the Homindan rule remained basically an agrarian country, backward economically, a country of petty bourgeoisie, where small ownership, unproductive individual peasant homesteads predominated, despite the fact that capitalism had begun to develop in it at the turn of the 20th century.

It was difficult for the Chinese national bourgeoisie to compete with the powerful foreign capital in the markets; therefore, it attempted to improve its ability to compete by increased exploitation of the workers through lengthening the workday, extensive use of cheap labor by women and children, et cetera. It is characteristic that the scale of exploitation of child labor increased from year to year. Thus, in Shanghai in 1924 23,900 children worked who were younger than 12 years of age; in 1929, their number increased to 27,482; and in 1934, to 32,261.

The work pay of workers in 1929-1933 in China was reduced by an average of two times.

During the war the Homindan bosses amassed tremendous riches and it rested its entire weight on the shoulders of the working people. The material situation of the working class

during the Homindan regime, as has been mentioned above, deteriorated markedly, particularly during the period of the war with Japan (1937-1945). The cost of living increased by 400-750 times. The increase in the actual work pay lagged considerably behind the increase in prices.

The frequent wars also impoverished the situation of the pensants. The acreage under crop was reduced; fertilizer became 80-100 times more expensive; rent increased by 16 percent.

At the end of the Homindan regime in China the economic and political crisis became more intense, and the collapse of the national economy assumed catastrophic forms. The number of starving, homeless, begging persons was expressed in the tens of millions. The Chiang Kai-shek band had systematically plundered the Chinese people.

The Communist Party of China throughout the people's revolution fought for the overthrow of the Homindan government, for the explusion of American and other imperialists, for the destruction of the political and economic rule of the feudal class.

History of Organization of Sanitary Organs

During the Period of the Homindan Government

Sanitary institutions of European medicine were created for the first time on Chinese territory by English physicians. The origin of them was constituted by the organization of a customs quarantine in Shanghai with the aim of preventing the transfer of epidemic diseases which frequently broke out in the country from China to Europe.

The first public health organ in China was created in 1906 by the emperor K'uang Shuh as the result of a "new political reform". -- The Central Sanitary Bureau. This organ was in existence for a total of several months and did not take any sanitary measures.

In 1909, an epidemic of plague broke out in Manchuria reaching tremendous proportions. The foreign imperialists and the emperor of the Ch'ing dynasty, afraid that the epidemic of plague would spread to Peking and Tientsin, contributed to creating a plague institution in Mukden, which was headed by the Chinese epidemiological physician Wu Leng-tieh. This plague institution was the first Chinese sanitary institution of European medicine; before this, only Chinese popular medicine institutions had existed.

After the overthrow of the Ch'ing dynasty as the result of

the bourgeois revolution of 1911 a republic was created in the country. A sanitation administration was organized in the Ministry of Internal Affairs. The work of the sanitation administration was initially directed by Chinese physicians who had received their medical education in Japan, in connection with which the forms of organization and the work of the sanitation administration were constructed along the model of the Japanese sanitation administration. For a certain time the function of the sanitation administration was carried out by the police administration. In places, the sanitary work was included in the police functions, which mainly amounted to observation of street cleaning.

After the counterrevolutionary coup in 1927 the reactionary Homindan government came to power. On 1 November 1928 the Ministry of Health was created. From this time on the work of the sanitary organs was directed by physicians who had received their medical educations in America rather then in Japan, as the result of which an American influence was felt in the work of the sanitary organs. In April 1929 the Ministry of Health was reorganized into the Central Sanitation Administration, which was included in the

Ministry of Internal Affairs.

After the victory of China in the war with Japan in May 1947 the Homindan government in Peking again created the Ministry of Health, which existed for about a year.

Therefore, the titles of the directing organs of public health, and at the same time their positions, changed for 20 years, depending on the change in the structure of the governmental apparatus, five times.

The local medical-sanitary organs were organized later than those in the center.

Long before the Homindan had come to power the foreign imperialists had created city sanitation organs, for their own purposes, in such large cities as Shanghai (1898), Chingtao (1922) and others. In Peking at the missionary hospital "Se.h e" the first sanitation station was organized (1922), which kept sanitation statistical records, and occupied itself with the problem of protecting motherhood and childhood.

The Homindan government began the organization of sanitary organs locally only in 1932. At first, sanitation departments were created in the large cities of the provinces. From 1932 through 1937 the sanitation departments were created

only in seven of 22 provinces, and in five provinces sanitation institutions were organized as an experimental matter; this was accomplished along with sanitary therapeutic functions.

The assignations of the Homindan government to medical-sanitary affairs were very small. In 1936, for this purpose there was an outlay of 1.09 dollar per city inhabitant per year in Hangchow; 0.54 dollar in Nanking; and 0.14 dollar in Tientsin. Of these funds an average of 51 percent was spent for street cleaning. Therefore, only 26 percent went for sanitary-medical aid to the population proper and 19 percent of the assignations went for other expenses. According to the official data, in 1939 the budget assignations for medical matters amounted to 0.5 percent of the total budget; in 1942, to 0.16 percent. The assignations for medical care of the rural population were even smaller: an average of 0.089 dollar per year was spent for each inhabitant.

In the provinces of northern, central and eastern China occupied by Japan even these very insignificant beginnings in the field of public health were destroyed by the invaders.

The Homindan government took refuge in southwestern China, where previously no sanitary organs or medical

institutions existed aside from missionary hospitals. When they were based in southwestern China the Homindan government carried out the organization of local medical-sanitation institutions in some provinces along with other measures. The creation of these institutions was brought about by the needs of wartime. Sanitation stations were organized along the central highways with the aim of caring for moving troops as well as for the peaceful population during the evacuation. The sanitation stations existed for a short time, because the Japanese forces were soon directed against the Eighth and the New Fourth Army directed by the Communist Party of China.

The State of Health of the Population in the Areas of the Homindan Government

The working population of China was under even poorer material conditions during the period of the Homindan government than before the advent of the Homindan power. Evidence of this was the stormy spread of epidemics of chl era, typhus, smallpox, plague and other infectious diseases.

The data which are presented below characterize the morbidity rate and mortality rate of the population according

to the incomplete official data of the Homindan government. It should be noted that during the 20 years of rule of the Homindan government the registration of acute infectious diseases was carried out very primitively and incompletely. Only in 1940 did the central sanitary organ of the Homindan government introduce a new registration system for the following types of acute infectious diseases: cholera, typhoid fever, dysentery, typhus, recurrent fever, malaria, smallpox, diphtheria, scarlet fever, encephalitis and plague.

The spread of the epidemics constituted a scourge to the health of the Chinese people. According to the data of foreign concessions, there were 12 large epidemics of cholera in Shanghai in 50 years. The cholera epidemics did not stop until the end of the Homindan government. In 1931, an epidemic of cholera broke out in some port cities in the Southeast of the country. In 1937, a new outbreak of cholera occurred. In the city of Ts'ang-tao in Hunan province 13,661 persons became sick with cholera of which 615 died. In 1938, an epidemic of cholera invaded six new provinces - - Kuang-hsi, Chiang-hsi, Hunan, Hupei, Honan and Shan-hsi, but raged particularly in Shanghai; during this year 55,965 cases of cholera were noted

throughout the entire country, and 13,093 persons died.

No active measures were taken to combat the cholera epidemic; therefore, for a number of the years which followed the epidemics continued to break out, now in the South, now in the North, now in the center of the country, and did not subside until the liberation of China. Next with respect to distribution were epidemics of plague and smallpox.

Plague epidemics in the Homindan period broke out in various parts of the country several times. From 1935 through 1937 an epidemic raged in the province of Fu-chiang, where more than 10,000 persons died; in 1940, an outbreak of pulmonary plague broke out in the northeastern part of the country (in Manchuria). From 1938 through 1941 plague was widespread in the southeastern portion of the country in the province of Fu-chiang, Che-chiang, in Canton, and continued in the eastern part of Chiang-hsi province and the southern part of Che-chiang province in subsequent years. In 1945-1946 a tremendous outbreak of plague broke out in all of its permanent foci, that is, in 10 provinces aside from the northwestern part of the country.

Epidemics of natural smallpox were also very frequent.

The fight against smallpox in the Homindan period was very poorly organized, although the effective method of vaccination had been in human hands for a long time.

Numerous parasitic diseases, such as, kala-azar, schistosomiasis, ankylostomiasis, and, in addition, tropic malaria, leprosy, et cetera, were very widespread in China.

Almost every province counted about 1,000,000 patients with various diseases, and the Homindan government did not even make any attempts to combat them. While sometimes an examination and partial treatment of some patients was carried out, this was accomplished by individual foreign and Chinese physicians only for research purposes.

Social diseases -- tuberculosis, syphilis, et cetera -- also were widespread because of the very low material and cultural level of the population during the period of the Homindan rule.

In view of the lack of statistical data concerning social diseases in the Homindan period we can judge their distribution among the population only by certain data. Thus, according to the information of the First Sanitary Station of Peking, which made an observation of the mortality rate of the population of this city from

tuberculosis for 10 years (from 1925 through 1935), it varied from 200 to 435 persons per 100,000 population. If we compare these data with the data of other countries during the same period the mortality rate from tuberculosis during the Homindan period in China was the highest.

According to the data of the Station of Sanitary Affairs in Nanking, which made an examination of pregnant women in 1935, syphilis was found in 18 percent of those examined.

During the period of Homindan rule the female and child mortality rate was very high.

According to the official data of the Homindan period, the average mortality rate of women delivering in the large cities amounted to 1.5 percent; in the rural localities the mortality rate of the parturient women was considerably higher.

The child mortality rate in cities was equal to 13 percent, on the average, and in the rural localities, to an average of 17 percent (Table 3).

The composite data of examination of students in the large cities of the country during the period from 1929 through 1938 attest to the following: among the students 40.5 percent had trachoma; 37.6 percent dental caries and other dental diseases;

22.6 percent, tonsillitis; inadequate nutrition was noted in 14.6 percent; skin diseases, in 9.4 percent; anemia, in 6.7 percent, et cetera. (Yu, Sad-ting. Collection of Material on Public Health. Ts'ung-ching, 1943.)

Table 3

Pediatric Mortality Rate by Individual Years

Name of locality	Year	Pediatric mortality rate in %	Institutions making the investigation
Henan Chengtu	1943	12,63	CAM Station, Chengtu
Hopeh Peiping	1944	12,26	Sanitary Station, Pekin
Hunan Nanking	1944	12,66	Sanitary Station, Nanking
Pishan, Sangch'iang in province	1944	17,69	Central Experimental Institute of Hygiene
In the country (from the investigation data of 36,198 healthy persons	1945	16,38	Agronomic Institute at Tangling University of Nanking

The results of examination of draftees in the provinces of Che-chiang, Chiang-hsi and An-huei during the war with Japan in 1940 showed that only eight percent of the draftees belonged to group I with respect to their health condition, that is, they were entirely healthy; 30 percent were in group II, that is, in the category of persons with mild physical defects; 62 percent of the draftees had various serious diseases, and they could not be

called into the army because of the condition of their health.

In 1943, a group of physicians made an examination of the soldiers in the Homindan army. (The examination was carried out by the physicians Li T'i-nan and K'un Tsu-ts'o, workers in the Scientific Research Medical Institute of the Central University of Chengtu). Of 254 persons examined various diseases were found in many of them: eye diseases (trachoma), in 54.3 percent; ear diseases, in 18.8 percent; dental caries, in 47 percent; diseases of the gums, in 46.5 percent; tuberculosis and other pulmonary diseases, in 5.3 percent; lymphadenitis, in 57.8 percent; enlargement of the spleen, in 8.2 percent; syphilis, in 1.2 percent; gonorrhea, in 2.9 percent, et cetera.

The average age of the soldiers examined was 26.9 years; the average height was 159 centimeters; the average weight, 51.9 kilograms; the average volume of the chest cage was 78.4 centimeters.

Of the group of soldiers investigated many did not satisfy the physical standards established by the Homindan government for soldiers. Thus, 57 percent of the soldiers did not satisfy the height standards; 35 percent of the soldiers, the

weight standards.

Medical Aid For the Population in the Areas of Homindan Rule

Governmental Medical Aid

During the Homindan period the population received medical aid of three types: governmental, missionary and private, both from physicians of European medicine and from physicians of the Chinese people's medicine.

All types of medical aid were free. Government hospitals existed for the city population. According to the official data of the Homindan government, in 1947 there were the following government city hospitals in the country in the central and provincial categories: 52 hospitals of general type with 4,228 hospital beds; 12 infectious-disease hospitals with 1,946 hospital beds; two tuberculosis hospitals of 180 beds; two psychiatric hospitals of 939 beds; one leprosy hospital with 10 beds; three hospitals for the treatment of opium addicts with 240 beds. (Chinese Almanac. Nanking, 1948, Vol 2). In addition, in the cities there were sanitation stations for the examination of prostitutes and laboratories for the performance of the Wasserma test, the Widal test and other clinical diagnostic examinations for

private physicians.

In all, there were 79 city hospitals of different types with 7,443 beds for 80,000,000 population. Therefore, one government hospital bed existed per 10,750 city inhabitants. According to the official data of the Homindan government, in 1937 in the entire country there were 302 government city hospitals with 4,239 beds and 417 rural hospitals with 1,030 beds. (Sanitation Statistics Published by the Ministry of Internal Affairs. 1938, No 5; Chinese Medicine, 1941, No 5, Issue 3).

In the government city hospitals and other city medical institutions the following persons worked: 1,132 physicians, 1,584 nurses, 341 midwives, 74 apothecaries, 220 pharmacists, 120 laboratory technicians, 469 nurses aides.

The majority of the city government hospitals was housed in buildings poorly adapted for this purpose which were rarely repaired; the hospitals did not satisfy the requirements of sanitation, there was no receiving department, and frequently intrahospital infections arose. The hospitals were poorly equipped with modern medical equipment: X-ray apparatuses, physiotherapeutic equipment were absent, and surgical instruments were insufficient.

The poorly paid physicians of the government hospitals were not interested in improving the work but rather preferred to occupy themselves in private practice.

The fact that despite the very low store of beds in the government city hospitals they were almost always vacant because they did not have the confidence of the population can serve as an index of the quality of work of the city government hospitals.

The main type of work of these hospitals was essentially outpatient treatment, because the independent government polyclinics and outpatients in the cities were very few.

It should be noted that some hospitals, such as the clinics of the medical institutes at Shanghai and Peking, the central hospitals of Nanking and Chungking, which cared for the top Kuomintangites, as well as the hospitals in Tientsin, Hangchow and Lanchow constructed in 1946-1947 with funds of the so-called "American medical aid" were much different from the government city hospitals. These hospitals were located in specially constructed buildings, had first-class modern medical equipment. The physicians of these hospitals, compared with the others, were paid much better. However, these central hospitals took care only of the richest portion of the population; the poor and middle-

class segments did not have any access there. The rural population of the country basically used the Chinese people's medicine.

In 1937, that is, before the war with Japan, in such a large province as the province of Ssuchuang with a population of 62,000,000 persons there was not a single government hospital bed in a single district; only in 1939 were government district hospitals organized with a total of 265 beds. (Chinese Almanac, Nanking, 1948, Vol II).

Throughout the entire country, with a rural population of more than 500,000,000 persons, according to official data in 1939, there was a total of 6,446 government district hospital beds. In 1947 this number increased to 11,226.

One should take a very critical approach to these official data, however. As the physician Hsiuz Chia wrote in 1947 in the journal "Popular Medicine", of the more than 20 district hospitals in the province of Kuang-tung investigated by this physician who took care of district hospitals, the majority had only signs indicating that they were district hospitals; as a matter of fact, the buildings were used as hotels for the district heads. Only in some district hospitals were there two or three medical workers, a very

small quantity of medical equipment, and outpatient reception was carried out in small volume, while there was no hospital care given.

After the victory in the war with Japan the Homindanites received drugs and medical equipment from the United Nations Organization, which were distributed among the missionary state and large private hospitals of the cities. The situation of the district hospitals remained unchanged.

The missionary hospitals, which served the interests of foreign capital, played a large part in old China.

Missionary Hospitals

The first missionary hospitals were created in China in 1820 in the city of Amoy by English physicians and in 1835 in Hangchow. The activity of these hospicals were highly praised by the imperialists: "not only canons but also the Parker scalpel has opened the gates to China".

Following the Opium War undertaken by England in 1840 th Chinese empire was opened to foreign capital. Foreign imperialists began to pour into China particularly at the end of the 19th and the beginning of the 20th century. Gradually they created missionary hospitals and medical institutes.

Beginning with 1820, that is, with the appearance of the first missionary hospital, 37 missionary hospitals were created in the large cities of China by imperialists of various foreign powers; at that time there were no Chinese hospitals of European medicine.

During the Homindan period the missionary hospitals which had been created previously continued their existence.

At the time of victory of the people's revolution in China there were 213 foreign missionary hospitals with 18,923 beds. Many of these hospitals, particularly in recent years, were maintained on funds of American imperialists. In 1951, until the time of nationalization of the foreign missionary hospitals, 70 percent of these hospitals belonged to Americans; 30 percent, to other imperialistic countries.

In connection with the fact that missionary hospitals were created chiefly by Anglo-American, German and French imperialists, three main divisions of European medicine were represented in China: Anglo-American, German-Japanese and French.

Anglo-American medicine found its expression in the creation of missionary hospitals and medical institutes in China.

In them Anglo-American physicians occupied themselves in missionary work. An essential condition for Chinese physicians receiving a medical education in Anglo-American medical institutes and subsequently working in Anglo-American medical institutions was the adoption of the Protestant religion.

Therefore, the main network of hospitals belonged to the missionary organization. Scientific work in the field of medicine was also in the hands of foreign imperialists. At the large missionary hospitals such medical institutes were created as the Anglo-American institute "Leonine" in Mukden, "Ch'i Lu" in Chingan (Shantung province), "Sheng" in Shanghai; "Lingnan" in Canton; "Hsien-Ya" in the city of Changsha (Hunan province); "Hua-hsi" in the city of Chengtu.

The largest medical institute in China, "Sehe" founded in 1906, was the center both for medical and missionary activity of Ango-American imperialists. This medical institute, at the beginning of the 1920's, was given a donation by Rockefeller funds The subsequent activity of the Institute was closely interwoven with the activity of the public health organs of the Homindan government. Chinese physicians who received an education at the "Sehe" institute directed the public health organs in the

Homindan government.

Chinese physicians who had obtained a medical education in Japan began to spread Japanese medicine in China; in a material respect this was more available than in Europe. These physicians created the Peking Medical Institute, the Chechiang Medical Institute and five other provincial medical institutes.

The Japanese themselves created only one medical institute in China, "Nangman" in Mukden. The Japanese physicians also acted in China for their own aggressive purposes.

German medicine penetrated into China with German capital. At the beginning of the 20th century German hospitals and medical institutes were created first in Tsingtao, and then in Shanghai. These institutes, after the First World War, were nationalized but the education in them was continued by German professors. There were several Chinese institutes under the influence of German medicine, like, for example, the medical institute "Chun-shan" in Kopton, the Henan Medical Institute and others.

French medicine was implanted in China by French missionaries. They created a number of French missionary

hospitals and one medical institute in Shanghai. The physicians who graduated from the French Institute worked mainly in missionary hospitals.

For the purpose of characterizing the work of the missiona hospitals we can present some examples. The physicians of missionary hospitals frequently performed experiments on patients, as the result of which many of them died. These inhsanthropic actions of the missionaries were no secret to the Chinese people and produced a lack of confidence in the popular masses in the new European medicine.

After the victory of the people's revolution the terrible details of the "activity" of missionary physicians came out. For example, in Peking in the American missionary hospital "Sche-" American physicians had performed experiments of infusing drugs which caused convulsions in patients, frequently performed operations which were not indicated simply to give the physicians the opportunity of practicing. In performing experime for the study of typhus American physicians made Chinese worke grow lice on their bodies specially for this purpose.

The American neuropathologist, Lehman, performed experiments on two patients, giving them very large doses of

X-rays for the purpose of determining the effectiveness of deep X-rays on barium and the influence of the rays on the permeability of the hemato-encephalic barrier.

Outpatients and eye stations existed at the missionary hospitals. Nurses or missionaries took on the duties of the physician as a rule. It is easy to imagine the results of treatment in these hospitals.

The imperialistic powers created hospitals, childrens' homes and even medical institutes in China under the banner of benificence. However, this benificence was only apparent, because these institutions used it for purposes of intervention and the seizure of territory.

The imperialistic powers kept a widely branching apparatus of scouts and propagandists in the missionary organizations in China.

Private Medical Aid

During the Homindan period the great majority of physicians were occupied in private medical practice. Thus, in 1947 13,447 physicians were registered who had a modern higher medical education. Of them, 2,625 physicians worked in government medical institutions; the others, in missionary

hospitals, in private Chinese hospitals and polyclinics, but the majority were engaged in private practice. Some of the physicians in private practice had their own clinics at home, but the majority of the clinics were in private pharmacies.

In the cities private medical aid to the population was give both by physicians of European medicine and physicians of the Chinese people's medicine.

Medical aid of government and missionary hospitals and of physicians in European medicine in private practice was not available to the broad masses of the population because of the high cost of a visit and of hospital treatment as well as because of the costliness of imported drugs. Only the rich segments of the city population used the medical aid of physicians of European medicine in private practice.

In the rural localities medical aid to the population was given chiefly by physicians of the Chinese people's medicine. According to the examination data of the physician Ling Ling - Ch'eng, in 32 districts of Chientsu province, the best developed culturally and economically, there were 7,033 physicians of the Chinese people's medicine in 1936, whereas there was a total of 763 physicians of European medicine, that is, nine times less.

In the majority of districts there were no physicians of European medicine at all, and medical aid to the population was given only by physicians who used the Chinese people's medicine.

The methods of treatment used by the Chinese people's medicine are markedly different from those used by modern European medicine. The Chinese people's medicine, despite a certain similarity (treatment with some of the same herbs) is markedly different from Tibetan medicine, which is closely interwoven with Buddhism.

It should be emphasized that the Chinese people's medicine, even in ancient times, has not only been radically different from sorcery, but has also carried out a stubborn battle against it.

Therefore, the Chinese people's medicine is one of oldest branches of the Chinese people's culture and during its many-centuried history has worked out unique methods of diagnosis, treatment and preparation of drugs.

In the treatment of many diseases with agents of the Chinese people's medicine successful results have been achieved.

During the Homindan period in the villages there was a considerable number of sorcerers, that is, charlatans who cheated the people but naturally did not give any medical assistance. The

Homindan government did not prohibit sorcery, because it was not at all interested in the life of the rural population. In the cities, the representatives of the Homindan regime attempted to forbid the practice of physicians of the Chinese people's medicine, considering them on a par with sorcerers. In connection with this, special examinations were arranged for these positions of the Chinese people's medicine after which they were permitted to practice medicine in the city. Frequently the representatives of the city Homindan regime took bribes from physicians of the Chinese people's medicine for the purpose of obtaining the right to practice medicine. However, under the influence of the people, who protested against the persecution of physicians of the Chinese people's medicine, the Homindanites had to change their policies and permit these physicians to work in the cities.

During the Homindan period the aid of physicians of the Chinese people's medicine was most available for the population, because they were present in the majority of inhabitated places (in 1952 there were about 300,000 of them). Everywhere that these physicians existed there were also pharmacies with a large assortment of drugs, which were also more available to the population.

The Preparation of Medical Personnel in Areas of the Homindan Government

In 1933, there were a total of four government medical institutes in the country ("T'ungchi" and "Shanghai" in Shanghai, the Peking Medical Institute and "Chungshang" in Hangchow), five provincial medical institutes (in the provinces of Chechiang, Chiang-hsi, Honan, Shang-hsi and Hupei), four private Chinese and 12 missionary institutes.

In 1933 a total of 3, 528 students were trained in them (Table 4). (Li T'ao, Chinese Medicine, 1933, Vol 19, No V, page 681).

Table 4

Number of Students being Trained in the Medical Institutes

	Total number	Men	Women
In 4 government institutes	619	519	100
In 5 provincial institutes	464	390	74
In 16 private institutes . . .	2140	1717	423
In 2 military medical institutes	305	297	8
Total	3528		

Shortly before the liberation three other governmental

institutes were created. The number of students trained in all the medical institutes of the country in 1946 amounted to 4,123 persons.

The Homindan Central Sanitation Administration in 1946 accomplished the registration of all Chinese medical personnel including physicians who had received European medical education both in China and abroad. There were 13,447 Chinese physicians with a European medical education in the country; in addition, the were 372 dentists and 352 apothecaries.

The followings were registered among the secondary-school medical personnel: 6,000 nurses, 5,268 midwives and 4,305 pharmacists.

The grent majority of the physicians in the Homindan period worked in the large cities. For example, in Shanghai alone there were 22 percent of the total number of physicians existing in the entire country.

According to the official data, during the 20 years of rule of the Homindan government the Central Sanitation Administration organized only a few courses on hygiene for physicians and secondary-school medical workers, which existed about five years.

Two hundred and fifty-one sanitation physicians, 41 physicians in community hygiene and about 2,000 persons among the secondary-school personnel in various specialties were graduated from these courses.

In the matter of raising the level of medical science and the qualifications of physicians an eminent part was played by the Society of Chinese Physicians created in Shanghai in 1932 and combined with the society, "Poihuei". ("Poihuei" is a society of Chinese physicians maintained on funds of the Japanese Economic Society).

The Society of Chinese Physicians gradually organized a number of local departments and sectors in various specialties which were occupied in the study of clinical and theoretical problems of modern medicine. This society published medical journals in various specialties, convoked scientific conferences and congresses of physicians. The activity of this society exerted a beneficial influence on the development of modern medicine in China. At the same time, the society committed great errors, spreading reactionary theories in the field of medicine -- malthusianism, neodarwinism, eugenics and the racial theories of Fascism.

During the period of rule of the reactionary Homindan certain changes occurred in the public health affairs of China compared with the period of rule of the northern militarists: a Ministry of Health was created which had five principal administrations: therapeutic, sanitation, antiepidemic, sanitary-statistical and administrative.

The Ministry of Health worked out a plan of public health organization in the cities and provinces but it was not realized because of financial difficulties and causes of political nature. The Ministry lasted for one year and was reorganized into the sanitation administration of the ministry of internal affairs.

During the second decade of rule of the Homindan, during the period of war with Japan, the majority of medical institutions was destroyed by the Japanese. After the victory in the war against Japan, the number of medical institutions increased somewhat but remained extremely small.

In characterizing the condition of public health during the period of rule of the Homindan, it should be noted that despite certain changes in the field of public health medical aid to the population was given in an extremely unsatisfactory manner becau of the small numbers of medical personnel and beds as well as

because of the costliness of medical aid. As the result of this, medical institutions mainly took care of the privileged segments of the city population, whereas the poor inhabitants of the city and the rural population remained without any medical assistance.

In view of the fact that the great majority of the population of China was deprived of modern qualified medical aid it made use of the Chinese people's medicine.

In Homindan China workers in factories and plants were completely deprived of medical care; there was no insurance against accidents and stipends were not given for incapacitating injuries.

Chapter III

Fundamental Principles of Public Health

After the liberation of China and in connection with the development of socialistic economy and the improvement in the material and cultural standard of living of the people the public health began to develop rapidly and to be perfected.

The theoretical foundations of the public health of China are based on the teaching of Marxism-Leninism, on the resolutions of the Central Committee of the Communist Party in China and on the instructions of Mao Tse-tung.

In December 1929, at the party congress of the Chinese Red Army Mao Tse-tung stated in his report that the military and party organs of the Army should direct attention to problems of sanitation. These problems should be in the center of attention. Sanitation and therapeutic institutions were to be consolidated by means of manning them with their full personnel so that they might cope with the tasks with which they were entrusted.

In his work, "Investigation of Villages of Ch'ang-K'ang Volost" Mao Tse-tung described in detail the methods and results of the sanitary movement in this volost and in conclusion he noted the following:"... diseases constitute one of the most malicious enemies in our

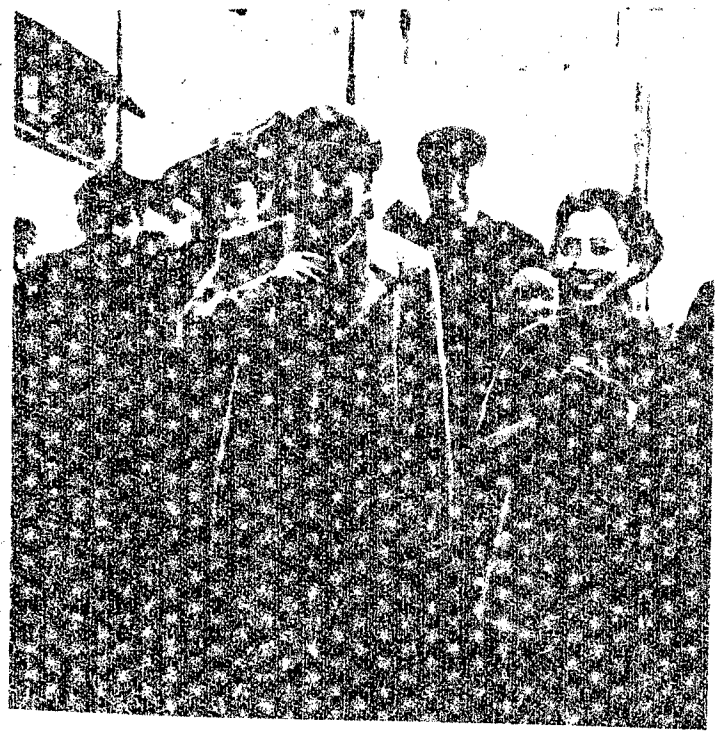
Soviet regions, because they weaken our revolutionary forces; therefore, the experience of the sanitary movement in the volost of Ch'ang-K'ang should be expanded in the fight for reduction and elimination of diseases among the population, which is one of the problems of first importance in Soviet regions". (Mao Tse-tung. The Peasant Movement and an Investigation of the Villages. Hongkong, 1949, page 148).

Therefore, the concern of the Communist Party for the health of the population and the soldiers of the Red Army was of very great importance in the matter of developing the public health.

Chinese public health was born because of the Chinese people's-freedom revolution. Its development was brought about by specific social-economic, political and cultural problems of China.

From the very beginning of the establishment of the people's regime the Communist Party and People's Government of China gave considerable attention to the matter of safeguarding the health of the population, which found its expression in the "General Program", adopted by the First Session of the Popular-Political Consultative Council of China in 1949. In article 48 of this program it is mentioned: " national athletics will be encouraged; the affairs of public health and medical care will be expanded and attention will be

directed toward safeguarding maternity and childhood".



President Mao Tse-tung Becomes Acquainted with the Sanitary Status of a Lane in Hsiao-Ying-s'iang in the City of Hangchow. (Province of Chechiang)

The People's Government immediately set about realizing the program which they had promulgated.

Shortly after the creation of the Chinese People's Republic, Independent Ministry of Health was instituted. Along with this, local organs were organized: departments of public health in the provinces, city, rayon and district departments of public health, as well as public health departments of the autonomous districts. In September

1954 a Constitution was adopted in the Chinese People's Republic by the First Congress of the All-Chinese Meeting of the Representatives, in accordance with which a new administrative division was established:

1) The entire country was divided into provinces (22), autonomous rayons (Inner Mongolia, Tibet and Hsing-ch'iang-Uiguria) and cities which were to be subordinated to the center -- Shanghai and Pekin;

2) Provinces and autonomous rayons were divided into autonomous cantons, districts, autonomous districts, and cities;

3) Districts and autonomous districts were divided into volosts, national volosts and hamlets.

Cities of central subordination and, therefore, large cities were divided into rayons. Autonomous cantons were divided into districts and autonomous districts. Autonomous rayons, autonomous cantons and districts were nationally autonomous rayons.

The public health organs of all levels were directed by all public health institutions and are subordinate to the local committees of the All-Chinese Meeting of the People's Representatives.

The concern of the party and government for the people has been shown in writing in article 93 of the Constitution of the Chinese

People's Republic. It reads: "The workers of the Chinese People's Republic have the right to obtain material assistance in their old age as well as in the event of disease or loss of their ability to work...".

Beginning with the first few days of creation of the organs of public health and in accordance with the resolutions indicated above taken by the party and government and in accordance with the general program, which played the part of a provisional constitution, four main principles of construction of public health of the Chinese People's Republic were established. They were formulated and approved at the First All-Chinese Congress of Public Health Workers, held 7 August 1950.

1. The bringing of medical aid personally to workers, peasants and soldiers.

2. Prophylaxis is the main thing, that is, the construction of public health on the basis of prophylaxis.

3. The alliance of physicians of modern and people's medicine.

4. The intimate connection of public health with mass public movement.

These principles became compulsory both for therapeutic-prophylactic institutions and for every medical worker.

The Ministry of Health required that all practical work in the field of public health be radically revised, that the class proletarian line be reflected more distinctly, that medical workers be consolidated and that their efforts be directed toward the protection of the health of the population.

The first principle -- bringing medicine personally to workers, peasants and soldiers -- defines the party policy in the field of public health, and indicates the fact that medical care in New China should be directed primarily toward safeguarding the health of the working class. All personnel and facilities are being brought in actively for this matter not only in government public health but also in private medicine.

The second principle -- prophylaxis -- is the main one in public health and defines the main line in the development of public health, being directed primarily at the prevention of diseases.

In the past, the reactionary government has not shown any concern for the health of the workers and peasants, was not interested in improving the working and living conditions of the population; therefore, various diseases, particularly infectious diseases, had a universal distribution. Now, when the people's regime is concerned with a radical improvement in the health of the population, prophylaxis

has become an active method of safeguarding the health of the working class. The realization of this principle is associated with measures which are of tremendous scale which are being taken in the field of systematic improvement of the working and safety technique conditions in industrial enterprises and in agriculture, improvement in the health conditions of living, improvement in the sanitary status of cities and villages, the destruction of pests and the elimination of old foci of diseases causing the greatest harm to the population (Japanese B encephalitis, schistosomiasis, kala-azar, and others).

The third principle -- the establishment of a united front of medical workers or, in other words, the consolidation of modern medical workers ~~in the~~ with workers in the Chinese People's medicine -- is of great importance in uniting the efforts of the medical organization.

The medical service of China requires a colossal number of physicians (about 500,000) for its proper organization. In order to train such personnel a long time is needed. Taking into consideration the popularity of the people's medicine, its experience which has been accumulated through centuries and the effectiveness of a number of treatment methods, it was essential in every way possible and actively to overcome the rift which previously existed between modern and old people's medical workers and which had at its basis not only differences in special medical views of the origin, diagnostic metho

treatment and prophylaxis of disease but also an improper approach to the evaluation of the richest national cultural heritage in the form of thousands of years of experience of old Chinese medicine. This rift reflected most unfavorably on the progress of Chinese public health and the progress of medical science in China.



Taking Advantage of an Interruption in Field Work the Members of the Red Cross Society in a Village Carry out Propaganda for the Elimination of the "Four Evils" and the Observance of Hygiene

The consolidation of the personnel, knowledge and experience of all workers in China in the field of medicine -- old and new -- is a most important premise for the successful solution of problems of safeguarding the health of the Chinese people. Therefore, the problem of consolidating physicians of the modern and people's medicine is acquiring a particularly great importance in China. For the practical

solution of this problem the Ministry of Health is taking the following measures.

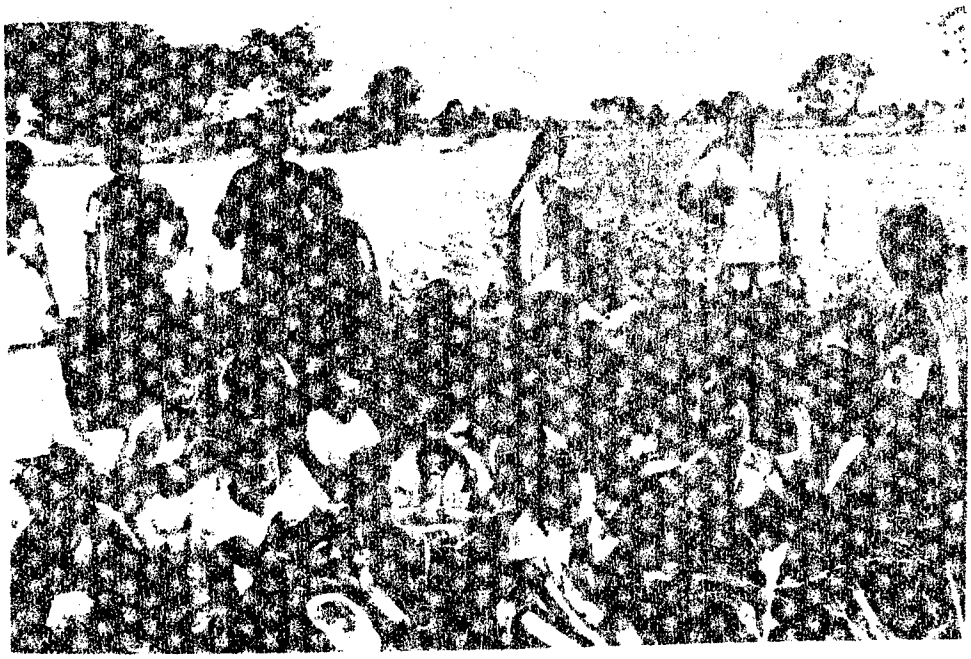
1. In institutes of the people's medicine special courses are being created for physicians of modern medicine. The work and clinical experience of the classics in people's medicine are include in the course programs. The oldest experienced physicians in the people's medicine are being brought in to do the teaching. After the completion of the course modern physicians continue a deep study of the people's medicine so as to take the very best from it -- "the rational nucleus" -- and to give it a scientific basis.

2. For the purpose of improving the qualifications of physicians in the people's medicine special schools, courses are being organized, lectures are being conducted, scientific reports, etc.

3. The ancient books on the people's medicine are being republished with a mass circulation with explanations in the modern Chinese language, which considerably facilitates the study of these works by modern physicians.

4. Plantations of medicinal plants are being created in localities with different climates, pharmaceutical plants are being created for the preparation of drugs according to the method of the

people's medicine.



President Mao Tse-tung Becomes Acquainted with the Wild Plant, Anemone of Hupei, Capable of Destroying Mosquitoes and Flies

The fourth principle -- intimate association in work in the field of public health with the mass popular movement -- was promulgated by the prime minister of the Chinese People's Republic, Chou En-lai in December 1952 at the Second All-Chinese Congress of Public Health Workers. The congress was of tremendous historical importance in the matter of future development of the public health of New China. At this congress, along with other problems, the results of the great patriotic sanitation movement were discussed, which at that time had reached a great scale.

During recent years, because of the sanitation movement, the sanitary conditions of working and living have been improved considerably, and, which is particularly important, measures have been taken for the elimination of the "four evils" (flies, mosquitoes, mice and sparrows).

The experience of the sanitation movement showed that the most effective method in improving public health is a very intimate association between the public health organs and the mass popular movement. It has long been known that the problem of safeguarding the people's health cannot be solved successfully without the active participation of the people itself in this matter.

Chapter IV

Sanitary-Antiepidemic Service and the Control of Infectious Diseases

In old China epidemics were a frequent occurrence and did considerable damage to the people. The Homindan government practically took no measures, and the mortality rate from epidemic diseases remained very high.

An important task of the People's Government of China was the matter of controlling epidemics and primarily the particularly dangerous infections: smallpox, plague, cholera and others.

The Ministry of Health of the Chinese People's Republic immediately after deliberation of the country worked out measures of first importance, directing special attention to those cities and inhabited places where outbreaks of epidemics were noted most frequently.

In 1950, the Main Sanitation-Antiepidemic Administration was created in the Ministry of Health, the function of which included operative and methodological supervision of the matter of sanitation and antiepidemic affairs. In the provinces and large cities of China this is carried out by the appropriate local public health organs through the antiepidemic departments included in their structures.

In China, according to the sample of the Soviet

Union, sanitation-epidemiological stations were created for the first time, the number of which has increased every year: in 1950 there were 61; in 1955, 315; in 1958, 1,420.

In 1955, the Communist Party of China promulgated an appe for the acceleration of the building of socialism. After Mao Tse-t gave a report "On Increasing the Cooperation in Agriculture", a new phase of socialistic revolution occurred, which was expressed in the stormy development of agricultural cooperatives, reconstruction of capitalistic industry, and trade in the household industries. In connection with the increase in the tempo of building socialism the material and cultural welfare of the people improved continuously. New problems on the future consolidation and expansion of therapeutic prophylactic and sanitation institutions and for the improvement of sanitary conditions of inhabited places were set before public healt organs. Large groups of personnel were mobilized for controlling infectious and parasitic diseases.

The following was written in article 27 in the "Project o the Principal Laws on the Development of Agriculture in the Chinese People's Republic for 1956-1957": "Four pests need to be destroyed during the period of 12 years beginning with 1956 everywhere that it is possible; chiefly, rats, sparrows, flies and mosquitoes are to be

eliminated". In article 28 the following is mentioned: "the most dangerous diseases for man are to be eliminated. In the course of 12 years beginning with 1956 everywhere that it is possible the most dangerous diseases are to be eliminated, such as schistomiasis, smallpox, plague, malaria, kala-azar, ankylostomiasis, filariasis, tetanus of the newborn and venereal diseases. It is also necessary to combat vigorously the other dangerous diseases, such as measles, dysentery, typhoid fever and typhus, encephalitis, poliomyelitis, diphtheria, pulmonary tuberculosis, trachoma, Urov's disease /osteoarthritis deformans endemica/, leprosy and Kaschin-Beck disease. For this purpose, it is necessary to actually train personnel among sanitation physicians, including also physicians of the people's medicine.

The problems posed by the Party are very broad and complicated in their extent and content. However, medical workers, basing themselves on the activity of the popular masses, under the direction of the Party with unprecedented enthusiasm have developed a mass patriotic sanitation movement. Antiepidemic detachments, mobile therapeutic groups have been created at rapid tempos for controlling various diseases; sanitary-epidemiological stations have begun to be organized on a broad scale. By the end of 1957 the number of sanitary-

epidemiological stations in the entire country had increased by four and a half times compared with 1955; the number of special stations for controlling the most dangerous diseases had also increased considerably (Table 5).

Table 5

Growth of Sanitary-Epidemiological Stations and Detachments in the Chinese People's Republic

Year	No of sanitary-epidemiological stations	No of special stations[1]	No of medical detachments
1947	—	7	50
1950	61	30	85
1952	147	188	169
1955	315	287	179
1957	1411	626	232
1958	1420	667	190

[1] Stations for controlling malaria, plague, kala-azar, schistosomiasis, brucellosis and other diseases.

In his work, "The Problem of Methods of Supervision" concerning the significance of a constant connection with the masses Mao Tse-tung wrote that in all the practical activity of our Party proper supervision should always be constructed on the principle of drawing from the masses and carrying out operations en masse.

This principle of Party work underlay the activity in the field of public health, particularly in the matter of eliminating massive diseases among the population. Experience has shown that

without the active participation of the masses of people it is impossible to attain success in controlling diseases.

For ten years very considerable work has been accomplished in the matter of controlling various diseases, particularly those which represent the greatest threat to the health of the population. After the publication of "Project for a Plan of Development of Agriculture" the work in controlling diseases was improved and a definite progress was attained. Over the cource of the last few years not a single case of cholera or plague has been observed in the country. The mortality rate from measles, scarlet fever, dysentery and others has been cut down considerably. For example, the number of cases with measles having a fatal outcome decreased from 8.6 percent in 1950 to 1.7 percent in 1958; correspondingly, the mortality rate from scarlet fever dropped from 17.8 to 1.3 percent; from dysentery, from 3.8 to 0.4 percent.

Measures Against Smallpox

Before mass inoculations were given natural smallpox was widespread in various regions of the country. On the basis of the decree of the government in 1950 the Ministry of Health of the Chinese People's Republic issued an order for the compulsory vaccination of the population with the aim of complete elimination of cases of smallpox

The periods during which the inoculations were to be given were established by special instructions: the first inoculation, at the age of one to six months; the second, at six years; the third, at 12 years; the fourth, at 18 years.

Because of the introduction of compulsory free vaccination natural smallpox has been completely eliminated in all provinces, cities and villages of the country. Only solitary cases of smallpox have been recorded in individual border areas.

By the end of 1952 more than 512 million smallpox inoculations had been given. In 1953, in a number of regions about 80 million persons were given selective additional inoculations. During 1955 alone initial and repeated smallpox inoculations [illegible] given amounted to two and a half times more than the number during the seven years before the liberation of China. The number of inoculations during this period amounted to 4,700,000,000 man-doses. At the present time, particularly considerable work in vaccination has been accomplished at places at some distance from the center.

Plague Control

In 1694 an epidemic of plague was first described in China in the city of Luan (at present, the city of Tsangtse in the province Shansi). . (Wu Leng-te, Plague in China. Monthly Journal of Hygien

1947, Vol XI, No 10, p 1).

From scurces in the literature of ancient Chinese medicine it is known that in the majority of those who died from plague a severe suppuration with ulceration and degeneration were observed in the cervical and inguinal lymph nodes.

In 1882, a plague epidemic in South China in the city of Pei-hai was described by an English customs physician.

A great outbreak of plague was observed in China in 1894, at first on the Island of Hongkong, which included Englishmen in 1842, and then in the other port cities of South China: Amoy, Pei-hai, Hangchow and others. This epidemic lasted for several years. Hongkong -- one of the largest trade cities at that time, became a permanent focus for the spread of plague in the provinces of South China.

Note should also be made of a plague epidemic in the Northeastern part of the country: in 1912, in Manchuria; in 1917, in Inner Mongolia (the former province of Sui-Yüan). In Manchuria 60,000 persons died from the plague; in Inner Mongolia, 16,000.

During the Homindan regime the outbreaks of plague continued in China; permanent natural foci of plague existed in ten provinces

and 141 districts.

During the years of war against the Japanese interventionists new foci of diseases were found in the cities, where the Japanese threw bacteriological bombs containing plague bacteria.

In the Northeastern part of China, in the vicinity of Harbin, the Japanese blew up a tremendous bacteriological laboratory before the approach of the Red Army for purposes of concealing their military crimes. After this, outbreaks of plague were observed in this area for a number of years, because the Japanese had released infected rodents from the vivarium. For the purpose of controlling plague in Harbin a plague detachment from the Soviet Union arrived in 1947. Here, as in the other regions of China the Soviet specialists gave considerable aid in the matter of controlling plague. Based on their experience, Chinese physicians subsequently performed great work in controlling plague in the entire country.

In August 1950, the government administrative council adopted a resolution for the complete elimination of plague in China. Antiepidemic committees were organized in the center and in localities for unified direction of the fight against plague and other epidemic diseases as well as antiplague stations, points and mobile detachments. In 1950, 13 plague stations were created in the country with several

mobile plague detachments, and in 1958 there were 46 plague stations.

The medical workers of the plague stations are accomplishing great work in the investigation and study of plague endemics at the places of their distribution, in preparing and perfecting personnel and groups of active sanitation corps in localities and on writing methodological texts: for controlling plague, methods of destroying rodents and fleas, the matter of information on the appearance of cases of plague, measures for the welfare of inhabited places, etc.

The local authorities and party organs are constantly giving their assistence to antiepidemic institutions in the control of plague; by means of them quarantine has been established in plague foci and deratization measures are taken on a broad scale.

As a result of the tremendous work in the mass extermination of rodents and fleas, the giving of plague inoculations and other prophylactic measures no cases of plague have been observed among the population in recent years.

Cholera and Typhoid Fever Control

Cholera was brought into China by the English Army, which had been transferred to China from India in 1838 for aggressive purposes. In the composition of the English Army at that time there was a large number of Indian soldiers, among whom there were many

sick with cholera. From that time, cholera began to spread among the inhabitants of the port city of Shanghai and then was carried by the local population to other areas of the country.

There are no accurate data concerning the number of persons who became sick with cholera among the native population of Shanghai, but it is known that among the foreigners who were in this city 8,000 persons fell ill with cholera in 1862, and here the mortality rate among Englishmen reached 65 percent; among Hindus, 77 percent. After this epidemic outbreaks of cholera of greater or lesser strength were repeated.

In 1902 and 1912 the largest cholera epidemics occurred in China which embraced a tremendous part of the country; at that time millions of people died from this disease. During the war with Japan in 1937-1945 continuous outbreaks of cholera epidemics occurred, whereby the spread into such places as the Northern portion of Ssuch'uan province and the province of Yunan, where up to that time there had not been even individual cases of cholera. For example, in Ssuch'uan province in 1940 more than 40,000 persons died from cholera.

During the period from 1937 through 1945 950,000 cases of cholera were registered in the entire country, whereby more than

100,000 persons died.

After the liberation of China, for purposes of reducing the morbidity rate with cholera and complete elimination of it, as well as of typhoid fever throughout the entire country, considerable antiepidemic and sanitation-education work was accomplished. The water supply was considerably improved, many new wells were constructed, the reservoirs were protected, and extensive chlorination of the water was accomplished. Inoculations against typhoid, parathyphoid fever and cholera were given to the majority of the city population. This made it possible considerably to reduce the typhoid and paratyphoid morbidity rate. Cases of cholera had not been found at all in the past nine years.

Typhus and Recurrent Fever Control

In recent decades, outbreaks of cases of typhus and recurrent fever have been observed most frequently in areas of national minorities and in localities suffering from catastrophes. Beginning with 1950 intensive work has been carried out throughout the entire country for controlling foci of typhus and recurrent fever.

The People's Government of the Chinese People's Republic since the very beginning of its activity has carried out definite

measures for the elimination of the parasitic typhus fevers among the population in the autonomous areas of Inner Mongolia, Sinch'iang-Uiguria, Tibet, the provinces of Tsing-hai, Kuichow, Yunnan. In these areas and provinces hundreds of medical and antiepidemic detachments worked.

Initially, there were considerably difficulties because the population lived under difficult conditions. Nevertheless, as the result of active operations of the antiepidemic and medical detachments under the supervision of local party organizations outbreaks of typhus and recurrent fevers were completely stopped in many areas. If the number of cases of typhus fever, just as the number of cases of recurrent fever, be taken as 100 in 1951 the typhus morbidity rate in 1953 decreased to 29.4 percent; in 1956, to 10.4 percent; and in 1958, to 5.2 percent; the recurrent fever morbidity rate dropped respectively to nine percent, 0.8 percent and 0.2 percent.

Because of the improvement in the material and cultural level of the population of these areas as well as because of extensive antiepidemice and sanitary measures there was a marked reduction in the typhus and recurrent fever morbidity rates for all of China.

At the present time, systematic sanitary processing is being accomplished successfully at the large construction projects with disinfection of the clothes of the construction workers for the prevention of typhus and recurrent fevers.

Schistosomiasis Control

Schistosomiasis in China is widespread in the river basin of the Yangtse and in the localities where there are many lakes, marshes and swampy rivers. This disease is particularly frequently encountered among the population which lives along the coast of the T'aihu, P'o Yanghu, Tungt'inghu and Tonghu Lakes.

Schistosomiasis has cost many human lives: even whole villages have died out. For example, in the villages of Hsia Hung Tap and Yangts'un of the district of She-hsiang in the province of Anhoy there were more than 200 yards in the past where cases of schistosomiasis were found constantly. Before the liberation of China the population of both villages almost died out.

Beginning with the second half of 1945 and until the end of 1950, that is, during the period of liberation of the country, i Eastern China treatment of patients with schistosomiasis was be for the first time in the suburbs of Shanghai and in military hospitals which were in this area.

According to the instructions of Mao Tse-tung the battl against schistosomiasis was included in the "Project of Developm of Agriculture" in 1956. According to the project, this disease should be basically eliminated during the course of the next seven years. In 1957, a special administration was created in the Minis of Health for combatting schistosomiasis. At the present time, in more than 300 districts and cities of the country the most varied measures of control of this disease have been taken. A resolution has been adopted for carrying out comprehensive measures: repea treatment of patients and the elimination of molluscs. With this in view, 147 schistosomiasis stations and points have been organi about 1300 detachments, more than 17,000 specialists and worker

been trained who incessantly wage a fight against schistosomiasis.

For the purpose of improving this control 42 scientific research institutions have been created. The control of this disease is being carried out on the basis of the realization of a combination of therapeutic and prophylactic methods.

Because of the measures adopted, in a period of nine years schistosomiasis has been eliminated, by and large, in approximately half of the regions affected by this disease. In order to eliminate schistosomiasis completely and create favorable conditions for the development of agriculture, in 12 provinces and cities of the country the entire population has been mobilized to fight against this disease. Prophylactic work has been developed extensively directed toward the elimination of molluscs by various methods over an area of more than 3,500,000,000 square meters. The treatment of more than 4,000,000 patients with schistosomiasis has been carried out. In addition to this, measures have been taken for regulating the storage of feces for the purpose of decontaminating them when they are used for irrigation construction.

Kala-Azar Control (Visceral Leishmaniasis)

One of the most severe epidemic diseases in tropical countries is kala-azar. In China it is encountered in a number of provinces.

During the Komindan regime patients with kala-azar died after three or four years from the onset of the disease because of the absence of any kind of medical care. The control of kala-azar was begun on the first day after liberation of the country in the province of Shantung, Chiangsu and others. Investigations showed that in certain areas the degree of contamination of the population with kala-azar reached 80 percent; more than 600,000 patients were detected. During recent years (1956-1958) the most vigorous measures have been taken for controlling kala-azar. Twenty-three specialized therapeutic-prophylatic institutions have been created in which patients suffering from this disease are treated free.

As a result of the measures taken no more than 10,000 kala-azar patients remained in the country by the end of 1958.

Malaria Control

Malaria was well known in China in antiquity. In the very old medical book "Huang-ti nei-ching", written in the sixth century B.C., there is a special chapter on malaria. In old China this disease was very widespread, particularly in the areas of Southern and central China. Only after the victory of the people's revolution in the republic was prophylactic work developed extensively for the elimination of foci of malaria.

Beginning with 1952 the organization was begun of a network of specialized antimalarial institutions. Before 1956, in provinces which were unfavorable with respect to malaria, 49 malaria stations and points were created and 72 antimalarial groups. The Academy of Medical Sciences of China organized a scientific research station for malaria on the island of Hainan. The training of special personnel is being conducted actively. At the present time, there are about 450 specialists with higher qualifications. In 1956 alone, in the province of Kuantung and others 1,125 specialists with secondary-school qualifications have been trained. An army of antimalarial workers is increasing from day to day; the area on which the fight against which malaria is being waged is expanding steadily. Province by province, city by city scientific research workers being developed for grounding effective measures for the elimination of this disease.

With the aim of working out effective methods of destroying the malarial vectors, early detection of patients and radical treatment of them in all the provinces are favorable with respect to malaria; experimental-demonstration areas have been set apart in which therapeutic and prophylactic work has been developed extensively. In 1956, in the province of Kuei-Chow 640 experimental-demonstration volosts were [illegible] created; more than 440,000 malaria patients have been

given treatment for recurrences; about 700,000 persons have been given chemoprophylaxis.

Massive work in controlling mosquitoes combined with a mass patriotic sanitation movement, is playing an important part in the elimination of malaria vectors. At the same time, in the malarial regions, in the vicinity of the inhabited places, elimination of the places of germination and habitation of the mosquitoes has been accomplished. In newly reclaimed areas and during the construction of new irrigation structures in new cities a sanitation-prevention supervision is being organized. In addition, in all the provinces and cities chemical preparations are used for destroying winged mosquitoes. The area subjected to chemical treatment is increasing with every year.

Because of the accomplishment of various comprehensive measures considerable progress has been achieved in the matter of destroying mosquitoes. By the end of 1958, in many districts and villages mosquitoes, flies, sparrows and rodents were definitively destroyed. As a result of the accomplishment of antimalarial measures in recent years it has been possible to prevent malarial epidemics. Thus, in many cities of the province of Ssuch'uan no such epidemics are found any longer. In the epidemic foci of agricultural areas and

at industrial enterprises the malarial morbidity rate is decreasing sharply. Despite the fact that in 1956 in all places in the country there was considerable flooding, no outbreaks of malaria were observed; conversely, by comparison with 1955 the malaria morbidity rate decreased by 67 percent. In the province of Kuei-Chow the morbidity rate in 1957 decreased by 85 percent compared with 1956, and in 1958, by another 67.7 percent.

As is well known, prior to the liberation of China, malaria epidemics were practically incessant in the provinces of Yunnan, Kuei-Chow, Kuangsi and Huan. How seriously malaria affected the health of people is clear from the following statistical data obtained during the period of several years after the liberation of the country. In many areas infested with malaria the splenic index reached 90 percent or more, and the parasitic index, 50 percent. In these areas, the birth rate decreased markedly. Thus, for example, prior to 1919 in the city of Kaimao in Yunnan province the population census exceeded 20,000 persons. As a result of the incessant epidemic and severe material living conditions the population of this city decreased sharply. In 1950, a total of about 1,000 persons was present in it. In the provinces of Yunnan and Kuei-Chow many cities were literally evacuated. The province of Yunnan became known as a dangerous place.

In a popular Yunnan song it says: "if you go to Mang Se-pa, first give your wife in marriage; if you go to Kangma, first buy a coffi.

After the liberation of China and thanks to the concern of the party and government work is being conducted actively in the prophylaxis and treatment of malaria. At the present time, as a result of successful antimalarial control, which has been continued several years, the regions which were previously unfavorable have begun to develop again.

For purposes of subsequent control of malaria, up to the point of complete destruction of it, in 1956 in the city of Kuangcho the All-Chinese Conference [illegible] on the Problem of Controlling was held.
Malaria At this conference a general-governmental plan of antimal arial work was constructed.

Tuberculosis Control

During the period of the Homindan rule the total number o patients with tuberculosis throughout the entire country amounted to several scores of millions of persons. Thus, the tuberculosis morbidity rate among students in the city of Pekin in 1948 was equal to 20 percent; the mortality rate from tuberculosis in Pekin, according to 1932 data, amounted to 380 persons per 100,000 population. From 1926 through 1948 more than two million persons died in the

country every year from tuberculosis.

Following the example of the Soviet Union the control of tuberculosis in the Chinese People's Republic is being conducted primarily by means of improving the working conditions and living conditions and accomplishing special prophylactic measures. During recent years, a network of antituberculosis institutions has been created (dispensaries, night and day sanatoria at industrial enterprises, rest rooms and special hospitals).

Tuberculosis control at industrial enterprises is being conducted by tuberculosis dispensaries in conjunction with the health stations. The principal attention is given to the detection of the initial forms of tuberculosis. Such patients are put into night and all-day sanatoria. Here, the patients are under the supervision of medical workers, receive appropriate nutrition and treatment, including also measures of the people's medicine (Chen-tsu therapy, respiratory gymnastics, etc.). For the purpose of increasing the nutrition of the patients trade unions and the administration of the enterprises and institutions put out special facilities funds. The patients themselves pay only one-third of the cost for their nutrition.

By the end of 1958 there were 104 tuberculosis dispensaries

61 tuberculosis hospitals with 16,000 beds, 299 tuberculosis sanatori with 17,181 beds, 1,425 night and day sanatoria with 16,698 beds.

Considerable work is being conducted in the dispensary care of workers and employees of the enterprises. Thus, for example, in 1957 422 of Pekin enterprises were included in the dispensary care. According to the data of medical examination of workers of industrial enterprises, 0.5 percent of persons newly afflicted with tuberculosis were detected.

For children sick with tuberculosis children's department in tuberculosis dispensaries and therapeutic-prophylactic institution are being organized.

At the present time, extensive use is being made of spec ific prophylaxis with BCG, primarily of newborn children in cities. Children who have been given inoculations after birth are then subject to revaccination. The first revaccination is given at an age from one year to three years; the second, from three to seven years; the third, from seven to 12 years; and the fourth, after 12 years. During the two weeks before revaccination a tuberculin test is given as an obligatory matter.

In 1957, in Pekin 92 percent of the newborn children were included in the tuberculosis vaccination. In 1950, 87,578 children

were vaccinated; in 1953, 99,781; in 1957, 160,000.

Because of this and other measures the mortality rate from tuberculosis among children from zero to one year of age decreased from 270.9 per 100,000 children in 1950 to 38.4 in 1956. If the mortality rate of children from tuberculosis in 1950 be taken as 100, in 1956 it dropped to 14 percent.

The mortality rate from tuberculosis among the adult population of Pekin also decreased: in 1949, it amounted to 230 per 100,000 population; in 1957, to 56.7. If we take the mortality rate from tuberculosis in 1949 as 100, in 1957 it dropped to 24.7 percent (Figs. 1-2).

In the Hsin Hua University the number of patients with tuberculosis dropped from 8.5 percent in 1953 to 5.5 percent in 1954 and to 1.9 percent in 1955. The tuberculosis mortality rate among 30,000 students in the secondary schools of Pekin in 1952 amounted to 24 percent; in 1956, it dropped to one percent.

In the matter of controlling tuberculosis the most important measure is the increase in the sanitation education work and efficient treatment of patients under domestic conditions. Considerable progress has been made in the treatment of patients with open forms of tuberculosis. General measures of controlling

tuberculosis amount to the following: inculcation of good habits of personal hygiene into the patient (washing the hands, the use of spittoons, individual utensils, towel, etc.), provision of a hygienic routine for the living quarters (airing, moist cleaning), concurrent disinfection, etc.

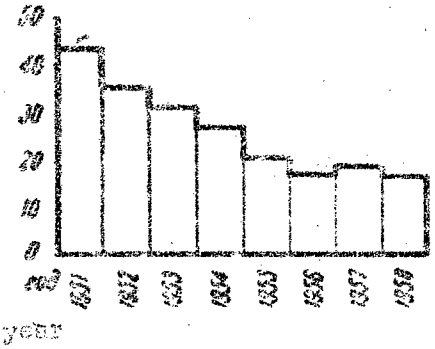


Fig. 1. Newborn Mortality Rate per 1000 Born) from Tuberculosis in Peking.

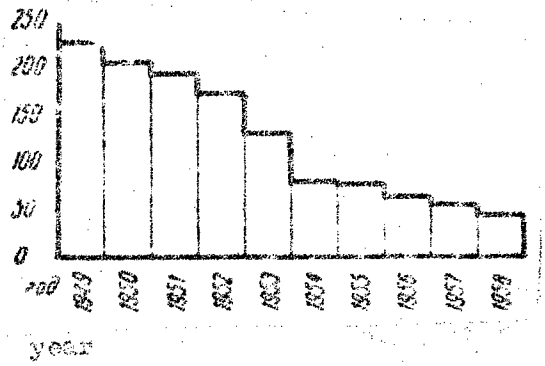


Fig. 2. Mortality Rate of the Population (per 100,000 Inhabitan from Tuberculosis in Peking.

The Patriotic Sanitation Movement and the Destruction of the Four Pests

Before the liberation of China the sanitary conditions of living and working were at a very low level for the working class. In the city rayons, in which the poor lived, and in villages and workers' dormitories there were many lice, mosquitoes, mice and bedbu Trash and excretions were thrown out into gutters and ditches, which were never cleaned out; a foul-smelling water came from them consta

In response to the appeal by Mao Tse-tung: "Mobilize, stu

hygiene, reduce the morbidity rate, raise the health standard, destroy the enemy in the bacteriological war", a patriotic sanitation movement, which played and is continuing to play a tremendous part in the matter of improving the sanitation welfare of the country, was begun on a tremendous scale in 1952. In the past several years alone gutters, sewage pipes and ditches with a total length of several millions of kilometers have been cleaned out or dug. In 1952 alone 280,000 kilometers of gutters were cleaned out, and marshy ditches were dug up with an area of 33,000 square meters. Hundreds of millions of tons of city wastes have been brought out (in 1952, more than 16 million tons).

The following fact deserves mention: trash 500 years old has been brought out of the Emperor's palace in Pekin. This trash had been kept here even before the time of the Ming Dynasty. In this region of the city two lakes, well known for their foul odor, flies and mosquitoes and hotbeds of malaria and other diseases were cleaned out and rendered innocuous. Now, this place has been converted into a beautiful park "Tao-jan-ting" -- a place for relaxation and strolling by the workers.

It may be stated without embellishment that the progress made as a result of the mass movement for the improvement of the sanitary

condition of the country is a shining page in the history of the Chinese public health.



"Grandmother" Ts'ao Ts-hsü of the Tai People (Yunnan Province) is We Known to the Whole Country as a "Local Specialist on Rat Control"

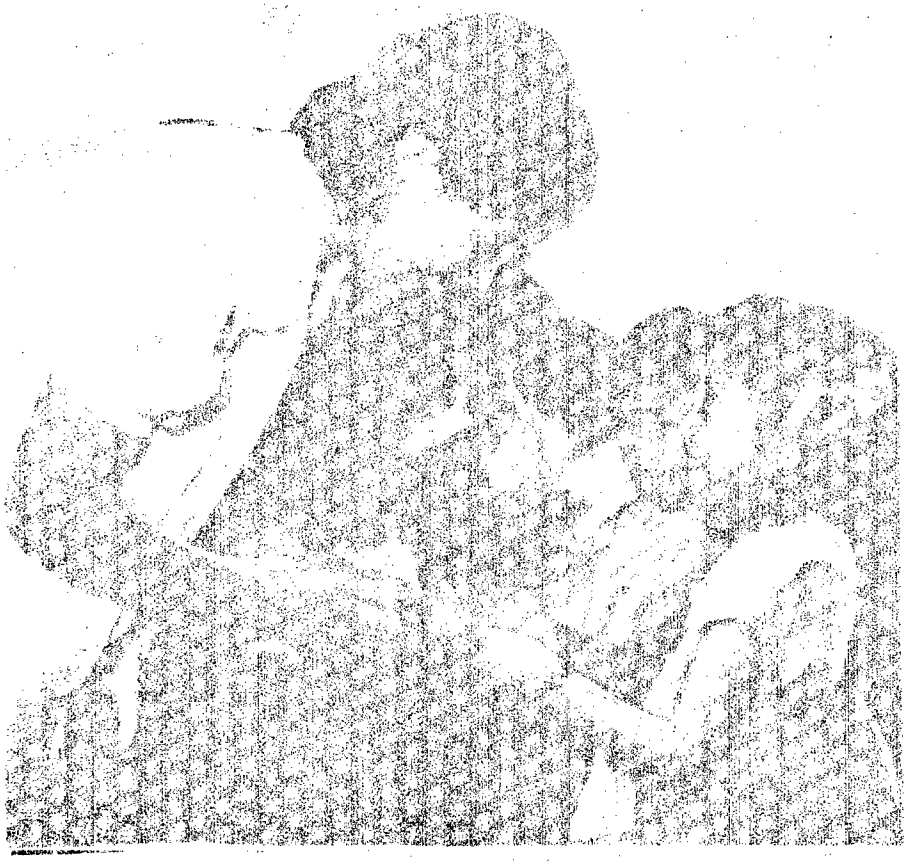
Before the liberation of the country there were clouds of flies and mosquitoes in the cities and villages in the summer and the autumn. As a result of the patriotic sanitation movement the sanitary condition of the country has been markedly improved, and in many cities and villages there are now neither flies or mosquitoes.

Considerable work on the elimination of the four pests is being carried out by the entire population. The active participation of the people has made it possible to achieve high indices of

sanitation welfare in street blocks, on the streets, lanes, in industry and under domestic conditions. Massive control has been set up for carrying out hygienic rules. The control groups, which consisted of representatives of public organizations, systematically check the degree of cleanliness in houses, yards, on the streets, enterprises, etc. The sanitary conditions of a given inhabited place is evaluated depending on the presence of flies in the houses, yards or public places, at industry, etc. These indices determine the level of sanitation literacy of the population.



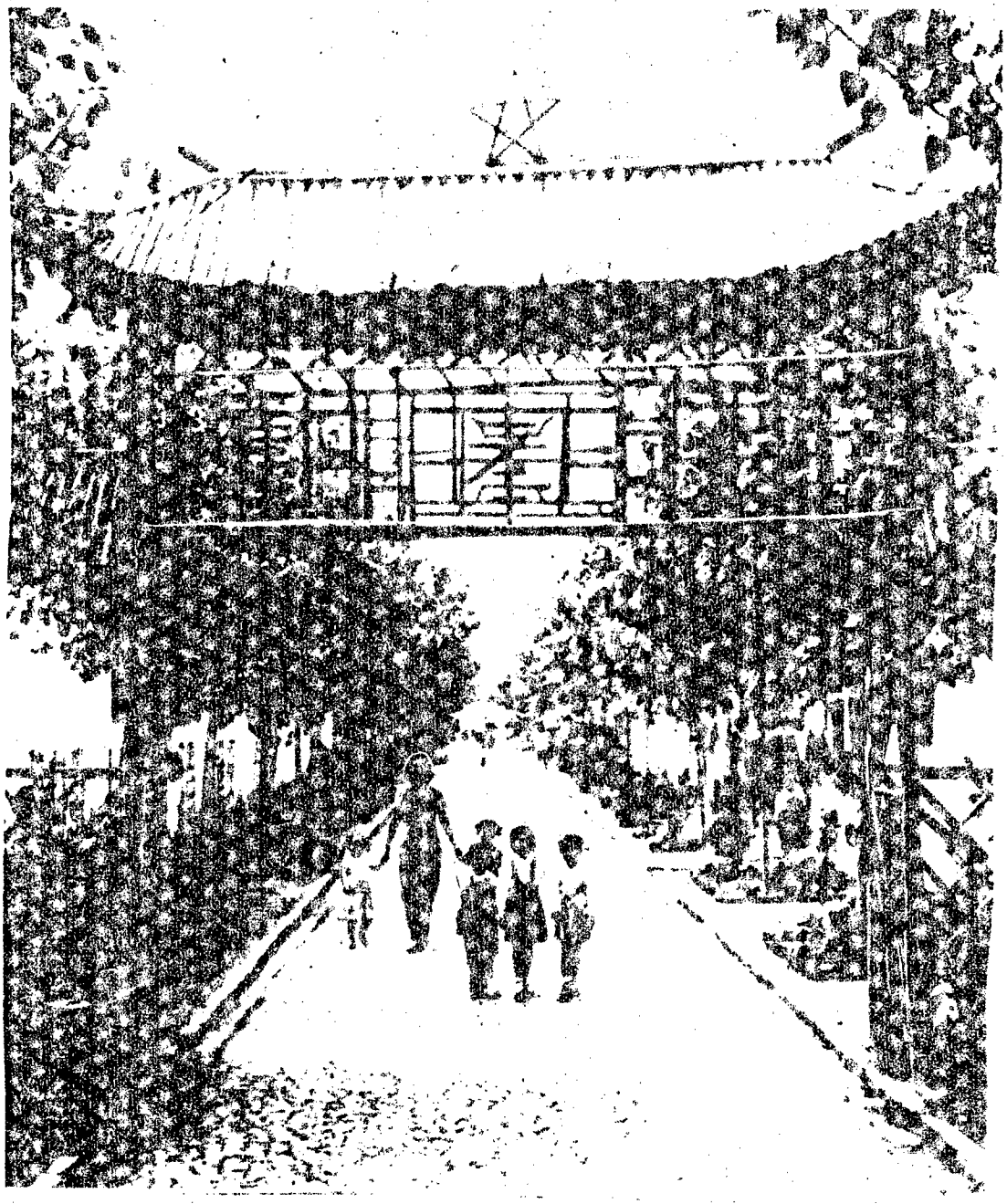
Young Red Cross Members Eliminate Weeds after Their Exercises



Kindergarten Children also Participate in the Work on Fly Eliminatio

On 1 October 1957 in Pekin it was established by a specia control investigation that in 62.8 percent of houses there were no flies; in 16.6 percent, there were flies in numbers less than five, and in 20.6 percent of the houses there were more than five flies. The quality of the sanitation cleaning is carefully checked by members of control groups. The houses, streets, blocks, plants, schools, which are best with regard to the condition of sanitation are decorate by special flags by the control groups: if the sanitation condition i

good, a red flag is hung out; if it is average, a yellow flag; if it is poor, a black flag.



Street in Hamlet of Gulau (City of Nanking)

The patriotic sanitation movement is becoming broader every day; progressively newer masses of the working class are being brought into it.

According to the data of the Ministry of Health of the Chinese People's Republic, from December 1957 to the end of 1958 more than 11,000,000,000 rats and mice and almost 1,200,000,000 sparrows, more than 2,000,000 kilograms of mosquitoes and more than 42,000,000 kilograms of flies and their larvae have been destroyed.

At the same time as the fight against the four pests in all cities and districts an extensive campaign has been begun for overcoming harmful customs and for observing rules of hygiene and sanitation.

Many districts which previously were backward have now become progressive with regard to their sanitation conditions. By the end of 1958, more than a thousand districts and cities appeared in the country in which, by and large, the mosquitoes, flies, rats and sparrows had been destroyed.

The mass sanitary patriotic movement, directed by the Communist Party, is exceptional in its scale and results and has no precedent in history.

Many foreign guests have properly evaluated the patrioti

sanitary movement. In May 1958, the French oncologist Professor P. Lacassagne who visited the Chinese People's Republic said: "China is a very clean country; I rarely see flies; there are more people with fly swatters than flies". In November 1957 a member of the delegation of English medical personnel, Professor Willis, noted the following: "the public health situation in China is distinguished by the fact that it is being conducted in close contact with the people at large ...".

In the course of the patriotic sanitation movement the following working principles have been elaborated on the basis of the best experience:

a) unified supervision of the committee of the patriotic sanitary movement and the construction of a comprehensive work plan;

b) the extensive performance of sanitation education work and the involvement of the masses of people in the sanitary movement;

c) the combining of the sanitation movement with problems of concurrent politics, with industrial processes and working conditions of the population;

d) the organization of competition for the best sanitary measures, control by high organizations and mutual control; the distinction of those who are excellent in the active group of the

sanitary movement among a number of institutions, enterprises, rayons, cities and villages;

e) timely diffusion of the best experience in the sanita movement.



Population of Tung-Chang Rayon (Fu-Ch'ing District of the Province of Fuch'ien) Destroys Mollusks at Building of Irrigation Canal



Worker in Antimalarial Station on the Island of Hainan Demonstrates Method of Using Preparation for Destroying Mosquitoes to Active Sanitation Workers.



Female Aid Man from Sang-mung Volost of Tunglang District (Autonomo
Rayon of the Chuang People of Kuangsi Province) Gives Drugs to Malar
Patients in the Field

Chapter V

Therapeutic-Prophylactic Care of the Population.

During the Homindan government there existed a very small number of government hospitals which basically took care of the privileged segments of the population. The government as well as the private and missionary hospitals had to be paid for, and pay for this therapeutic aid was not possible for the majority of the population.

The main therapeutic-prophylactic institutions in New China are hospitals, polyclinics and outpatient departments. In addition to the governmental system of therapeutic-prophylactic institutions, there are private-government joint hospitals and outpatient departments also in China as well as hospitals and outpatient departments of the Red Cross Society.

Beginning with the first few days of the victory of the Chinese people measures were taken for the restoration of the old and the creation of new therapeutic-prophylactic institutions. The Ministry of Health, together with an increase in the number of hospitals and polyclinics, took measures for improving the quality of their work; in connection with this, they carried out a number of resolutions concerning the reorganization of government hospitals, the reorganization of work of private hospitals and outpatient

departments. Foreign missionary hospitals were nationalized.

The Reorganization of government Old Hospitals.

On 27, November, 1950 the Ministry of Health published a decree "Concerning the Reorganization of the Work of Old Hospitals". The cause of this was constituted by the complaints of the population, in which were expressed the inadequacy of patient care, lack of timely medical aid, improper diagnosis, and poor attitudes toward the patients.

The old government hospitals were different in their origin: some were created by Japanese; others, by Americans; still others, by the Chinese bourgeoisie. Ther hospitals, in their majority, continued to work as before even after the victory; many physicians did not feel that they were servants of the people and were not much or not all interested in the health of the people and had a poor attitude toward the patients. There were many serious defects in the work of these hospitals, as a result of whic the effectiveness of their work was very low. There were quite a few cases of irresponsible attitudes toward operations, diagnosis and treatment, and to procedures carried out. Not uncommonly, as a result of erroneous diagnosis and lack of timely hospitalization, the patients died.

Hostility and unhealthy competition was noted betweer physicians. A characteristic defect in the work of these

hospitals was the very complete absence of any kind of plan.

Conservatism was observed in therapeutic practice: many physicians refused to apply the achievements of progressive medical science of the Soviet Union and other countries.

In New China the public health organs had to carry out prolonged and tremendous work in the reorganization of hospitals and in the retraining of physicians.

After the publication of the decree of the Ministry of Health dated 27, November, 1950 the reorganization of hospitals was begun everywhere. In every hospital a commission was created for checking the work. The commission included representatives of the local public health organs, party organization, hospital workers and public representatives.

The results of the work of the commissions were reported to the public health organs, which made a study of the investigation material and took the necessary measures. The reorganization of the hospitals consisted of the stabilization of staffs, improvement of equipment, the organization of isolation wards and receiving departments, the construction of a unified plan of operation of the hospitals, et cetera.

During the restoration period the reorganization of hospital operation was accomplished everywhere. According to the data of the administrative rayon of the Central South,

in 1951 reorganization was accomplished in 95 out of 109 city hospitals. According to the data of the Ministry of Health, in 1952 the reorganization of the work of city hospitals was accomplished almost completely, as a result of which medical care of the population was improved considerably. For example, in Shanghai the outpatient reception of patients was increased by three times; the number of hospitalized persons, by 30-40 percent, which means that the effectiveness of utilization of hospital beds increased.

The number of errors in diagnosis and treatment decreased considerably. In the report of the Ministry of Health for 1951 noted the following: "There were 260 cases of erroneous diagnoses in the public hospital of the provin of Hupei during the three months from October through December 1950, and after the reorganization, during the seven months from January through July 1951, there were only 15 cases of erroneous diagnoses".

The attitudes of the physicians toward the patients improved considerably. Medical workers organized donor detachments voluntarily and from their own members for the purpose of saving the lives of the seriously ill. The physicians began to have a much more attentive attitude toward diagnosis and treatment. The interrelationships between the physicians improved.

The main achievement in the reorganization of govern

hospitals consists of the utilization of the experience and the incorporation of the achievements of progressive Soviet medicine into practice.

Special attention is given to the study and incorporation of the protective routine according to I.P. Pavlov into therapeutic practice.

The Reorganization of the Work of Private Hospitals and Outpatient Departments

With respect to private hospitals, outpatient departments and physicians in private practice the principle of combination of private interests with general governmental interests is applied. In connection with the fact that the government therapeutic institutions cannot as yet completely satisfy the needs of the masses of people and that to date in the country there is still private ownership in the area of trade and industry, private hospitals, outpatient departments and physicians in private practice are still necessary for the China of today. According to the data of 1952, 1255 such private joint polyclinics and outpatient departments were organized in the cities; in the villages, 13,792 (similar to the Feldsher stations). All this played a great part in the matter of developing the public health of China.

Below a table is presented showing the dynamics of development of government and private hospitals in China

Table 6

Developmental Dynamics of Beds in Government and Private Hospitals in the Chinese People's Republic

Year	Number of Hospitals								
	Total	Government		Private		Joint		Coop.	
		Absol #	%	Absol #	%	Absol #	%	Absol #	%
1936	1 316	420	31,9	896	68,1	—	—	—	—
1937	2 580	1 728	67,0	852	33,0	—	—	—	—
1949	2 600	1 800	69,2	800	30,8	—	—	—	—
1950	2 880	2 324	80,7	543	18,9	13	0,4	—	—
1951	3 150	2 797	88,8	318	10,1	35	1,1	—	—
1952	3 540	3 247	91,7	220	6,2	73	2,1	—	—
1953	3 580	3 318	92,7	160	4,5	102	2,8	—	—
1954	3 658	3 430	93,8	135	3,7	93	2,5	—	—
1955	3 740	3 509	93,8	109	2,9	122	3,3	—	—
1956	3 903	3 664	93,9	25	0,6	214	5,5	—	
1957	4 179	3 759	89,9	13	0,3	397	9,5	10	0,3
1958	4 949	4 231	85,5	15	0,3	566	11,4	137	2,8

Number of Beds in Hospitals

Total	Government		Private		Joint		Coop.	
	Absol #	%	Absol #	%	Absol #	%	Absol #	%
37 000	7 700	20,8	29 300	79,2	—	—	—	—
6 576	33 960	51,6	31 800	48,4	—	—	—	—
80 000	50 000	62,5	30 000	37,5	—	—	—	—
99 800	73 552	73,7	26 068	26,1	180	0,2	—	—
124 100	110 387	88,9	12 602	10,2	1 111	0,9	—	—
160 300	149 822	93,5	8 902	5,6	1 506	0,9	—	—
181 100	173 370	95,7	6 147	3,4	1 583	0,9	—	—
204 835	198 107	96,7	4 936	2,4	1 792	0,9	—	—
220 968	213 813	96,8	4 534	2,0	2 621	1,2	—	—
261 745	257 074	98,2	843	0,3	3 828	1,5	—	—
294 733	287 763	97,6	487	0,2	5 976	2,0	507	0,2
371 453	365 720	98,4	638	0,2	4 449	1,2	646	0,2

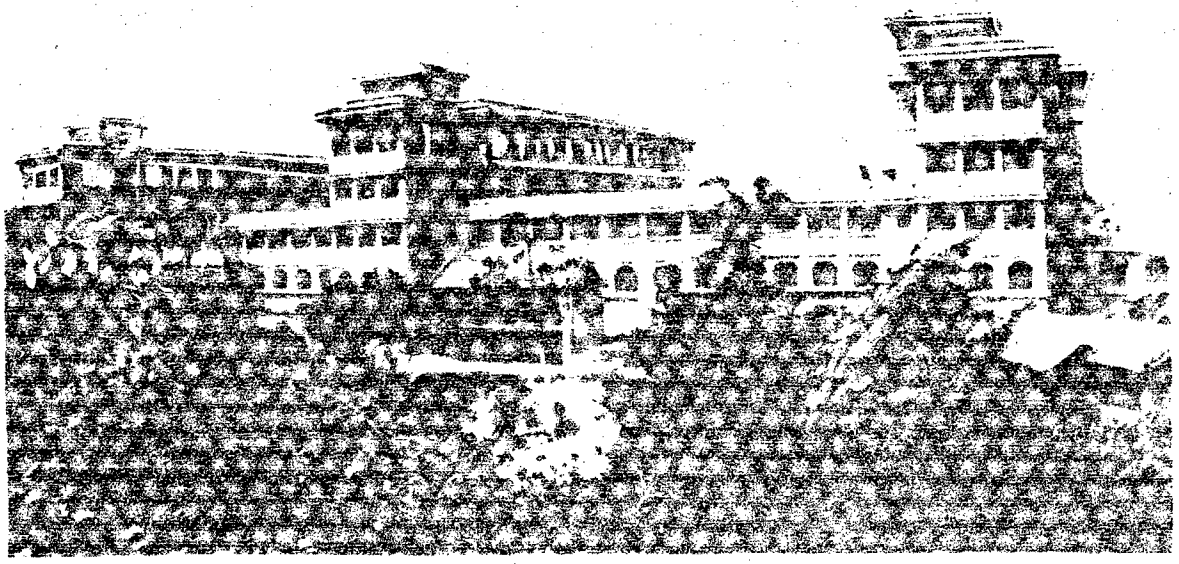
Table 6 graphically shows that during the years after the liberation of the country the relationship between the government and private hospitals changed markedly: The number of the former increased; the number of private hospitals gradually decreased. The number of beds in the government hospitals increased percentage-wise to an even greater

extent than the number of hospitals. Nevertheless, even r private hospitals and physicians in private practice occur a considerable place in the public health of New China. Thus, in Shanghai, according to 1953 data, there were 72 private hospitals and the number of beds in them amounted to 25 percent of the total number of beds in all the hosp of the city. In addition, there were 1,700 private midwive feldshers and nurses, 57 private joint outpatient departments and 1,154 physicians in private practice.

Nationalization of Missionary Hospitals

On 29, December, 1950 the People's Government promulgated the act "On Nationalization of Medical Institutions Receiving Subsidies from Americans". At this time, there were 306 missionary hospitals with polyclinics or outpatie departments in them, and the number of beds was equal to 24,122.

In setting about the nationalization of missionary hospitals the public health organs convoked conferences o medical workers of these hospitals at which the chief physicians of all the hospitals as well as other workers were present. The aim of these conferences was the clarifi cation of which of the missionary hospitals would continue to obtain monetary aid from Americans or aid of other imperialistic powers even after the revolution.



Ch'ingshuitang Hospital in Pekin

According to the act of the People's Government, those hospitals were primarily subjected to nationalization which had been materially dependent on the United States of America.

At the conferences it was made clear that some missionary hospitals which had existed up to that time on funds of other imperialistic governments now did not desire to continue working on foreign subsidies and themselves demanded their nationalization. These demands were immediately satisfied.

At the present time, in the Chinese People's Republic there are no foreign missionary hospitals: the majority of them have been nationalized, and a small part of them have been changed into Chinese Christian societies. All nationalized missionary hospitals have been subjected to reorganization, just as any other old hospital. Their work has been revised with the aim of eliminating the influence of the capitalistic ideology and religion both on patients and on medical workers and on methods of treatment. As a result of this, during the comparatively short period from 1949 through 1953 the number of hospitals, polyclinics and outpatient departments increased considerably compared with 1947: the census of city hospitals increased by five times; the number of beds in them, by six times. Even at the end of 1951 the majority of districts had their own sanitary

institutions, and now they were created in all districts. During the four years (1949-1953) the total number of hospital beds in the system of the Ministry of Health increased by 5.1 times, and in the city polyclinics and outpatient departments, by nine times.

Free Medical Aid to Laborers and Employees

The introduction of free medical service to laborers, employees and to the population of areas of national minorities in the country was of tremendous historical importance in the area of public health in China.

Free medical care of employees of government institutions, of the population of the regions of national minorities, and of the population of old revolutionary bases was given through the government, and by means of the laborers and employees of industrial enterprises through social security.

Free medical care of workers in government enterprises was introduced during the first year of creation of the Chinese People's Republic. In February 1951 a law was promulgated concerning the safeguarding of the labor of workers, providing free medical care at all enterprises, both governmental and private. In July 1952, the People's Government passed the act "On Free Medical Care for Employees of Government Institutions and Education Workers".

The aim of public health in the Chinese People's Republic is the provision of free medical care for the entire

population of the country. At the present time, this is still impossible because of the lag in development of medical institutions behind the needs of the population an the inadequate quantity of medical personnel in the countr Nevertheless, free medical care in the Chinese People's Republic is being expanded from year to year and primarily for those population groups which are participating in the economic reconstruction of the country.

By the end of 1953 more than 5,490,000 employees of government institutions and education workers were included in the system of free medical care; in 1958, more than 6,800,000. In addition, free medical care was provided for the population of the old revolutionary rayons which had been subjected to terrible destruction by the Homandanites and the Japanese during the period of the Second Civil War (1928-1936) as well as for the population of the regions o. national minorities, which for long years had been under unsanitary and particularly difficult material conditions: Tibetans, Mongols, Uigurs, Kazakhs, the Myao and Yao peopl et cetera. Considering the acute need for medical aid by these areas the government ordered the Ministry of Health t provide them with free medical care first.

In the regions of the national minorities by the end of 1958 there were 750 hospitals and 14,230 district and rayon medical aid stations. In these rayons therapeutic-prophylac

detachments were sent regularly for the purpose of giving free medical care.

In the old revolutionary areas several millions of persons were included in the free medical care.

Improvement of Therapeutic-Prophylactic Care of the Population

As a result of measures taken during the nine-year period (from 1948 through 1958) the number of hospitals and outpatient departments has increased considerably. Compared with 1947 the number of hospitals has increased by five times, and the number of beds in them, by more than ten times. The number of hospitals in the rural regions increased by more than 30 times (Fig. 3).

With the increase in industrial and agricultural production there was a considerable increase in the material provision for and the cultural level of the population. The masses of workers and peasants enthusiastically participated in labor competition. The appeal by the Central Committee of the Communist Party of China and its chairman, Mao Tse-tung, penetrated deeply into the hearts of the people: to catch up with and outstrip England with respect to the volume of production of steel, cast iron and other very important forms of industrial production in 15 years or a somewhat shorter period. "Catch up with England in the name of Socialism"--these words became the fighting slogan of the working class

of New China.

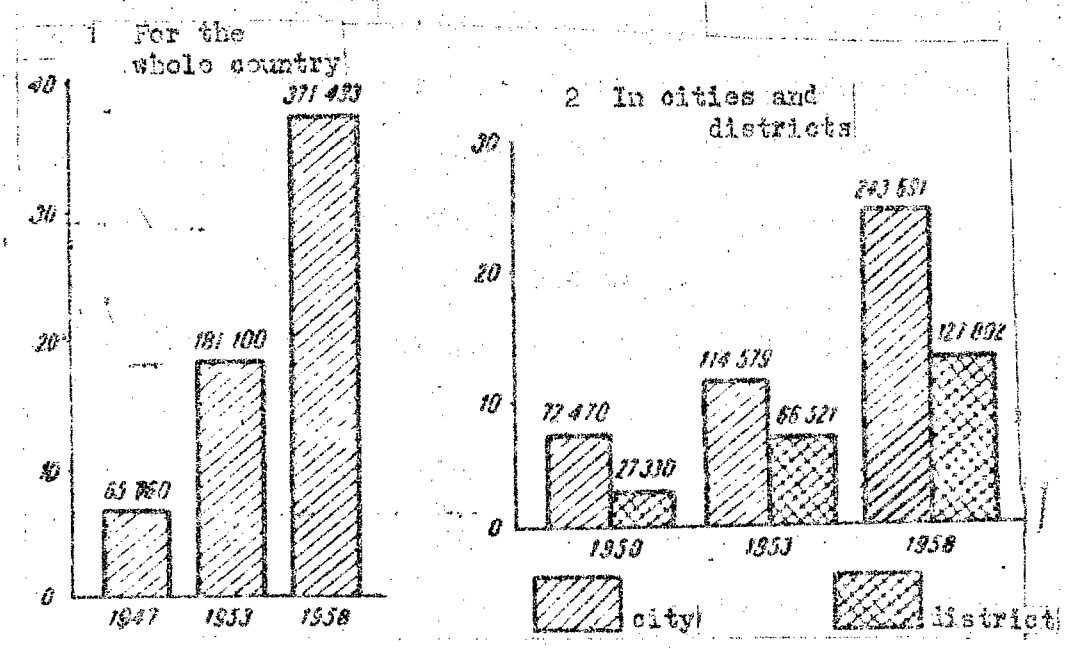


Fig. 3. Increase in the No of Hospital Beds in the Chinese People's Republic

Along with the development of production in the area of industry and agriculture there has been a considerable increase in the system of therapeutic-prophylactic institutions.

Three thousand two hundred and eighty-nine volost sanitation-therapeutic stations and 717 rural district hospitals with 6,399 beds were opened up. In 1958 there w 17,346 health stations and more than 115,548 joint outpat departments. In hospitals organized on funds of agricult cooperatives there were more than 200,000 beds.

Medical workers in rural outpatient departments frequently go out on local visits--to cooperatives, where they give medical aid, check the sanitation status of the yards, do sanitation-education work, et cetera.

Hospital care occupies an important place in the organization of therapeutic-prophylactic care of the population. During a period of eight years of the people's regime the number of beds in hospitals has increased considerably both in the cities and rural localities. (Table 7).

Table 7

Increase in Number of Beds in the Chinese People's Republic (From 1952 Through 1957)

Year	No of Beds Set Up		
	in cities	in rural areas	total
1952	103 168	57 132	160 300
1953	114 579	66 521	181 100
1954	132 197	72 638	204 835
1955	138 706	82 262	220 968
1956	161 189	110 556	261 745
1957	184 733	110 000	294 733
1958	243 891	127 802	371 493

Despite the considerable increase in the number of beds, the population's requirement for medical specialized care has not yet been satisfied. In 1955, in the large cities of the country there were two and a half beds per thousand population. By individual cities this figure per

thousand population was equal as follows: Pekin, 2.43; Tientsin, 1.68; Shanghai, 2.75; Mukden, 1.99; Talnii, 2.61 Hsian, 2.62; Wuhan, 2.67; Kuangchow, 2.70; Chungch'ing, 2.58; Harbin, 3.34.

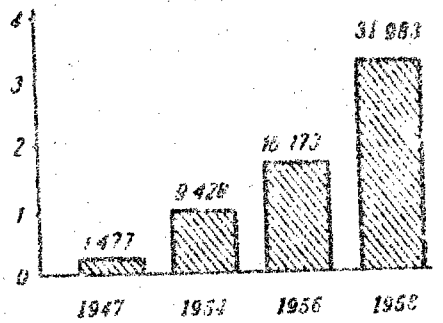
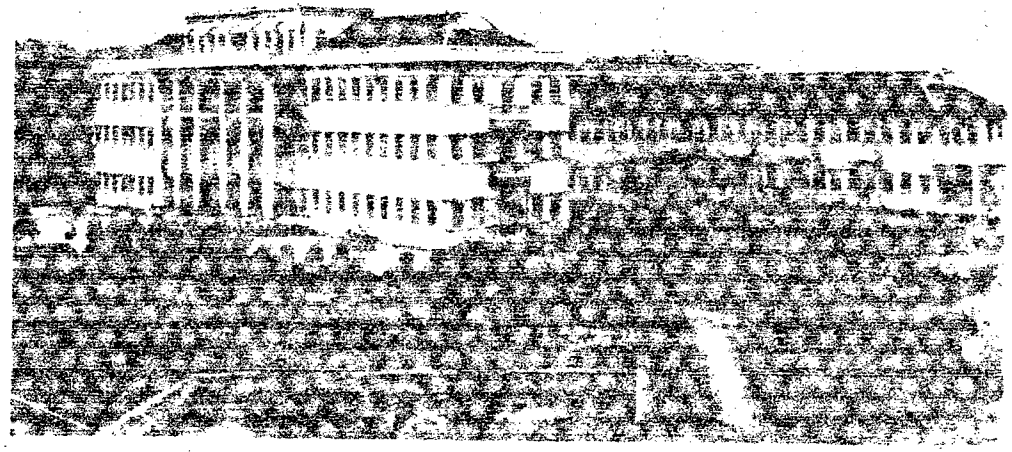


Fig. 4. Increase in the Number of Hospital Beds in Areas of National Minorities

The bed system in the areas of the national minorities, where previously there were almost no hospitals, has increased considerably. During the nine years 750 new hospitals with 31,983 beds have been constructed in these areas; in addition, 22 dermatological-venereological dispensaries, 641 stations for safeguarding the health of motherhood and childhood, 25 plague stations, 17 antimalar stations are operating. In every district there are dist and rayon hospitals (522 hospitals with 12,719 beds); ever



Zun'i hospital in Kuichow Province

rayon has a rayon outpatient department (1,574) and 60 mobile therapeutic-prophylactic detachments (Fig. 4).

In 1950-1952, as has been mentioned above, the Ministry of Health carried out a reorganization of the old hospitals, which made it possible to create a joint hospit of a new type. Beginning with 1956, in more than 30 large cities the principle of district medical care for the population has been realized, and a unified planning of the work of therapeutic-prophylactic institutions of various types has been accomplished. The strain on the therapeutic-prophylactic institutions has been regulated to a considerable extent, there has been a gradual increase in the quality of medical care in the large cities and at the industrial enterprises.

A tremendous jump in the area of hospital matters has been observed in the villages, as a result of which the work of the district hospitals, primarily servicing the rural population, has been improved. At the present time, there is a new hospital in every district. In the majority of them there is an internal medical, pediatric, surgical, obstetrical-gynecological, and infectious-disease departments and laboratories.

The increase in the stock of beds in the district hospital institutions in shown in Table 8.

Table 8

Number of Beds in District Hospitals

1950 1951 1952 1953 1954 1955 1957

	1950	1951	1952	1953	1954	1955	1957
Hospitals of general type	9 823	10 693	14 221	16 848	18 928	26 204	74 719
District hospitals	15 241	22 987	36 349	41 480	43 249	44 565	17 083
Leprosy hospitals	2 266	3 486	6 591	7 983	10 230	11 095	11 362
Tuberculosis hospitals	—	—	—	—	—	60	1 790
Hospitals of the people's medicine	—	12	61	230	231	338	2 153
Total	27 330	37 178	57 132	66 521	72 638	82 262	110 000

Despite the progress made a tremendous lack of hospital beds in the villages is still being felt. In 1958, in the report of prime minister of the Chinese People's Republic, Chou En-lai, mention was made of the need for the very rapid development of so-called "simplified hospital beds".

During the time of the Homindan government there were very few specialized government hospitals. After the liberation of China the number of them has been increasing from year to year, which is seen from Table 9.

There are still serious difficulties in the matter of giving hospital aid in the Chinese People's Republic. The insufficient number of beds in the hospitals does not make it possible to provide complete hospitalization even for

infectious-disease patients; medical care for parturient women, as a rule, is given at home.

Table 9

Growth of the Government Specialized Hospitals

	No of hospitals				No of beds			
	1947	1955	1957	1958	1947	1955	1957	1958
Infectious-disease hospitals	21	53	60	61	2 078	4 353	5 150	6 018
Tuberculosis hospitals	7	41	55	61	396	6 360	11 352	16 455
Pediatric hospitals	1	11	16	27	100	1 300	2 295	3 682
Lying-in homes	13	92	96	230	431	5 701	6 704	7 557
Psychiatric hospitals	4	23	43	62	1 039	4 112	10 469	14 004

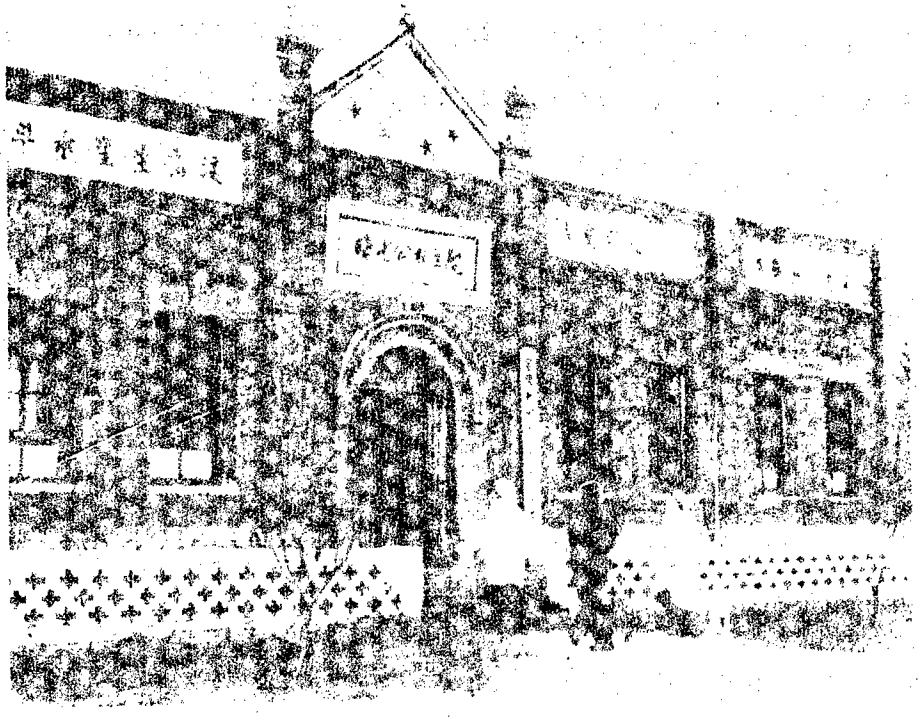
Care of the Population Outside of Hospitals

At the present time, in China the principal medical institutions giving non-hospital care to the population are the government polyclinics and outpatient departments as well as private joint outpatient departments and polyclinics.

In the villages there are rayon outpatient departments, mobile therapeutic detachments and health stations at the agricultural cooperatives.

In New China considerable attention is being given to the development of outpatient-polyclinic institutions. Thus, by the end of 1957 there were 2,239 independent city polyclinics and outpatient departments with 1,034 beds in the country, 12,305 outpatient departments in the rural areas

with 14,488 beds, 5,209 rural outpatient departments with 1,192 beds. The organization of small simplified hospitals at the polyclinics and outpatient departments to some degree covers the deficit of hospital beds and provides medical care in emergency cases.



"Dawn" Hospital at the People's Commune (Anko District in the Province of Hopei).

Outside of the outpatient departments and polyclirics of the general type specialized institutions have been created in the cities where non-hospital medical care is given. Among them are antituberculosis, dermatological-venerealogical dispensaries, dispensaries for patients with

leprosy, kala azar, schistosomiasis and others. By the end of 1957 there were 626 specialized dispensaries in the entire country, among which there were 8,764 beds.

For the entire country in 1958 there were 101 tuberculosis dispensaries, 34 dermatological-venereological dispensaries, 147 dispensaries for patients with schistosomiasis, 17 for patients with kala-azar, eight dispensaries for regional pathology and eight dispensaries for patients with leprosy. These dispensaries not only give therapeutic care but even conduct considerable prophylactic work, train personnel and actively participate in sanitation-education work and in the sanitization of inhabited places.

Medical Personnel

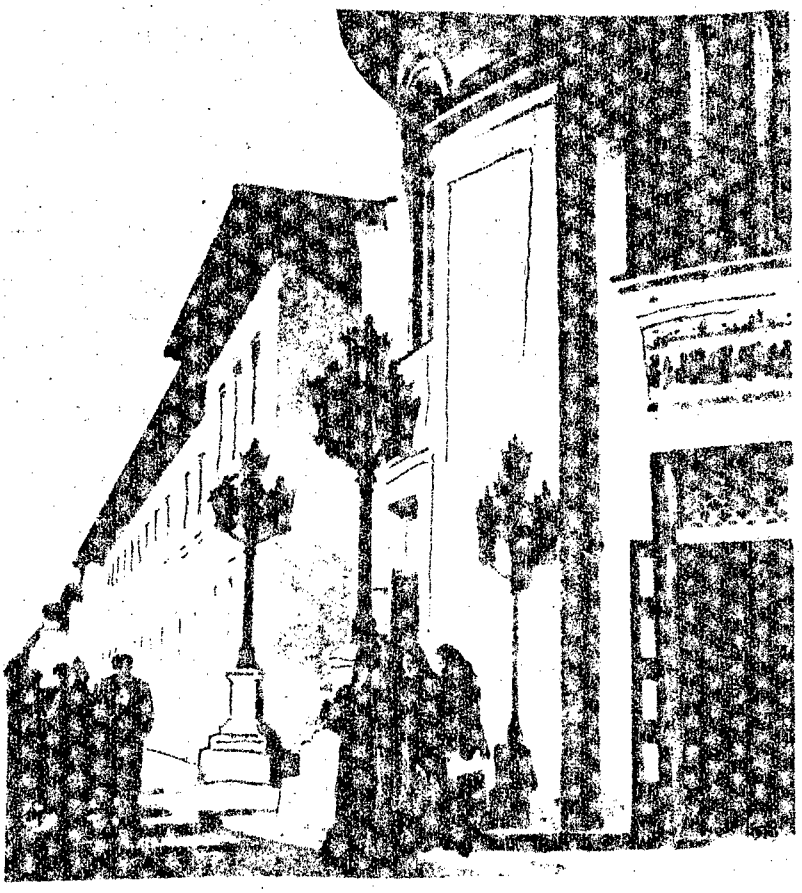
The consolidation of physicians in the people's and modern medicine and the increase in the number of medical workers are playing a great part in the improvement of therapeutic-prophylactic care of the population. The increase in medical personnel by years is shown in Table 1.

In the matter of raising the level of medical aid a tremendous part is being played by the proper Party policy with respect to physicians in the people's medicine, who at the present time number 500,000 in the Chinese People's Republic. The majority of them are participating actively in the construction of the public health in the villages

Table 10

Increase in Medical Personnel

	1947	1950	1952	1954	1957
Physicians of modern medicine	34 800	41 400	51 736	63 046	73 573
Feldshers	—	53 400	66 500	86 000	135 701
Midwives	—	15 700	22 400	31 995	35 774
Nurses	—	37 800	60 900	93 800	128 174



Shenyang Medical Institute

In 1957, more than 200,000 physicians of the people's medicine worked in rural joint outpatient departments. This is of very great importance in providing the rural population with medical care, because there are still very few physicians who practice modern medicine.

Therefore, the Chinese people's physicians obtain the possibility of serving the affairs of socialistic construction of the country even more fruitfully. At the present time, representatives of people's medicine physicians participate in meetings of the people's representatives a all levels.

In accordance with the directives of the Central Committee of the Communist Party of China "The Study and Development of Chinese People's Medicine" special departments of people's medicine have been created in all the hospitals; 305 hospitals of the people's medicine with 6,957 beds had been opened by the end of 1958. More than 27,000 physicians of the people's medicine, who have considerable theoretical and practical experience, have be brought in for therapeutic work in the government medical institutions. They are working in close collaboration wi physicians of modern medicine.

Sanatorium - Health-Resort Treatment

In 1947, in old China, there were a total of 10 priv sanatoria with a place for 300 persons, which serviced a

large group of the bourgeoisie. In New China, considerable efforts and tremendous financial investments have been required for the development of health-resorts.

Sanatorium - health-resort treatment has been widely developed. In 1957, there were 835 sanatoria with places for 68,860 persons and 329 night sanatoria and nursing-homes with places for 12,792 persons (Table 11).

Table 11

Increase in the Number of Sanatorium-Health Resort Institutions in the Chinese People's Republic

Year	No of sanatoria	No of places in them
1947	10	300
1949	30	3 900
1954	678	44 967
1957	835	68 860

Primarily laborers and employees of industrial enterprises are sent to sanatoria and health-resorts.

Some industrial departments have their own sanatoria and rest-homes. In 1957, 498,000 laborers and employees made use of the free treatment in sanatoria.

All the sanatoria of the Chinese People's Republic may be divided into three principal types: sanatoria for patients with tuberculosis, balneological sanatoria and general sanatoria. In 1955, the number of beds in the sanatoria for patients with tuberculosis amounted to 29.8 percent of the total number of beds, and the number of beds in the

balneological sanatoria, to 5.6 (Fig. 5).

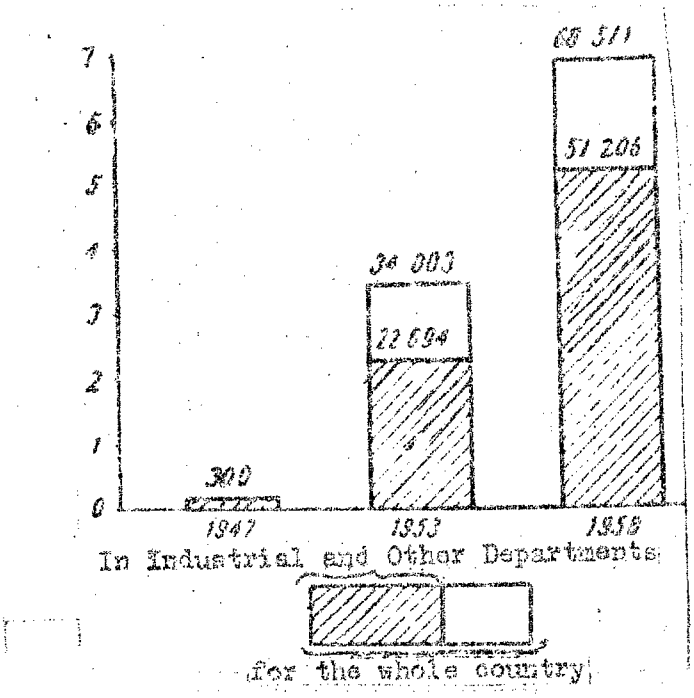


Fig. 5. Increase in the Number of Sanatorium Beds in the Chinese People's Republic

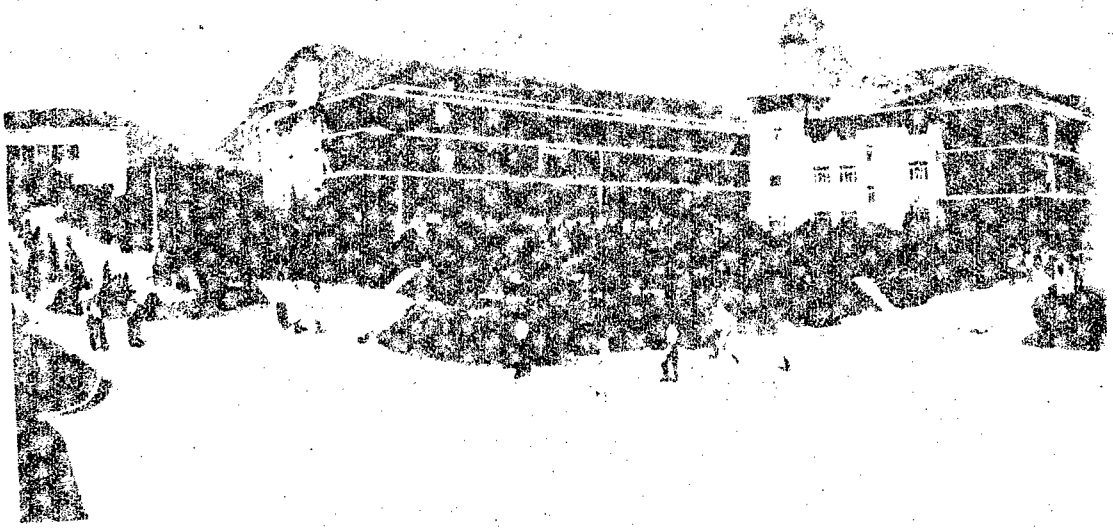
The Talnii Health-Resort. Talnii is located in the South of the Liao-tung peninsula. This is a maritime health-resort, which is well known for its beautiful views and moderate climate. Before the liberation of the country there was not a single sanatorium here, and after the libertion 20 sanatoria with 2,000 beds have been created.

The natural therapeutic factors of the health-resort are being used with great effect for the treatment of neuroses, arthritis, diseases of the digestive organs and some forms of pulmonary tuberculosis.

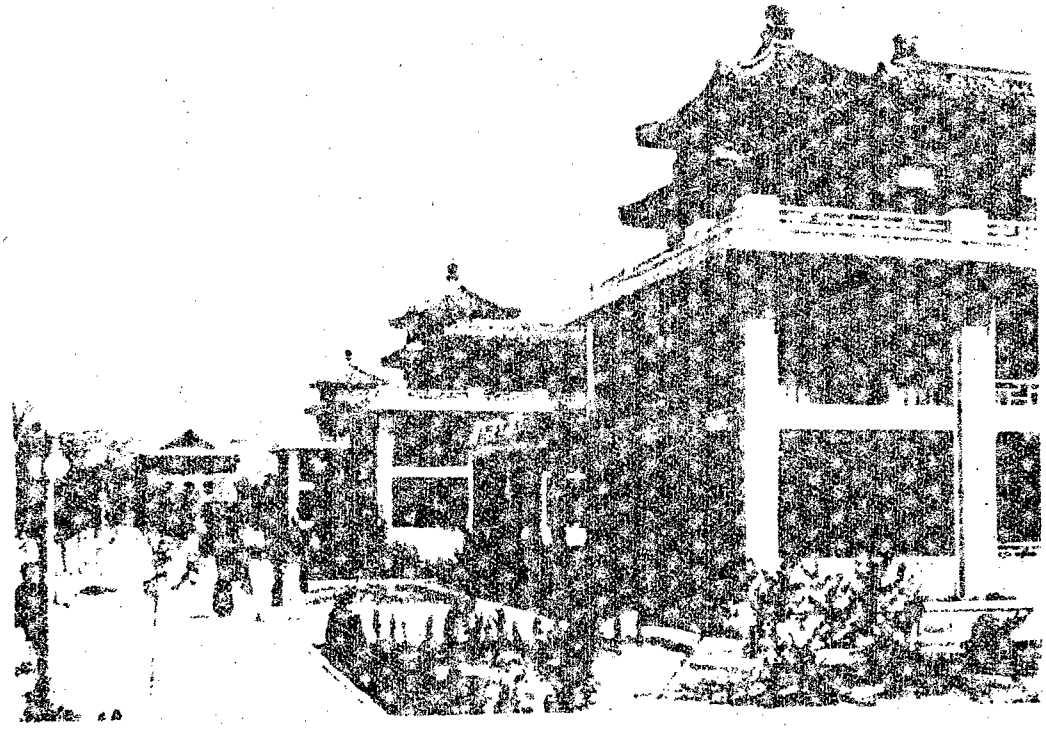
The Liui-ta Health-Resort. The Liui-ta health-resor are located on the seashore. Mud, sea water in combination

with the sun and good sea air represent the noteworthy therapeutic factors in such diseases as neuroses, diseases of the digestive organs, arthritis, and certain forms of pulmonary tuberculosis. At the Liui-ta health-resorts extensive use is being made of physiotherapy, Chen-tsu therapy, physical culture and respiratory gymnastics. The latter is being used with good results for the treatment of gastric ulcers and chronic gastritis. The health-resorts are supervised by the local health-resort administration, which is working out rules and indications for the effective use of all these factors. Here, extensive use is being made of the therapeutic-protective regimen and methods of combined treatment.

The Chingtao Health-Resorts (City of Chingtao). The Chingtao health-resorts are located on the shore of Shan'tun Island. They belong to the group of maritime health-resorts and are well known for their temperate climate, beautiful views and a pretty bay. Before the liberation of the country there was not a single sanatorium here. Numerous villas constructed by the bourgeoisie took care of the capitalists. After the liberation 18 sanatoria and rest-homes were constructed here, in which there are 2,660 beds. The natural therapeutic factors of these health-resorts are being used with good effect for neuroses and diseases of the digestive organs.



Sanatorium for Chinese Textile Workers in the City of Ch'ingtao



Sanatorium for Students of Countries of Asia and Africa in a Picturesque Spot in Haishang (Western Mountains) near Peking.

The Lushan health-resort. Lushan is one of the well known mountain cities of China and is on the south shore of the middle course of the Yangtse River. The height of the mountain is 700-1500 metres. At a height of 100 metres above sea level there is an extensive mountain valley, where pine trees and cypress trees grow. Lushan is an evergreen mountain. Even in ancient times Lushan was considered a good health-resort. However, until the liberation of the country the working class did not have any opportunity for enjoying it. In 1949, the Lushan health-resort was given over to the workers. At the present time, there are 37 sanatoria and rest-homes for 4,000 beds here. The natural factors of this health-resort exert a good therapeutic effect in pulmonary tuberculosis, diseases of the nervous, cardiovascular and digestive systems.

The Taihu Health-Resort. Taihu is one of the well known climatic health-resorts of China. After the liberation of the country 36 sanatoria were organized here, one after another, in which there were 567 beds. This health-resort is indicated for patients with neurosis and hypertension, stage I.

The Hangchow Health-Resort. The Hangchow health-resort is near the beautiful lake of Hsihu. It is surrounded on three sides by hills, where thick woods and aromatic flowers grow. Around lake Hsihu there are 14 sanatoria and

rest-homes with 2,050 beds. Here, patients are successfully treated with neuroses, hypertension, stage I, and disturbances of the digestive organs.

The Hsingcheng Health-Resort. The Hsingcheng health resort is located on the shore of Pohai Gulf between Chingchow and Shanghai in the province of Liaosin. This well-constructed maritime health-resort with a temperate climate and a mineral spring (sulfate). At the present time, there are seven sanatoria here with 3,104 beds. Patients are sent here with rheumatic arthritis and diseases of the digestive organs.

The T'angkangsi Health-Resort. T'angkangsi is a health-resort with a sulfate hot spring containing radioactive radon and a large quantity of mineral mud. The mineral spring at T'angkangsi was opened 1,500 years ago and has been used extensively by the ruling classes. Dur the occupation of this area by Japanese invaders the imperialists created a hospital for their ground troops, but it was destroyed even before the liberation of Northe China by the People's Freedom Army. After the liberation of the country the health-resort was restored and reconstructed. Now, there are 1,300 sanatorium beds here. The T'angkangsi spring exerts a good therapeutic effect in rheumatic arthritis, chronic dermatosis and neurosis.

The Hsiaot'angshan Health-Resort. The Hsiaot'angshan

health-resort is located in the environs of Pekin at the foot of a mountain and is rich in mineral springs containing bicarbonate water. This health-resort was created after the liberation of the country. At the present time, there are 530 beds here. The mineral waters of this health-resort give a good therapeutic effect in arthritis, diseases of the nervous system and gynecological diseases.



Members of Trade-Unions -- Post-Office and Telegraph Workers -- Relaxing at the Lushan Health Resort. Performing the Exercise "Waved Sword".

Chapter VI

Medical Care of Workers at Industrial Enterprises

Medical Aid for Workers During the Period of the Homindan Government

While hunger, beggary and disease are inevitable in any capitelistic government, in semicolonial China the predominance of foreign capital could not help but lead to excessive exploitation of the proletariat. The Chinese working class, like the working class of any colonial or semicolonial country, carried the double burden of exploitation. The length of the work day to the greatest degree characterizes the semicolonial conditions of exploitation of the Chinese proletariat.

In the Chinese journal "Laokung" dated 1 March, 1936 the following data are presented concerning the length of the work day of certain categories of Chinese workers: machine construction workers in private enterprises--14-16 hours; workers in government machine construction enterprises, 9-12 hours; miners, 12-14 hours; builders, 12-16 hours.

The rule of plundering foreign capital and the reactionary Homindan government accounted for the extremely severe working conditions at the enterprises. The work was accomplished under unsanitary conditions, with poor lighting

and with contamination of the air; there was no ventilation in the majority of cases. There were no dining rooms, as a rule. In some textile enterprises the workers ate while standing at their work benches. The stuffy, oppressive air was saturated with residues of cotton fibers and dust which were swallowed along with the food.

In the majority of enterprises, both Chinese and foreign, the most elementary measures of safety technique were not realized. The overfatigued workers frequently sustained serious injuries and lethal traumata. The capitalists did not show the slightest concern for protecting the place of work. Accidents at the enterprises were of a mass nature. Safety technique was absent not only at the factory-plant enterprises but also in the coal mines (foreign and Chinese). During cave-ins and inundations scores and hundreds of miners died in the mines. For example, in the spring of 1935, in the province of Shantung, in mines of the coal region of Tzunkun, which belonged to Japanese capitalists, streams of water flooded the galleries, in which 800 miners working there died.

The difficult working and living conditions had an extremely unfavorable influence on the health of the workers.

In the majority of cases there was absolutely no medical care at the enterprises. Thus, for example, of 323 industrial enterprises, there were poorly equipped

medical institutions with a very small number of poorly qualified physicians and nurses at only 72 of them.

In old China there was no social security, which made it necessary for the workers to pay for their own diseases.

The morbidity rate and the traumatism figures were very high. For example, the morbidity rate of workers in the coal mines of "T'ienfu" in the province of Szuch'uang reached 82.2 percent; at the metallurgical combine "An'shan" during the Japanese occupation 30-40 cases of injury were recorded almost daily.

At many mines among the workers epidemics of typhus and recurrent fever and other infectious diseases frequently raged. Thus, for example, in the "Fushun" mines i Northeast China in 1939-1947, 5,038 persons became sick wi the parasitic typhus fevers. At the metallurgical plant i the city of Chungching in 1949, 6,477 persons became sick with malaria, or 64.9 percent of the entire number of workers.

The Development of Medical Care of Workers After the Victory of the People's Revolution

The victory of the people's revolution put an end to the oppression and exploitation of the working masses. The Chinese working class began to be the master of its own country, began the building of a new happy life about which the best representatives of the people had always dreamed.

Beginning with the first day of its formation the People's Government of China has constantly given serious attention to the health of the workers and to the matter of safeguarding their work.

In 1949, at the Fifth Session of the All-Chinese Political Consultative Council the "General Program of the NPKSK" (People's Political Consultative Council of China), which was adopted read: "At the present time, an eight-ten-hour work day has been established in government and private enterprises...gradually, a system of social security is being introduced. The interests of the labor of adolescent and female workers are being protected particularly. For purposes of improving the protection of labor and the sanitary conditions at industrial enterprises and in the mines labor inspection has been introduced". (The General Program of the People's Political Consultative Council of China. Gospolitizdat, Moscow, 1950, page 15).

In February 1951, the Administrative Council (Central Government of the Chinese People's Republic) published the law "Social Security in the Chinese People's Republic".

Through this law social security was given to all the workers both in government and private enterprises. Stipends were given for all forms of temporary inability to work: because of disease, serious injury, pregnancy and delivery, for invalidism, old age, and other reasons. These stipends

are paid beginning with the first day of the loss of the ability to work until it is recovered (Fig. 6).

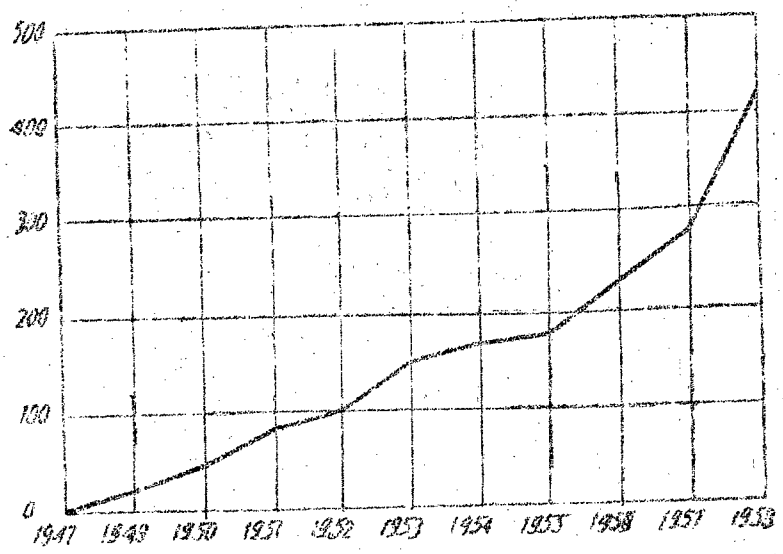


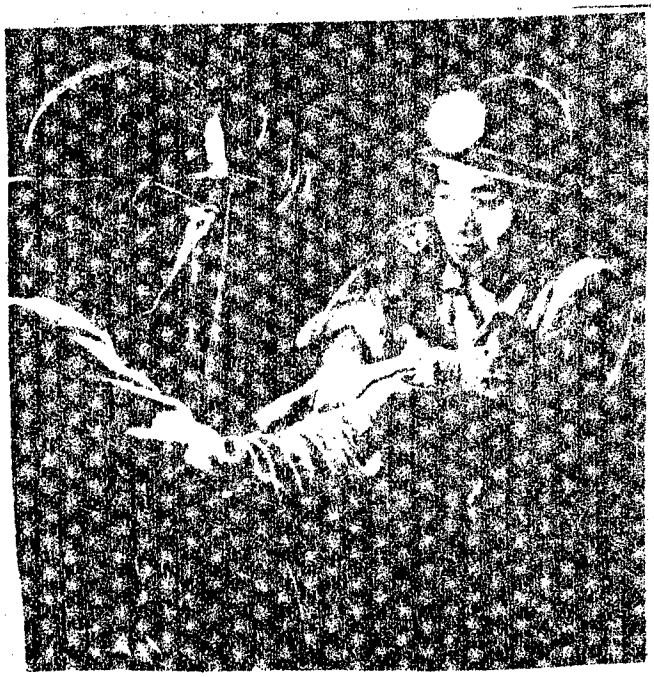
Fig. 6. Increase in the Number of Insured Laborers and Employees at Enterprises of the Chinese People's Republic

The nature of medical care for the workers has changed radically.

From the very beginning considerable attention has been directed to the accomplishment of prophylactic measures. The main organizational principles of prophylactic work were outlined at the First All-Chinese Congress of Public Health Workers in August 1950. The Congress acted with the design of extensive accomplishment of prophylactic work, particularly in industrial areas, and outlined specific tasks in the field of public health.

A study of working conditions and sanitary-hygienic circumstances, the technology of production, daily

familiarization with the life of workers at the given enterprise was made the responsibility of the medical institutions of factories and plants.



Medical Workers Render Aid to Miners in a Mine

Medical institutions in cooperation with factory-plant committees of the trade unions, the committees of the patriotic sanitary movement, the organs of labor protection were to participate actively in improving the sanitary condition of the enterprises, maintain a constant supervision of the state of health of workers, take antiepidemic and prophylactic measures (innoculations, medical examinations, et cetera).

A great part in the improvement of the sanitary condition and safety technique at the enterprises was played by the

movement for checking safety technique and sanitation begun in 1950 in Northeast China and which then spread throughout the entire country. The Ministry of Health in cooperation with the Ministry of Labor, the Ministry of Industry, trade unions and other organizations everywhere created special commissions for checking the sanitary-technical condition of industrial enterprises.

In workshops containing harmful gases and substances in mines, in the galleries and drifts ventilators were outfitted for removing the harmful vapors and gases. General protective adaptations, ventilation, illumination were provided, and individual protective adaptations were furnished, namely: overalls and special footwear, dust respirators and gas masks, goggles, lifebelts, cushions and pads for protection against mechanical pressure, et cetera.

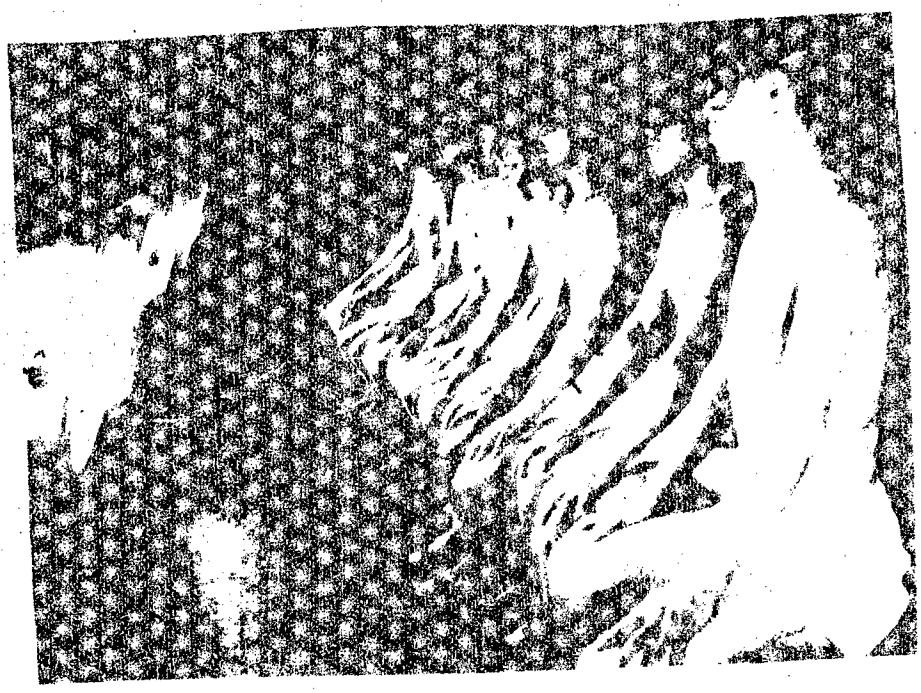
For purposes of controlling excessive heat production at many enterprises in the country a number of measures are being taken, which make it possible to eliminate or mitigate the harmful effect of meteorological conditions in industries, for example:

1) The construction of natural and artificial ventilation;

2) Air refrigeration by means of special ventilation an air shower directed at the workers in hot shops (in forges, steel casting, dye and vat shops in silk producti

3) A regular supply of salted soda water for workers in hot shops; in the majority of enterprises a special popular national drink is used--a decoction of green beans rich in proteins and vitamins;

4) The introduction of a special routine of labor and rest for workers in hot shops: brief interruptions in work, alternate work of various groups of workers, rest rooms and rest compartments for relaxing groups of workers.

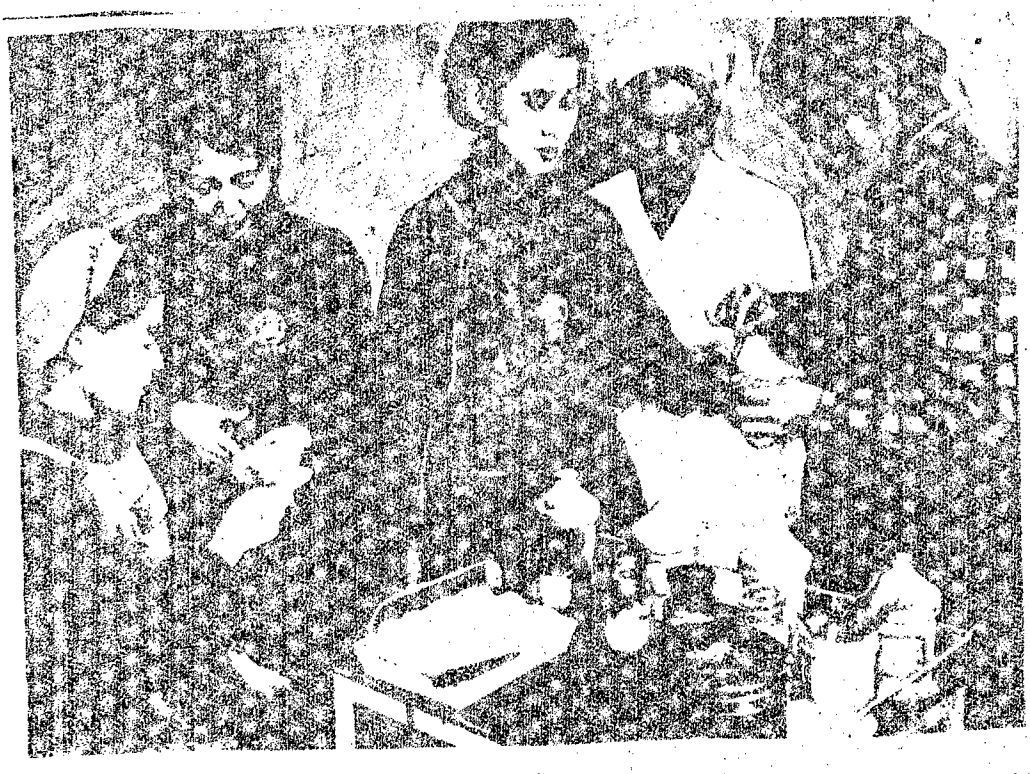


Miners of the Kailang Coal Mines after Work in the Physiotherapeutic Clinic

These measures have assisted considerably in raising work productivity.

During the developmental period of the movement for checking the state of safety technique and sanitation at large enterprises public groups of sanitation safety began

to be created, courses in the sanitation minimum were organized for the active sanitation members and workers who had newly arrived with the aim of increasing their elementary knowledge of sanitation. The active sanitation group is trained in self-help and mutual aid in the case of injuries particularly in mines.



Workshop Health Station in First Ch'anchung Automotive Plant. Medical Workers Conduct Practical Exercises with an Active Sanitary Group.

During the restoration period of the country's economy (1949-1952), in addition to the permanent medical workers, a large number of medical detachments and antiepidemic brigades were sent to industrial enterprises, particularly in the areas of large construction on the Huangho and Ihe

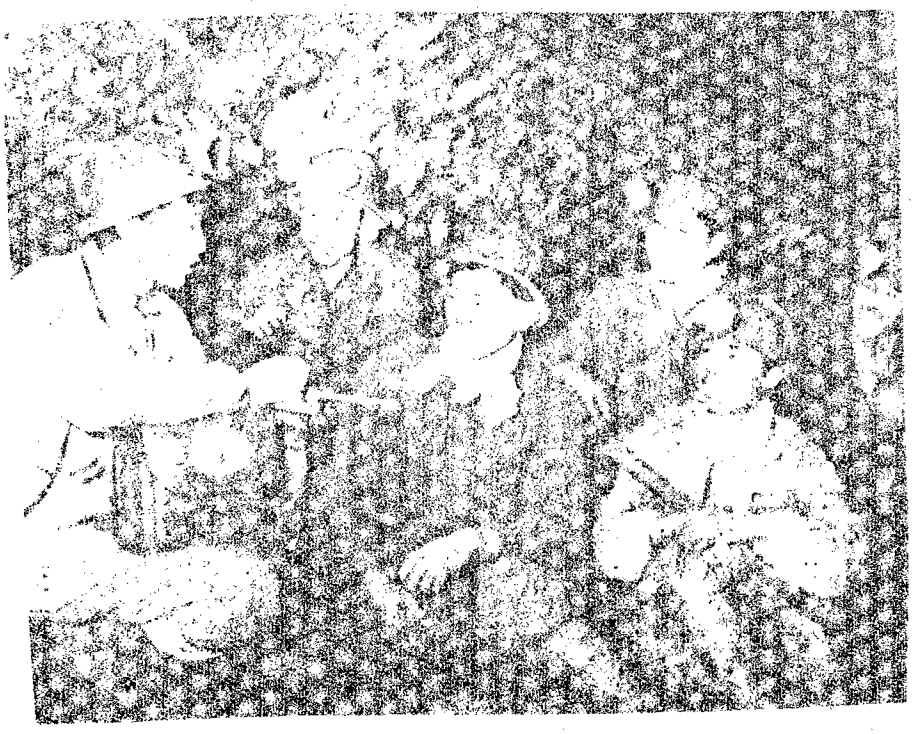
rivers, in the areas of construction of the Cheng-tu-Chungching railway, at places of construction of shore installations on the Huangho River and in the areas of construction of the Chinchieng Reservoir.

The public health organs did considerable sanitation-prophylactic work in the prevention of infectious diseases among the workers at the construction of artificial branches of the Chinchieng River and new reservoirs. The builders were confronted with the task of completing the job during the period from the beginning of April through 16, June, 1952. During these two and a half months more than 300,000 peasants from various parts of the country were concentrated at the construction; they had to complete the principal construction before the advent of the inundation season. This tremendous number of workers was concentrated in a narrow area of construction of two sluices, which created many difficulties in carrying out prophylactic work, providing the workers with housing, vegetables, carrying out dirt, et cetera.

Because of the accomplishment of extensive sanitization sanitary-hygienic measures (the organization of an active sanitary group among the workers, the creation of suitable sanitation conditions in the houses of the camp type, everyday control of the sanitary status of the building areas, provision of the workers with drinking water and good food

in the dining rooms) the task set by the government was accomplished in the necessary period of time.

Considerable work at the construction was also accomplished in preventing infectious diseases: 80 percen of the workers were given innoculations and phage against dysentery. Medical aid was given on time to sick workers at work and in provisional hospitals.



Public Health Worker in the "Coal Capital", Fushung. During an Interruption in Work He Does Sanitation-Education Work Among the M

As a result of all these measures no mass infectious diseases occurred at the construction, which was responsibl for the systematic coming to work of more than 95 percent

the workers.

When the International Scientific Commission for the Investigation of Facts of Bacteriological Warfare in Korea and China arrived at this construction, it came to the conclusion that the construction in dividing the Chingchieng River into branches which was accomplished at the most rapid tempos, was a great achievement, and the sanitation-prophylactic work in reducing the morbidity rate of the workers was also a noteworthy attainment in the matter of public health of New China".

The network of medical institutions for the service of industrial workers began to grow particularly rapidly beginning with 1953 following the historic act of the Central Committee of the Communist Party of China concerning the general line of the period of transition to Socialism.

While the first three years (1949-1952) of existence of the Republic were a period of restoration of the national economy, in 1953--the first year of the Five-Year Plan of economic reconstruction of the country--the main efforts were directed at carrying out the tasks of the first Five-Year Plan.

Prime Minister of the Chinese People's Republic Chou En-lai wrote the following: "During the course of the first Five-Year Plan in our country it is intended to

construct and reconstruct about 700 large industrial installations the nucleus of which, as is well known, is represented by 141 enterprises constructed with the aid of the Soviet Union. Among these installations are included metallurgical plants, enterprises of the coal and oil industry, plants of heavy machine construction, automobile tractor and aviation plants, electric power stations, chemical plants, et cetera". (Chou En-lai. The Work of t Chinese People's Republic Government. Report at the Firs Session of the VSNP in Pekin 23, September, 1954. Publis by "Pravda", Moscow, 1954, page 113).

The successful accomplishment of the industrialization plan outlined by the government is of tremendous importance for the further development of the Chinese People's Republic economy, is contributing to strengthening the country, guaranteeing it against any transgressions against its freedom, independence and the great democratic conquest of the free Chinese people.

In carrying out this magnificient national task a gre part is to be played by the public health organs. Medical workers of the country should provide the organization of medical care for the population such that the working clas of China lose as few work days as possible from diseass an can give their full efforts and abilities to producing material and cultural benefits for the welfare and develop...

of the country.

The fulfillment of the instructions of the Party and government is proceeding both along the line of increasing the number of medical institutions at enterprises and of reorganizing the entire work of these institutions.

In July 1954 the Ministry of Health convoked the All-Chinese Conference on Problems of Medical Care of Workers in Industrial Enterprises. At this conference the problem was discussed of increasing medical care for workers in the chief branches of industry. This was not by chance, because this problem was one of the most important ones at that time. It required the maximum attention of medical workers and public health organs to the matter of prophylaxis and controlling general and occupational diseases associated with working and living conditions of the workers.

At the conference, the important question of uniting all medical institutions of industrial ministries under the single methodological and administrative guidance of the Ministry of Health was also put.

Although shortly after the victory of the people's revolution in China the Ministry of Health was created and thereby a basis was laid for uniting all medical institutions and public health organs, a complete unification could not be accomplished quickly, and therapeutic institutions of industrial enterprises still remained actually administrative

and financially subordinate to the industrial ministries.

The division of medical institutions taking care of the industrial enterprises and the lack of a unified methodological supervision led to the fact that some of t most important principles of work in the field of public health were understood differently and sometimes incorrectly in a number of places. Thus, for example, even now the principle of the so-called "workshop medical care of industrial workers" is still understood differently, the significance of prophylactic work at enterprises is evaluated differently; there is no uniformity of the types of medical institutions at industrial enterprises, et cetera.

This is why the need has matured for ending the existing contradiction in the forms of work of therapeutic-prophylactic institutions of industrial enterprises as so as possible and working out a unified system of public health institutions for industry, establishing their nomenclature and functions, working out standard forms o registration and accounts. The solution of a number of other public health problems is associated with this, ne the training, education and proper disposition of medical personnel, the establishment of a standard staff organizational structure of medical institutions of industrial enterprises, of a single system of governmental sanitation supervision, et cetera.

In accordance with the resolutions of the All-Chinese Conference and the progressive experience of the Soviet Union the system of medical care for workers in industrial enterprises at the present time is being constructed according to the principle of workshop care.

At large enterprises, where more than 5,000 persons work, and at newly created enterprises at a distance from the center with 3,000 or more workers medical units of the first and second categories are being organized. The medical units of the first category include hospitals, polyclinics, health stations or medical first aid stations and stations for the protection of motherhood and childhood.

The medical units of the second category, consisting of outpatients and health stations, are organized at enterprises having workers numbering from 2,000 to 5,000.

Where the total number of workers at enterprises is from 500 to 2,000 persons, feldsher health stations are created. At small enterprises where the number of workers is less than 500 workshop health stations are organized or a combined physician-operated health station containing several physicians sets up several such enterprises.

At particularly hazardous industries, at enterprises where there is increased traumatism (chemical, coal industries, et cetera) the medical institutions mentioned above may be organized even with a smaller number of workers.

At the present time, almost every enterprise has one type or another of medical institution: a feldsher health station, a physician health station, a polyclinic, out-patient department, hospital, night sanatorium and others. The principal attention is directed to safeguarding the health of the laborers and employees occupied in the coal, chemical, metallurgical and textile industries.

During the years of the first Five-Year Plan the number of therapeutic institutions at industrial enterprises increased considerably. According to statistical data, by the end of 1957 there were 406 hospitals, 6,866 polyclinics and health stations, and 528 sanatoria under the management of 19 industrial ministries; the total number of hospital beds was equal to 38,440; of sanatorium beds, to 39,895; the number of physicians was equal to 11,831 (Fig. 7).

The number of therapeutic institutions and physicians compared with 1952 increased by more than four times (Table 12).

At certain large enterprises special departments of labor hygiene were created manned by industrial-sanitati physicians and feldshers who at the same time are propag ndists and organizers in the field of industrial sanitat

The public health organs in cooperation with the occupational organizations prepared and are training a lar

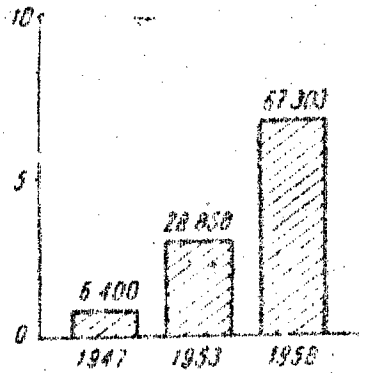


Fig. 7. Increase in the Number of Beds in the Medical Institutions of Industrial Offices

Table 12

Increase in the System of Medical Institutions in Industrial and Other Offices

	1946	1947	1950	1952	1955	1957	1958
Hospitals	12	67	253	307	473	500	767
No of beds in them	400	6 400	17 271	27 885	40 178	48 119	67 303
Sanatoria	—	—	21	175	475	691	557
No of beds in them	—	—	1 824	11 715	39 593	50 536	51 206
Polyclinics and health stations	—	—	1 500	4 800	8 607	9 307	12 404

army of active sanitation workers among the laborers, who give valuable assistance to medical personnel in their everyday sanitary -hygienic work.

As a result of the accomplishment of extensive sanitation measures the morbidity rate from occupational diseases and traumatism has been considerably reduced.

According to incomplete data, if we consider the number of injuries in the metallurgical industry in 1953 as 100 percent, in 1954 it was reduced to 83.3 percent; in 1955, to 79.3 percent; in 1957, to 56 percent. The morbidity rate from occupational diseases in the textile industry in 1957 amounted to 134.8 cases (755.8 days of temporary loss of work) per 100 workers; in 1956, 180.4 cases (1047 days of temporary loss of work).

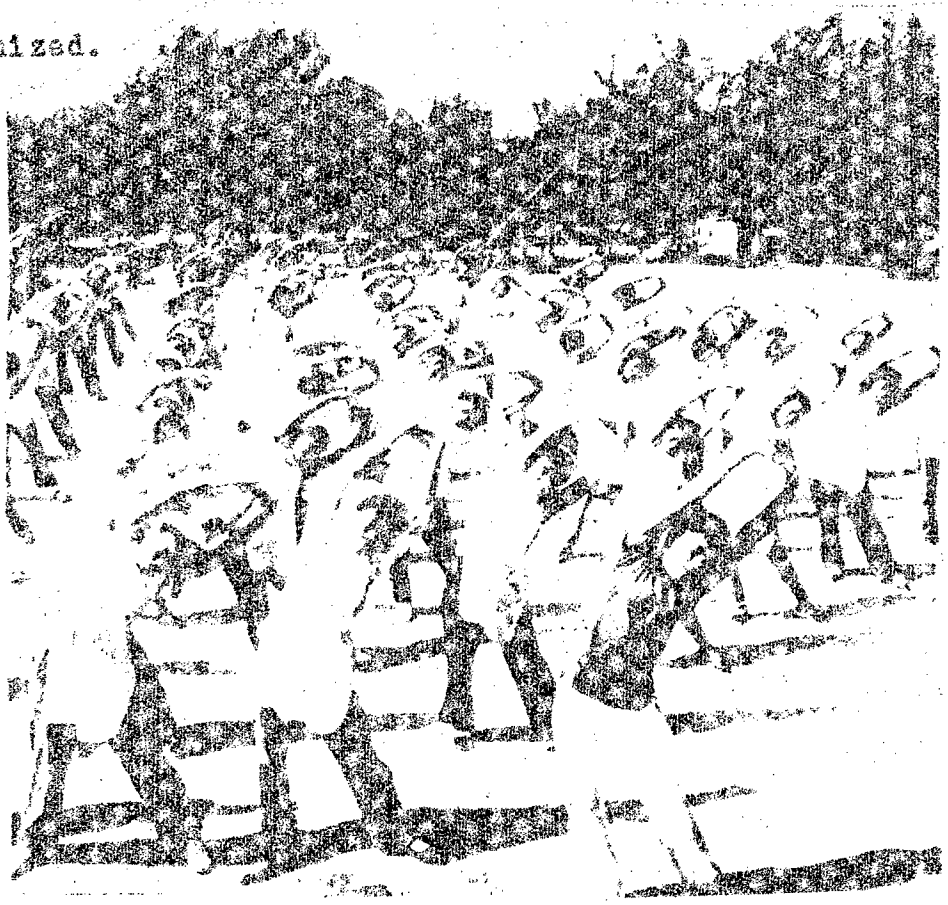
During recent years active measures are being taken industrial enterprises for controlling occupational disease and occupational intoxications. In 1956 for purposes of successful control of silicosis the government council published an act "The prevention of harm from silica dust at industrial enterprises". At the present time, in the majority of mines the use of wet drilling, spraying, drenching and other prophylactic measures has been established; at the plants dust-catching apparatuses, wet and other processing methods are used. Considerable work in controlling silicosis is being conducted at mines for ferrous and

nonferrous metals, at coal mines and enterprises which produce and use raw material containing free silicon dioxide. As a result of this, there has been a considerable reduction in the concentration of siliceous dust in the air of the work premises: from several scores and several hundreds of miligrams per cubic metre of air to the government standard--two miligrams per cubic metre and less. In 1958, at the K'ailang coal mines comprehensive work was accomplished for the first time in the matter of reducing the concentration of silica dust: the concentration of dust was reduced to two miligrams per cubic metre of air as against 1900 miligrams per cubic metre.

In previous years at the Shanghai glassware plants it was believed that elimination of the increased concentration of silica dust could not be accomplished. However, the creative experience of the workers has repudiated this opinion. The use of the method of wet mixing, gentle spilling, gentle unloading, gentle sweeping, gentle screening and gentle mixing of the original material has made it possible to reduce the concentration of dust in the air in 10 shops to two miligrams per cubic metre and less.

While in 1957 patients with silicosis amounted, on the average, to 15-20 percent of the total number of workers (having contact with silica dust), in 1958 the morbidity rate in a number of large enterprises was reduced to one to

two percent. Definite progress was made also in the treatment of silicosis. For this purpose, special groups of physicians of modern and people's medicine were organized.



Workers of Peking Textile Combine Engage in "Textile-Workers' Gymnastics"

Intensified efforts are being made against overheating In industrial premises heat-lowering adaptations have been established, the natural ventilation has been improved, spraying ventilation has been introduced with insulation against thermal sources, et cetera. In addition, an efficient system of work and relaxation of workers in hot shops has been worked out, their water supply has been regulated.

appropriate premises have been designated for relaxation, et cetera. Workers in hot shops are subjected to a regular medical examination. At the metallurgical plants and textile factories, where previously overheating was a very important and unresolvable problem the temperature in the shops now has been reduced in the summertime to 35°; in the cotton and weaving shops of textile factories in the summertime the temperature inside the rooms is 3-4° less than the outside temperature. As a result of these measures the number of cases of heat stroke has been reduced sharply.

The government has published a number of rules and instructions for the prevention of occupational intoxications. Investigative work has been accomplished on the study of intoxications with lead, benzol, mercury and others. In a number of large cities the "Instructions on Occupational Intoxications and Occupational Diseases" has been put into effect. At the present time, at the industrial enterprises acute occupational intoxication has become a rare phenomenon; the number of cases of chronic occupational intoxications is also being reduced.

All the progress made in the matter of sanitation care of workers in industrial enterprises in the Chinese People's Republic are inseparable from the study and utilization of the progressive experience of the Soviet Union and other

socialistic countries.

In connection with the development of industrial sanitation and medical-sanitation care of workers the protection of the health of workers will be improved steadily. This will assist in the successful accomplishment of the tasks of building Socialism.

Chapter VII

Sanitation Education

The improvement of sanitation culture of the population is a component part of general cultural-educational work. Every medical institution is engaged in sanitation education; broad masses of the people are being involved in this matter. An important task of sanitation education is popularization of sanitation knowledge among the population and the education of active groups of sanitation workers.

Sanitation education has been called on to assist in the solution of the following problems: controlling epidemics and superstitions; the improvement of the sanitary conditions of work and life of the working class and of the population's health; consolidation of the sanitation defense of the country.

One of the most important principles of public health in the Chinese People's Republic is its intimate association with the mass movement. Sanitation-education work among the broadest masses of the population of the cities and villages should also be subordinated to this. During the Komindan regime there were no organs or institutions of sanitation education. After the People's Government came to power, along with the general development of the work of public health on a prophylactic basis, the vigorous

development of sanitation education was begun. In 1951, a special Administration of Sanitation Education was created in the Ministry of Health of the Chinese People's Republic. It was occupied in working out documents, determining problems, the direction and the thematics of sanitation-education work, is studying and spreading the experience o the people's democracy, publishing appropriate material in a monthly popular-scientific journal, "Talks on Health".

For the purpose of studying the methods of sanitation education work the Institute of Sanitation Education has been created, which is publishing appropriate literature, placards, diapositives, movie films and other aids.

In the provinces the departments of the sanitary-antiepidemic service of the public health departments are in charge of sanitation education; in the districts the sanitation-education work is being conducted by sanitary-antiepidemic stations; in the villages it has been entruste to workers of the cultural-education system. In 1957, 14 sanitation education houses were functioning. In addition all medical workers, the public health active group, women's, trade union organizations, the Red Cross Society, et cetera are carrying out sanitation education work. For the purpose of sanitation education use is being made of exhibits, moving pictures, lectures, talks, radio broadca bulletin boards, et cetera.

In the capital, in various provinces and cities sanitation exhibits are arranged systematically. In 1950, the Ministry of Health of the Chinese People's Republic organized the All-Chinese Sanitation Exhibit in Pekin, which was visited by 400,000 persons. In 1952, the All-Chinese exhibit was constructed, illustrating the patriotic sanitation movement. These exhibits were shown in many cities of the country. In all, the exhibits were examined by about two million persons.

In 1956, an exhibit was organized in Pekin for the prevention of intoxication with carbon monoxide, a patriotic movement for the observance of rules of hygiene, elimination of measles, et cetera. The exhibit was visited by 831,310 persons. In 1954, in the province of Ssuch'uang 10 districts organized 71 exhibits; they were examined by 517,440 persons.

In 1950, at the Pekin Palace of working class culture the All-Chinese Exhibit was opened devoted to the technical revolution in the field of medicine, pharmacology and public health. There were 45,000 exhibits, including various visual aids, models, photographic films, diagrams with an explanatory text. They showed the achievements of medicine and public health in China. This exhibit was convincing evidence of the fact that Chinese medical workers have made notable progress in the past several years.

In January, 1959, the All-Chinese Exhibit was opened illustrating the work in the annihilation of the "four pests". Numerous visual aids were shown at the exhibit, models and photographic films, which speak for the progress of the patriotic sanitation movement. At the exhibit also numerous objects and various types of extermination of rodents, flies were demonstrated, and methods of cleaning cities and villages were shown in a convincing form; methods and facilities for eliminating parasitic diseases were also demonstrated (schistosomiasis, kala-azar, malaria et cetera). These exhibits enjoyed great success and were of tremendous educational value.

The sanitation exhibits proved to be very effective and an available form of diffusing sanitation and medical knowledge among the population. If we take into consideration the comparatively low level of literacy of the population, it becomes clear that exhibits on sanitation propaganda play a tremendous part.

Moving pictures on problems of sanitation and hygiene enjoy great popularity among the population. For the purpose of an extensive showing of moving picture films on topics of sanitation many thousands of mobile brigades were organized which penetrated into the most remote corners of the country, located in mountains, woods, et cetera. Projectors are also very popular among the population;

particularly in the villages there are projectors in the sanitation homes of every province, by means of which slides from the life of plants, agricultural cooperatives, et cetera are extensively demonstrated.

In the cities one of the important forms of sanitation education work consists of lectures. In 1957, in the Institute of Sanitation Education of Pekin 234 lectures were given which were heard by 50,000 persons. In the city of Hangchow in the province of Chechiang lectures on sanitation topics were visited by more than 50,000 persons, et cetera.

Artistic forms of sanitation education work are being extensively utilized also: plays, operas, humorous dialogues, popular songs. They enjoy great popularity among the population. In 1957, in the city of Fushun artistic activities were organized on sanitation topics, which were visited by 250,277 persons. In the province of Ssuchuan a play was given, "Elimination of Bacteria and Harmful Insects"; it was seen by 83,700 persons; in the summer, at Talnii and Port Arthur during the patriotic sanitation movement artistic activities and parades were organized in which 300,000 persons from 323 institutions participated. In two days 220 activities on the most varied sanitation topics were organized.

Although, in recent years progress has also been made

in the field of sanitation education there are still many defects. In order that the people might be better guided in their fight against disease it is essential to raise the political and technical level of sanitation education in every possible way.

Under conditions of the sharp rise in the development of socialism public health organs have been confronted with new tasks in the matter of the further improvement of forms and methods of sanitation education.

The Communist Party of China is giving considerable attention to the development of mass sanitation education. The fight for sanitation culture is a matter of great importance. At the given stage of development the main problem of the sanitary movement is the elimination of the "four evils" (rodents, flies, mosquitoes and sparrows) and improving the sanitation welfare of the country. Naturall the accomplishment of these tasks depends to a tremendous degree on the proper organization of sanitation education work. This is why an inalienable part of the patriotic sanitation movement is the accomplishment of mass measures of sanitation training of the population, raising its cultural and sanitation level.

The scales of agitation-propaganda work in this direction may be judged by the following data. In 1956, more than 100,000 reports and lectures on sanitation topics

were given in the entire country, and a number of talks in Shanghai alone amounted to 500,000. In the district of Su in Shensi 160,000 persons were given hygienic training. In 50 percent of the villages of this district permanent detachments of sanitation propagandists were organized from the group of women and students (2,464 women and 2,300 students took special training).

As a result of the measures taken the level of sanitation culture of the population was raised considerably. In 1957, in all districts of the country more than 90 percent of the peasants began to use a toothbrush and toothpowder and to take care of the cleanliness of their clothing. Committees of the sanitation movement are regularly following the observance of rules of personal hygiene, of cleanliness and of good construction of homes, institutions, enterprises, agricultural cooperatives and streets. Medical workers, in the course of the sanitation movement, are organizing competitions in the districts between neighboring inhabited places; in the cities, between rayons; at enterprises, between shops, et cetera. A mutual checking of the competition results is carried out.

In the agitation work for a high standard of sanitation culture an active part is taken by members of the All Chinese Association of Democratic Women, The Communist Union of Youth, the Red Cross Society, and representatives of the

workers and peasants.

Sanitation propaganda among the workers of factories, plants and mines is directed toward increasing the knowledg of sanitation in the area of controlling infectious, gastrointestinal, occupational diseases and traumatism. Among female workers, sanitation work is being carried out in the matter of safeguarding maternity and childhood.

In recent years, work has been extensively developed in the matter of educating an active sanitation group. Thu for example, in the "Kucheng" mines in 1957, 1,500 sanitati propagandists were trained. This active group is doing active work in sanitation propaganda.

Considerable work in sanitation education is being conducted among workers of the public dining room enterprises. Medical workers are organizing special courses f cooks and dining room personnel, inculcating good habits c sanitation in them, acquainting them with methods of prope preparation of food, and putting the dining rooms into sanitation order. Now, at many enterprises there is an efficient nutritional system organized and it is clean in the food section. All this undoubtedly is contributing to improving the health and reducing the morbidity rate. The sanitation education work is being conducted not only at enterprises but also among the members of the workers' families.

The most important tasks in the field of sanitation education work are the following.

1. The all possible expansion and improvement of sanitation education with the aim of mobilization of the efforts of the entire people toward carrying out the most important task of eliminating the "four pests" and eliminating the most dangerous diseases among the population.

2. The organization of sanitation education homes in cities and provinces and increase of supervision of their work.

3. Increase of sanitation education work in all therapeutic-prophylactic institutions of cities and rural rayons, for which it is necessary to attract medical workers on a broader scale to participation in sanitation-propaganda work, particularly among outpatient and hospital patients and in the districts.

4. Increasing the part played by sanitary-antiepidemic stations and sanitation education homes in the field of organization of sanitation education work.

5. Expansion of scientific research work in the field of sanitation education (methods and content of this work).

Because of the every-day concern of the People's Government and The Communist Party of China for the health of the people sanitation education will be developed further and on a broad scale.

Chapter VIII

Protection of Motherhood and Childhood

In Old China women and children were deprived of all rights, and no one cared about their health at any time. After the formation of New China the women of China for the first time in the history of the country were emancipated completely in all areas of cultural and economic development.

The protection of motherhood and childhood is the direct duty of the government. This principle was written into the "General Program of the People's Political Consultative Council of China". The idea of the protection of motherhood and childhood has been recorded with particular clarity in article 96 of the Constitution of the Chinese People's Republic, adopted by the First Session of the All-Chinese Conference of the People's Representatives in 1954. In this article it is stated: "Women in the Chinese People's Republic shall enjoy equal rights with me in all areas of political, economic, cultural, public and family life".

During the years which have elapsed after the formation of the Chinese People's Republic, the party and the government published a whole series of decrees and acts protecting the interests of women and children. Particular note should be made of the government's act for the elimination of

prostitution, a new law about marriage and a law concerning workers' insurance. According to this law, female workers and female employees of industrial enterprises are to enjoy free medical care and a 56-day leave for delivery with maintenance of work pay. A monetary stipend in connection with delivery is issued to all female workers and female employees as well as to the wives of laborers and employees.

The women of New China, after getting rid of their eternal oppression and enslavement, are participating actively in all branches of the national economy. There has been a considerable increase in the number of women occupied in industry. Tremendous masses of peasants in the villages are attempting to increase the yield of grain and cotton.

Women are showing considerable activity also in the political life of the country. Women have actually begun to administer the government. This is proved by the fact that in 1954 women constituted 17.31 percent of the elected people's representatives.

In a brief period a governmental system of protection of motherhood and childhood has been created with the constant support of the Communist Party and people's government in China.

Not only public health organs but also many public

organizations are participating in the accomplishment of extensive measures for the protection of motherhood and childhood: the All-Chinese Democratic Federation of Women and its affiliate in localities, trade union organisations, the Red Cross Society, the All-Chinese Committee for the Protection of Children and others. They are doing great propaganda work, participating in the organization of institutions for the protection of motherhood and childhoo and in training personnel.

In 1949, a special Administration for the Protection of Motherhood and Childhood was created at the Ministry of Health, and in every provincial department of public heal and in the health departments of large cities--departmen for the protection of motherhood and childhood. These departments in various localities are operative-administr tive organs, through which the directives of the Party/and government are incorporated and accomplished with respect to the protecti of the health of the mother and child.

The Communist Party is lovingly concerned with the rising generation. Even before the liberation of China Mao Tse-tung in his report "The Coalition Government" wrote the following: "...It is necessary to protect the interest of youth, women and children...to carry out the principle freedom of marriage and equal rights of men and women; to organize training of the youth and children in useful

knowledge and habits". (Mao Tse-tung. Selected Works. Vol. 4, page 517).

After the liberation of the country there was a considerable increase in the system of institutions for the protection of motherhood and childhood. According to 1957 data, there were 17,657 homes and stations for the protection of motherhood and childhood in China. In addition, throughout the entire country there were 83,784 lying-in stations in which midwives worked (Fig. 8).

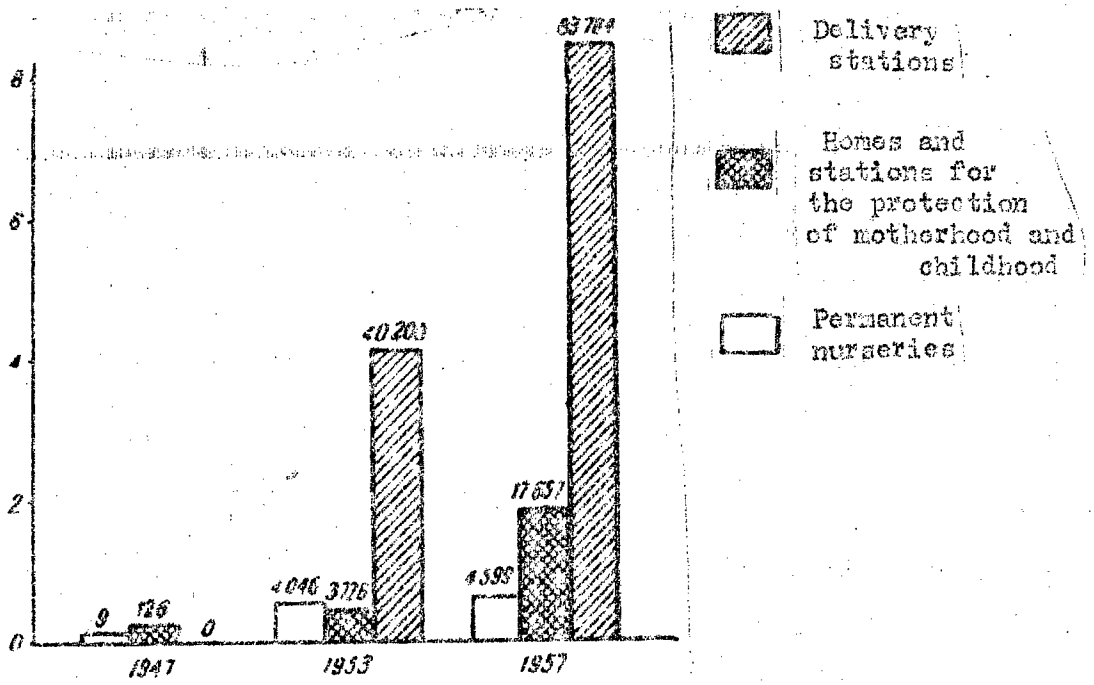
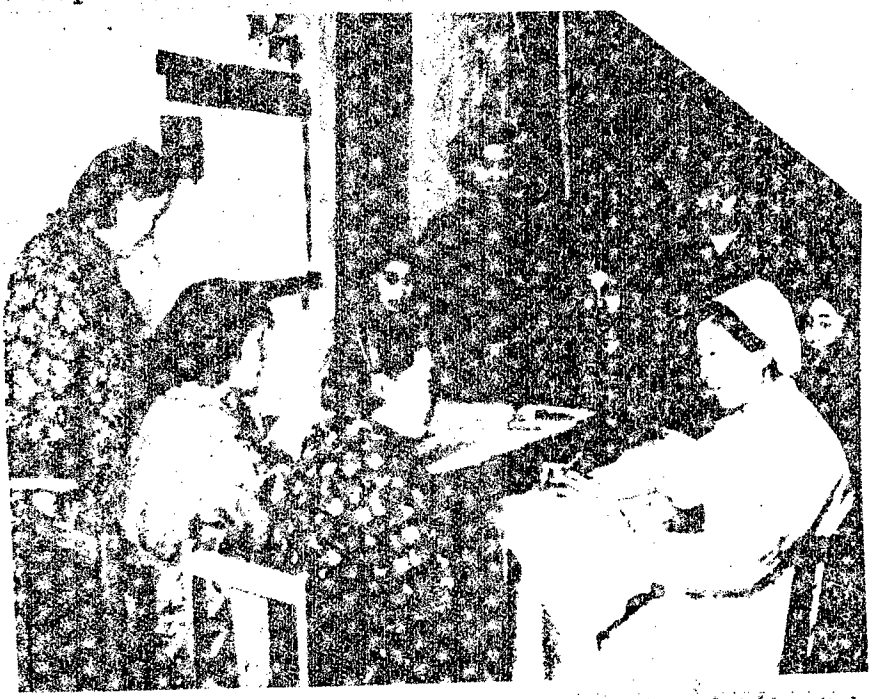


Fig. 8. Development of Medical Institutions for the Protection of Motherhood and Childhood in the Chinese People's Republic

At the present time, in the large and medium-sized cities the mortality of the newborn from tetanus has, by and large, been eliminated. In 1958, in Pekin the mortality rate of mothers during delivery was reduced to

0.1 percent; there has not been a single case of death fro puerperal sepsis.



Medical Worker of "Peace" Lying-in Home in the City of T'ientsin Talk with Women Near Term

In the cities a system of institutions for the protec ion of motherhood and childhood has been created. All primiparas and parturient women having difficult deliveri are given qualified aid in the hospital departments.

After the liberation of the country the number of beds for parturient women was increased to more than 6,000.

During these years the government took most important measures for safeguarding the labor of female workers. In the majority of industrial enterprises special dining rooms were organized for pregnant women and personal hygiene rooms All enterprises have put out large sums of money for the

organization of nurseries and rooms for feeding suckling children. In accordance with physiological characteristics of the female workers appropriate changes in work organization and in industrial equipment have been made. As a result of this there has been a gradual decrease in the number of menstrual disorders, gynecological and occupational diseases, and loss of work days.

In the villages considerable work has also been done for the protection of motherhood and childhood. For women in agricultural cooperatives lying-in receptionists, hygienists and female instructors have been trained. In their work they direct special attention to working conditions. This has played an important part in raising the level of agricultural production.

Protection of the health of the mother and child among national minorities is one of the most important tasks of public health. As a result of the accomplishment of extensive measures for the elimination of syphilis, the training of midwives, the organization of special stations for the reception of parturient women, the fulfillment of the act concerning a sedentary life in the post-parturient period it has been possible, by and large, to eliminate the unfortunate circumstances of the past, when "only pregnant women were encountered but no children were seen".

The Party has given special attention to protection of

the health of children. After the liberation of the country propaganda on new methods of training children has been developed extensively, an effective method of feeding them has been worked out as well as of supplementary feedi and nutrition; the children are being trained in proper habits of hygiene, et cetera. As a result of the extensi development of the work of protection of children's healt the giving of free tuberculosis and other prophylactic innoculations, the mortality rate of children from measle scarlet fever, whooping cough, diphtheria and tuberculosis is decreasing every year.

After the liberation of the country and up to 1958, 27 children's hospitals with 3,682 beds, and 44 stations for the protection of children have been created (Fig. 9).

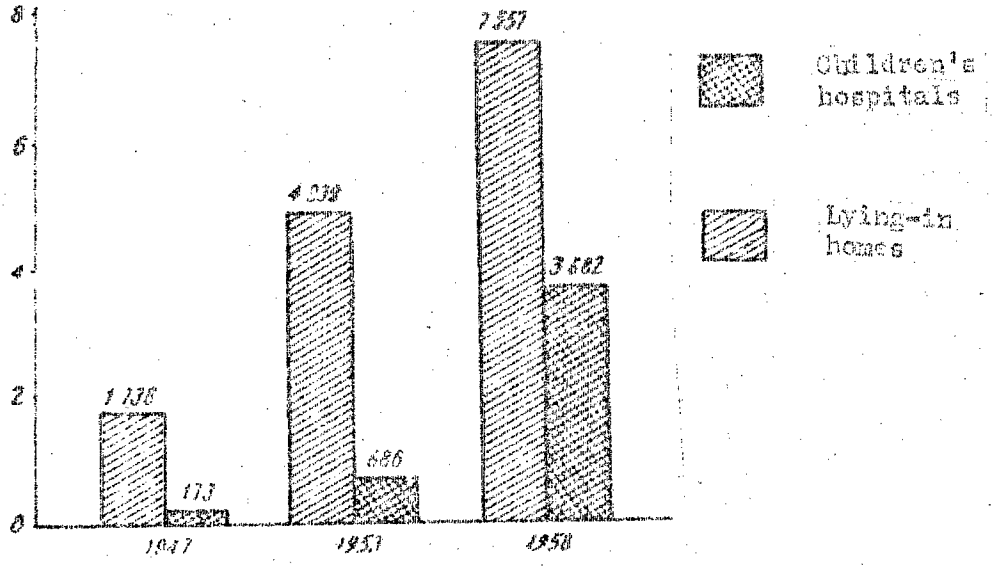


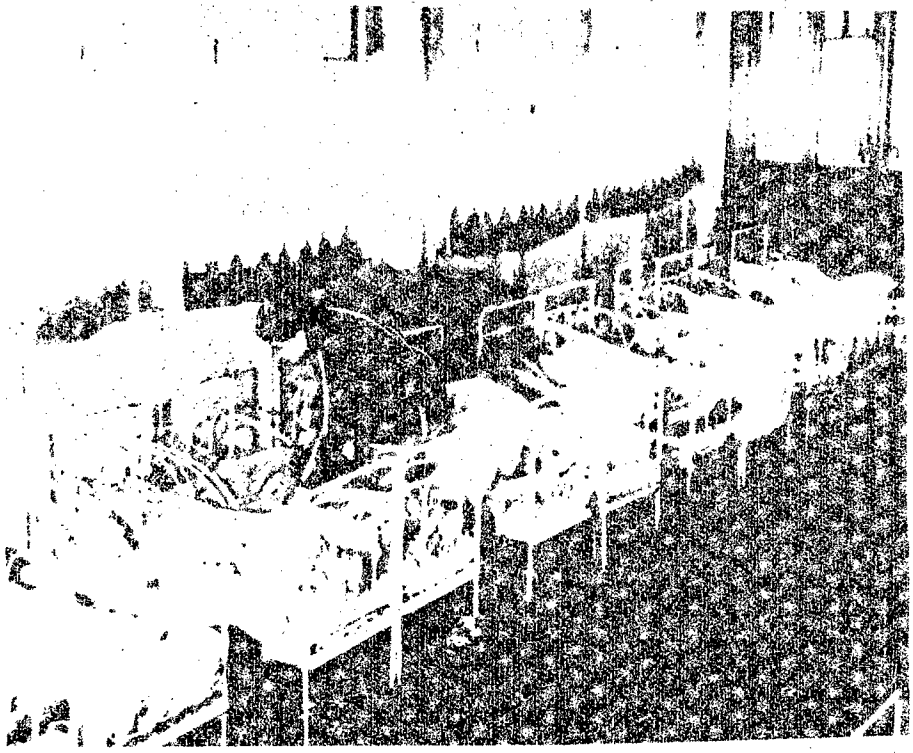
Fig. 9. Growth in the Number of Beds in the Children's Hospitals and Lying-in Homes of the Chinese People's Republic



Woman of the Han People with Her Newborn Baby in a Hospital for National Minorities in the Locality of Hsingchieh (Autonomous Rayon of the Yao People in the District of Chiangyung of Hunan Province)

Great progress has been made in the organization of the network of nurseries. In 1957, 17,657 permanent nurseries with accommodations for 485,000 were counted in the cities, that is, 140 times more than before the liberation. The care in the nurseries has also improved notably. In Old China in the rural rayons there were no nurseries at all. After the liberation of the country and up to 1956 seasonal nurseries were created in almost every cooperative and brigade. At harvest-time there were 634,640 such nurseries

for six million children. In 1958, the number of permanen nurseries in the entire country increased to 3,189,292 (accommodations for 47,139,695).



Rest Hour in Children's Nurseries on Dongweibutung By-Street in Pekin

In order successfully and quickly to cope with the problem of reducing the maternal mortality rate in delive and the mortality rate of the newborn it was impossible t limit the situation simply to the training of new midwive For this purpose considerable time would be required. Therefore, the Ministry of Health, together with increasi the training of new personnel, organized a system of retraining of swathing mothers / This term, which is usuall loosely rendered as midwives, actually represents a group

persons with less training than is given to a midwife/. Short courses were created for them (one and a half months - two-three months). At these courses, the swathing mothers received elementary information on the physiology of pregnancy, the hygiene of women, care of the newborn, asepsis and antisepsis, and were acquainted with the elementary sanitary-hygienic rules of managing delivery. Those who attended the short retraining courses were given the right to take charge of deliveries, chiefly in the villages. Such a swathing mother was awarded the title of "delivery receptionist". Supplying them with sterile material and supervision of the activity of swathing mothers is carried out by the local public health organs.

During the past nine years 35,000 new midwives have been trained and 774,983 swathing mothers have been retrained.

As the result of measures taken there has been a considerable reduction in the mortality rate from puerperal septic diseases and in the mortality rate of newborn children from tetanus.

Table 10 speaks for the progress made.

It is well known that in Old China the mortality rate of the newborn was one of the highest in the world. After the liberation of China the mortality rate of children from the age of one year up decreased from 200 per 1,000 (before the war with Japan) to 71 per 1,000 (1957 for the entire

country) in the cities, from 120 per 1,000 (before the war with Japan) to 36 per 1,000 (1957).



Model Workers Examin Children and Nurseries at the Ch'inghe Cloth Factory near Pekin.

Therefore, incomparably better conditions have been created for mother and child in New China than in old China or in captalistic countries, where women and children live in proverty and deprivation.



Dentist in Dental Dispensary Performs Prophylactic Work on Teeth for School-Children in the Village of Lungchiehsiang (Shanghai).

Table 10

Reduction of Child Mortality Rate

Year	(1) Смертность детей от 0 до 1 года на 100 родившихся	(2) Смертность новорожденных от 0 до 1 месяца на 100 родившихся
1949	11,8	No data available
1950	9,6	» »
1951	8,7	4,4
1952	6,6	3,6
1953	5,9	3,2
1955	4,5	3,1
1957	3,5	1,8
1958	3,7	1,7

(2) Mortality rate of the newborn (from 0 to one month) per 100 born

(1) Mortality rate of children (from 0 to one year of age) per 100 born

Chapter IX

Medical Education in the Chinese People's Republic

The vigorous development of public health in the Chinese People's Republic required a considerable intensification of the training and education of new medical personnel.

In old China a very small part of the population used the services of educated physicians. It is sufficient to say that there was a total of 16,000 physicians with diplomas among the six hundred million people. They all worked chiefly in large cities.

For the successful development of the matter of medic education in New China it was first of all necessary to reconstruct radically the entire system of training personne and to create new higher and secondary-school medical institutions.

In old China there was no standard system of medical education.

The first teaching medical institution of European type was created in Tientsin in 1881 at a time when Li Fun Tsan was governor. In this school, the training was begun of Chinese in European medicine.

In recent years, a number of medical institutes was gradually organized in various cities by various missionary

societies.

At the beginning of the twentieth century the first Chinese medical institutes were created (in 1901 The Military Medical Institute was created in Pekin; in 1911, The Pekin and Chechiang Medical Institutes).

During a period of 69 years, from the time of penetration of European medicine into China and until the time of its liberation, 38 medical and 7 pharmaceutical faculties and institutes were founded. Many of them were poorly equipped; the teaching was carried out at an insufficiently high level. These institutes trained a total of about 20,000 physicians and pharmacists during the 69 years.

In the old medical institutes there were eight periods of training of physicians--from two and a half to eight years; therefore, the level of training was different. After obtaining a medical education, the physician strived toward a single purpose--having a private practice.

The medical institutes were located in old China in an extremely non-uniform manner. Thus, in Shanghai seven of the 38 medical institutes and faculties were concentrated, and in a number of provinces (Anhei, Chinghai and others) there has not been a single medical institute.

In August 1950, at the first All-Chinese Congress of Public Health Workers the problem of training medical personnel was discussed in detail, and a system of medical

education was worked out. The new system provided for higher, secondary school and elementary medical education.

The following training periods were established for higher education on the basis of general theoretical and general medical training: specialized training in interna medicine, surgery, pediatrics and obstetrics and gynecolo five years; in eye diseases, otolaryngology, dermato-venere dental diseases, as well as training of sanitation physicia four years.

In the medical and pharmaceutical institutes special two-year courses were organized; at these courses, there were persons who had a general secondary-school education. Those trained at the courses received an incomplete higher medical education. The need for this was produced by the fact that in the country after a number of bitter wars epidemics raged everywhere, and an acute deficiency of me personnel was felt.

In 1954, at the All-Chinese Conference of Workers in Higher Medical Education the first unified training plan adopted for all medical institutes of China following the example of the medical institutes of the Soviet Union. According to the new training plan the training period for therapeutic and sanitary-hygienic faculties was set at five years; for pharmaceutical institutes and stomatological faculties, four years. A number of pharmaceutical faculties

were combined with medical institutes, at which there subsequently arose independent pharmaceutical institutes.

As a result of these transformations 32 medical institutes were organized at 44 medical and pharmaceutical institutes and faculties in 1955, and two medical institutes were given over to the war department.

A proper arrangement of medical institutes, the building of new institutions of learning, equipping them with medical equipment made it possible to increase the number of students taken by many times. In 1957, there were 38 higher medical and pharmaceutical institutes in the country; 32 medical institutes, two pharmaceutical institutes, and four institutes of Chinese people's medicine; seven institutes were constructed in 1956. At the present time, in medical and pharmaceutical institutes 49,107 students are being trained, including 19,747 women and 1,909 students from the areas of national minorities. The number of students has increased by almost four times compared with 1947. There are 183 secondary medical and pharmaceutical schools. In them, 81,000 persons are being trained, approximately 7.8 times more than in 1946, a period when the maximum number of students was noted before the liberation of the country. In the past nine years medical and pharmaceutical institutes have trained 33,625 physicians; and secondary medical and pharmaceutical schools, 131,108 specialists. This has

considerably exceeded the total number of medical workers who have been graduated from institutes before the liberati n of the country (Figs. 11-12).

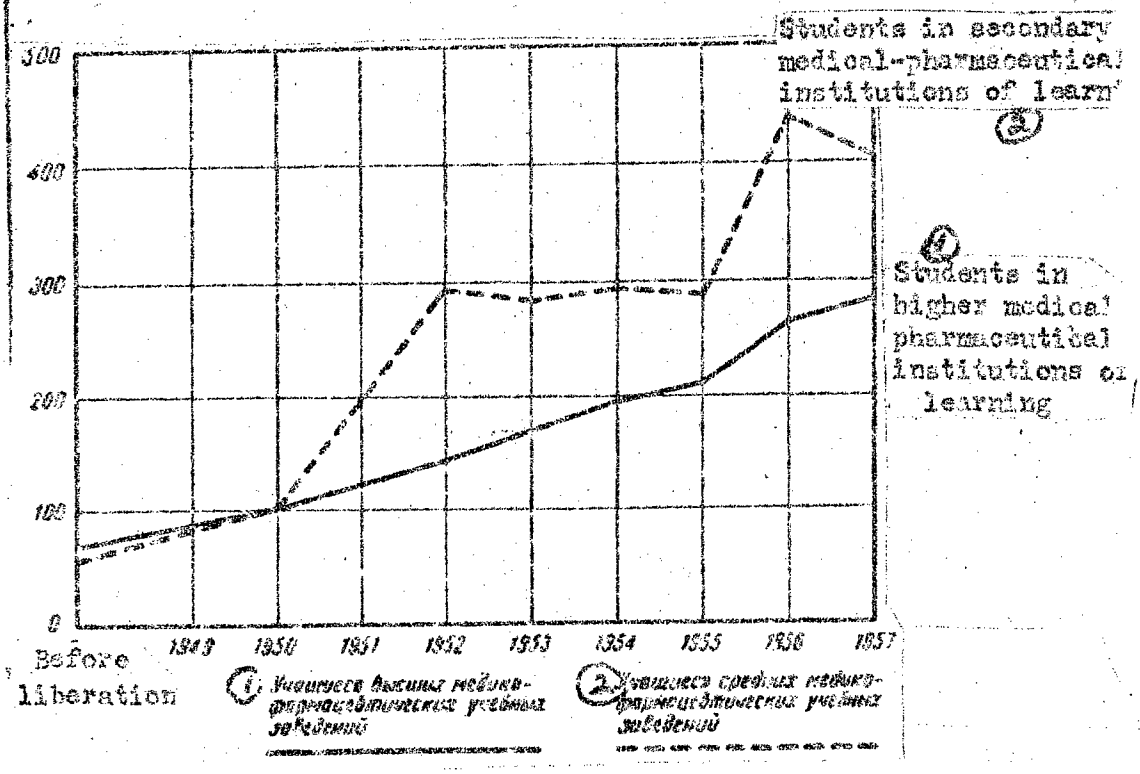


Fig. 11. Increase in Number of Students in Higher Medical-Pharmaceutical Institutions of Learning in the Chinese People's Republic.

At the present time, medical institutes are training physicians in six specialties: therapeutic, pediatric, stomatological, pharmaceutical, sanitary-hygienic and the specialty of the people's medicine. The training period in the institute of the people's medicine is six years.

According to the data of the 1957/1958 school year, 7,974 instructors were working in medical colleges; of them 497 were professors; 525 were assistant professors; 2,296

were instructors and 4,656 were assistants. In addition, 871 teachers were working in more than one capacity. In all the medical colleges of the country chairs have been organized; in the secondary medical schools, boards on various disciplines.

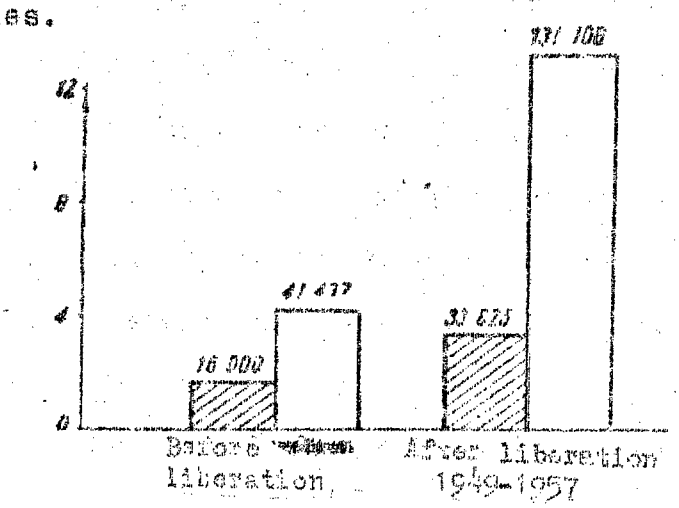


Fig. 12. Comparative Graduation Data for Higher and Secondary Medical-Pharmaceutical Institutions of Learning before and after the Liberation of China (per 10,000 Persons)

The reform of higher medical education and systematic work in ideational-political education has contributed much to the fact that many professors and teachers in medical institutes have realized the error of their idealistic views and of their submission to the system of medical education in capitalistic countries. A feeling of responsibility and activity in training physicians have increased in the majority of teachers and professors.

In 1953, at a conference given over to the third anniversary of the alliance between the Chinese and Soviet peoples, Mao Tse-tung said the following:

"We intend to carry out a great national construction. The work which we have to do is difficult and our experie is inadequate. Therefore, we have to be taught persisten by the progressive experience of the Soviet Union. Regar less of whether we are members of the Communist Party or not, old or young personnel workers, engineering-technical workers, intelligentsia, workers or peasants--we should al with utter sincerity learn from the Soviet Union".

In response to this appeal by Mao Tse-tung medical workers began to study progressive medical science of the Soviet Union in an intensified fashion as well as experien in the field of medical education. Many professors and teachers are studying the Russian language. Part of them are already able to use Russian textbooks and reference w in their specialty or to make translations.

Beginning with 1953 a systematic study of the fundam- tals of Marxism-Leninism as well as of the teaching of I. Pavlov, which is the natural scientific basis of dialecti materialism in medicine, has been begun in the medical institutes.

Experience in a movement for regulating the style of work has shown that it is first necessary to take persist

measures for the ideological re-education of the old professorial personnel, to raise the level of their scientific qualifications and of their political consciousness.

Considerable attention is being given to increasing the qualifications of medical workers. The Ministry of Health of the Chinese People's Republic has created The Institute for Advancement of Personnel; in every province, schools or courses for the systematic advanced training of medical workers at various levels have been opened up. The advanced training of physicians and pharmacists with higher educations is being accomplished also in scientific research institutes, in medical colleges, in therapeutic-prophylactic and sanitation institutions. Scientific medical societies and other scientific organizations have arranged for the giving of scientific reports, discussions, courses on the study of the physiological teaching of Pavlov, night schools, brief courses, et cetera.

In some therapeutic-prophylactic and sanitary-antiepidemic institutions, if conditions permit, three to four hours a week are given over to increasing the qualifications of the personnel.

In accordance with the country's needs the training of a large number of physicians in the people's medicine is being accomplished. This training has its own characteristics. In Pekin, Shanghai, Kuangchow and Chentu institutes of the

people's medicine have been organized, which are training personnel with higher qualifications. In addition, 29 schools of the people's medicine and schools for the advan ment of the people's physicians have been organized. The training of the people's physicians is being accomplished also by means of an apprenticeship system.

In the next 12 years new medical institutes will be organized, no less than 100,000 physicians will be trained, and the number of secondary medical schools and people's physicians will be increased considerably.

An actual problem of higher medical education in the country is the further perfection of training plans for new specialists, who have to master the latest medical knowledge and be able to combine theory with practice properly. Medical personnel from now on will have to be trained in t spirit of Marxism-Leninism and will have to be physically hardened, full-scale builders of Socialism. In the light these problems a steady increase in the quality of teachi and ideational education should be achieved, a high level progress of the students and active participation of them work and scientific research work should be attained.

At the present time, the most important problem is the provision of medical colleges with teaching personnel. In 1949, there was a total of 3,000 persons in the professori instructor staffs of medical colleges of the Chinese People

Republic. By the end of 1957 this number increased to 7,974 persons, and there was still a great deficiency of teaching personnel felt.

Chapter X

The Development of the Pharmaceutical Industry and of Apothecary Affairs in the Chinese People's Republic

In old China the pharmaceutical industry was very poorly developed. Drugs were chiefly imported from beyon the border. Although the national pharmaceutical industr began to be created 40 years ago, its development under conditions of old China was delayed. It could not produc even the simplest marketable drugs in adequate quantities.

The imperialistic countries--England, Germany, The United States, Japan and France, which had made themselves at home in China during the period of rule of the Homindan oligue, vying with one another, plied China with various drugs of their own production. In a profits race they increasingly pushed the drugs which they had imported.

Foreign entrepreneurs bought the raw material for dru cheaply in China, manufactured the drugs from it and sold them at three times the price to the Chinese people as imports. The situation reached the point where ampoules were imported, although there was enough of its own glass China. The abundant importation of drugs prevented the development of the Chinese pharmaceutical industry. This wa the situation before the country was liberated. After t victory of the revolution the Chinese people vigorously too

upon themselves the creation of a Chinese pharmaceutical industry.

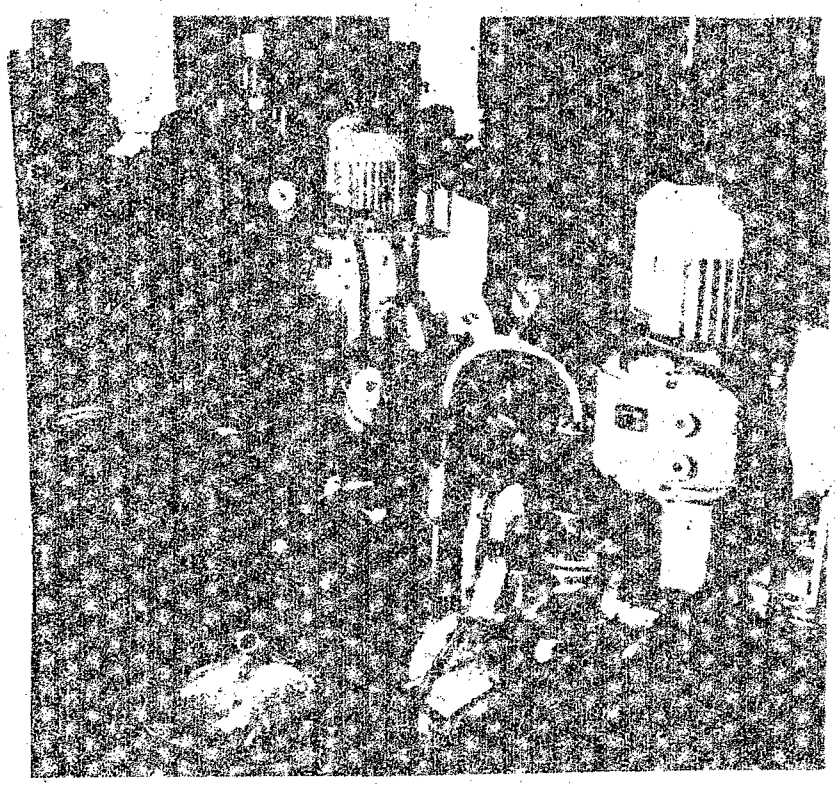
The Communist Party and the People's Government are giving considerable attention to the development of the pharmaceutical industry. During the first few years after the victory the supervision of the pharmaceutical industry was carried out by the Pharmaceutical Administration of the Ministry of Health. For purposes of improving this supervision the Main Administration of the Pharmaceutical Industry was created in 1952 in the Ministry of Light Industry, which is now in the Ministry of the Chemical Industry.

Considerable work was done in uniting the government pharmaceutical plants. Because of this, it was possible to concentrate their efforts and considerably increase the production of medical preparations. Thus, for example the Northeastern Chemical-Pharmaceutical Plant with six large shops, the largest in the country, was constructed at several small enterprises. Now, this plant is producing sulfonamides, glucose, chloromycetin, DDT and other drugs in large quantities.

The unification of small enterprises was accomplished in many cities, particularly in Shanghai, which has now become the center of the pharmaceutical industry of China.

In addition, there are more than 200 small pharmaceutical

factories at which the most varied therapeutic preparations and medical equipment are prepared.



Experimental Shop at Hua-Pei Pharmaceutical Plant

The People's Government is following a policy of uni the small private factories, converting them into large Government or government-private pharmaceutical enterpris which are financed from the government budget. Previousl these factories belonged to private entrepreneurs, who pursued only commercial purposes. The equipment of the

factories was primitive; production was by hand. Now, the government-private pharmaceutical plants have become highly mechanized enterprises, and their production output has been considerably increased.

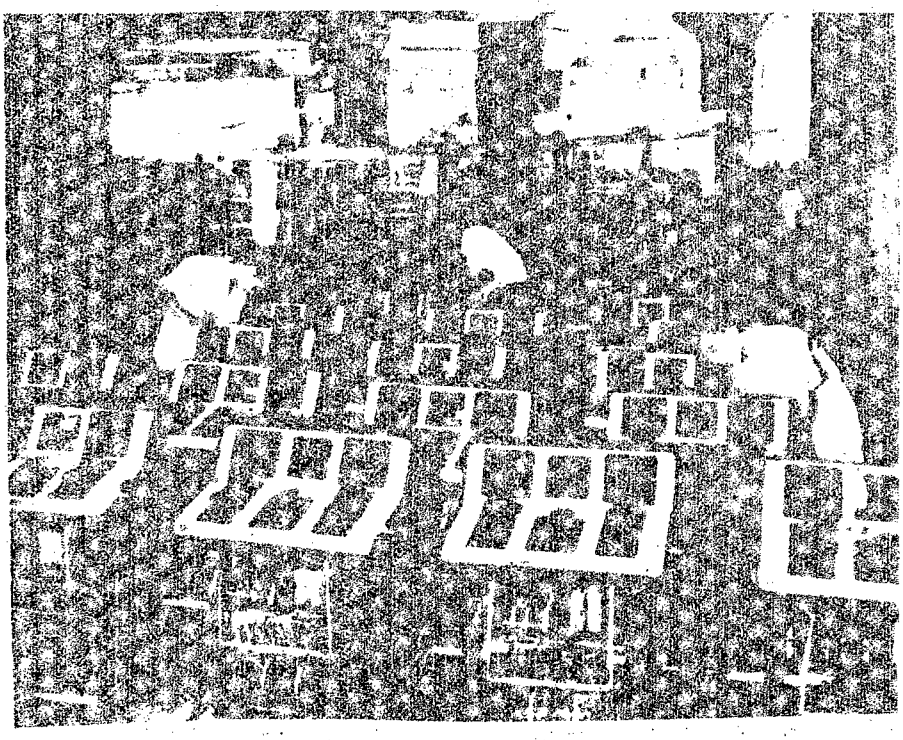
With the aid of the Soviet Union the construction of large plants for the production of antibiotics and sulfonamides was begun in 1954. In 1958, a newly constructed plant for the production of antibiotics equipped with modern equipment went into operation.

At the Shanghai government plants of medical instruments and equipment the output of Chinese X-ray apparatuses and diathermy apparatuses is increasing yearly.

The Chinese pharmaceutical industry is being developed from day to day, and its technical equipment has been considerably improved. At the present time, in the Chinese People's Republic a large assortment of drugs (penicillin, aureomycin, tetracycline, streptomycin, terramycin, synthomycin, sulfathiazole, sulfaguanidine, phenacetin, chloroguanidine, ephedrin and others) as well as X-ray apparatuses, microscopes, ultra high frequency apparatuses, all-purpose operating tables and surgical instruments, are being produced.

The Five-Year Plan was overfulfilled by 40.5 percent with respect to the cost of production. In 1953, a total of 18 types of drug raw material and semifinished products was

produced in a quantity of 1,570 tons; in 1957, 65 types, i a quantity of 19,500 tons. The cost of the principal typ of production in 1957 decreased by 94 percent compared wit 1953.



200 MA X-Ray Apparatuses Produced by Shanghai Plant of Accurate Medical Instruments and Apparatuses. The workers are engaged in assembling the control panel.

In connection with the continuous growth of productio of Chinese drugs the importation of them is decreasing from year to year. During the Homindan period the total quanti of imported drugs amounted to 95 percent; in 1954, only 40 percent. Therefore, in 1954, the drug needs were furnished by Chinese industry to the extent of 60 percent.

In the interests of the development of the Chinese

pharmaceutical industry the Ministry of Health of the Chinese People's Republic established rules for the importation of drugs. According to these rules, the drugs, the production of which can be assured by Chinese industry are not imported, while drugs which may be produced only partially are imported depending on the need for them.

At the present time, more than 80 percent of the drugs and instruments are being produced by Chinese industry. The drugs and instruments which are imported amount to only 15-20 percent. Certain types of drugs are exported.

The pharmaceutical industry of the Chinese People's Republic is striving not only toward the quantitative increase in production of drugs and medical equipment but also toward an improvement in their quality. The control laboratories are doing great work in investigating production, and are prohibiting the production and sale of drugs which are not of good quality.

Along with the development of the pharmaceutical industry in New China considerable attention is being given to the preparation of drugs from herbs according to the method of the Chinese People's Medicine. A special scientific research institute has been created for the study of the Chinese People's Medicine, particularly of medicinal herbs. Many drugs from herbs, the effectiveness of which has already been checked, have been included in the modern

Chinese pharmacopoiea and are being prepared at pharmaceuti[illegible] enterprises.

In the Chinese People's Republic there is a large network of pharmacies which prepare drugs according to the prescriptions of physicians of the people's medicine. The drug houses are both in cities and in villages. The majority of the population of the country uses chiefly dr[illegible] of the Chinese people's medicine. In connection with thi[illegible] a number of measures have been taken for the increase and regulation of the production and marketing of these drug[illegible] In 1954, the Main Campaign for the Preparation and Produc[illegible]n of Chinese People's Medicine Drugs was instituted.

In the provinces, cities and autonomous rayons apothe[illegible] administrations are being organized for the people's therapeutic facilities. By the end of 1957, 5,342 such apothecary administrations existed, in which 60,000 employees worked, and 100,000 government-private pharmacies with 200,000 employees. According to 1957 data, the output of drugs of the people's medicine has increased costwise by two times compared with 1954. In 1957, the assortment of drugs prepared increased by six times compared with 1953.

In 1959, it was planned [illegible] to create new large plantations for the cultivation of medicinal plants used by the Chinese people's medicine as well as to open up special pharmaceutical factories or shops for the reprocessing of

the medicinal plant raw material.

Considerable attention in the Chinese People's Republic is given to pharmaceutical affairs. During the period of the Homindan government apothecary affairs were conducted chaotically. There were no government pharmacies, and only private pharmacies existed. Drugs and medical instruments were objects for speculation of private entrepreneurs.

After the liberation of China in 1950 the Main Pharmaceutical Administration was formed, and in it the Central Government Pharmacy was created. Supplying drugs and medical equipment to therapeutic institutions as well as the regulation of the prices of the drugs were included among the functions of the Main Pharmaceutical Administration. By the end of 1950 pharmaceutical administrations with pharmacies in six administrative rayons were formed, and 90 government pharmacies were created in large cities and provinces. In 1953, 354 government pharmacies existed, that is, 13 times more than in 1950.

In recent years the number of institutions which supply the population with drugs has increased considerably. By 1957 the number of such institutions had increased by six and a half times compared with 1952. At the present time, there are 27 provincial and city pharmaceutical administrations with drugs in the country, 20 supply

stations, 92 pharmaceutical administrations with pharmacies in cities subordinate to provinces, 103 affiliates of pharmaceutical administrations of special cantons and 561 district drug houses. In addition, there are 426 wholesale departments in the large cities and 458 affil ates of these departments. The number of persons working in these institutions amounts to 40,000.

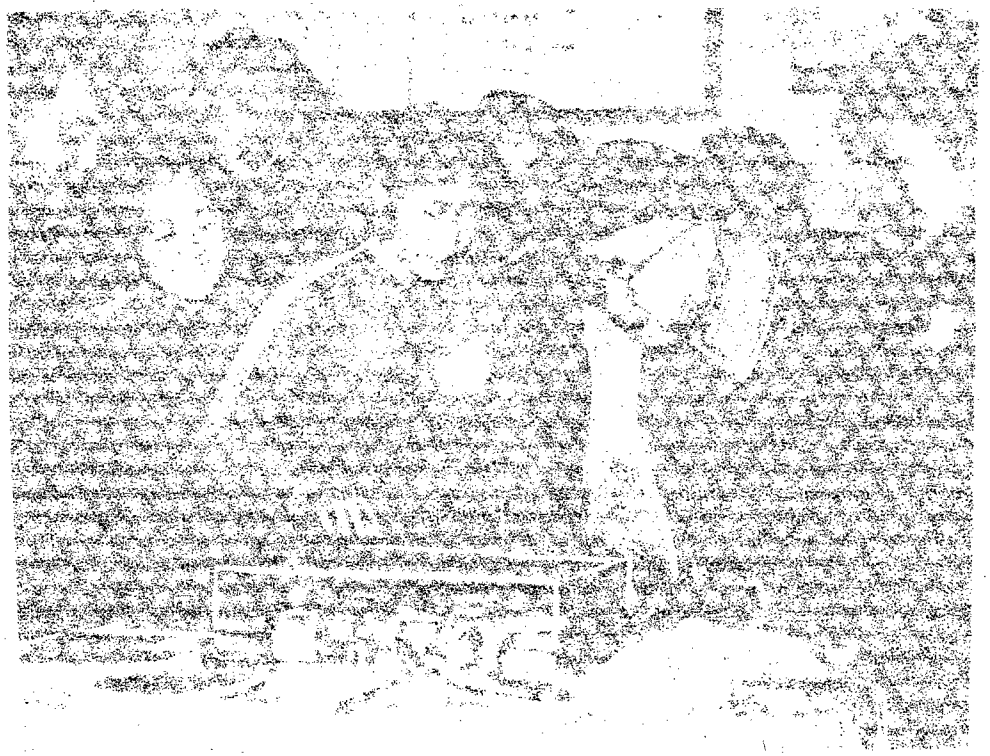
With the increase in the buying power of the population general and the need for drug care the demand for drugs in 1957 increased by times compared with 1952. The rural population is being supplied wi prepared drugs as a planned matter. The Ministry of Health has appr. a number of prescriptions for making ready-made preparations. In 19 a special network was organized for supplying the villages with smal medicine chests.

The Ministry of Health is giving tremendous attention to the organization of control of the quality of preparations, both import and Chinese. In China before the liberation there was only a single control institute of medical preparations. During the nine years after the liberation 29 such institutes have been organized. In the pharmaceutical factories control departments and control laboratorie have been created.

In 1953, a Chinese pharmacopoiea was constructed for the first time. In 1957, an addendum was published to this pharmacopoiea, in which many approved drugs of the people's medicine were included. The second publication of the pharmacopoiea will be in 1960. A considera increase in the assortment of drugs of Chinese medicine will be provid in this publication. In 1957, a book was published, "Standards of Medical Instruments".

After the liberation of the country the training of pharmacists was expanded considerably. During the period of nine years (from 1949 through 1958 inclusive) pharmaceutical institutes of New China have graduated more than 4,000 pharmacists. In 1956-1957 the number of students in the secondary pharmaceutical schools increased by more than 3.4 times compared with 1950. In the second five-year period provision is made for the future improvement of both the administrati of the pharmaceutical industry and of apothecary matters, and, in addition, improvement of the quality of drugs.

In the next six to eight years it is proposed to increase the production of antibiotics (15 types) by 1,000 tons; of sulfonamides (12-15 types) by more than 400 tons; of antipyretics, by 5,000 tons; of vitamins, by more than 400 tons, etc.



Comrade Chu-Te in the Department of the Chinese People's Medicine at the "Revolution in the Field of Medical Technics" Exhibit

Chapter XI

Physical Culture and Athletics

Physical culture and athletics are very important factors contributing to strengthening the health of the population. In the Chinese People's Republic they are of a mass nature. The Committee of Physical Culture and Athletics has been instituted in the government council which accomplishes the supervision of physical culture on a country-wide scale. At enterprises, in schools, in villages, in the army many hundreds of thousands of adults and children are included in physical education and athletics. In 1957, 1,680,000 persons met the standards for the title "Ready for Labor and Defense". Voluntary athletic societies, circles and clubs have been organized. According to 1957 data, there were 21 athletic societies, 1600 athletic fields, 47 gyms, 258 swimming pools. In addition, there were tens of thousan of athletic clubs and circles which united more than 10,000,000 persons. It is characteristic that there are many athletes among the rural populatio For example, in one of the districts of Chechiang province there are about 1200 basketball teams; in the Me district of Kuantung province there are 333 football teams. Before the liberation of the country athletics had been poorly developed in the villages. People engaged in them here and there in the form of popular games and durin

holidays.

The daily gymnastics which have already been firmly included in the life of China, can serve as an example of the extensive development of physical culture and athletics. In China work is stopped systematically, three times a day, for 15 minutes and all the workers and employees as well as the students go out into the open air in order to perform a certain combination of gymnastic exercises which are broadcast over the radio.

Many types of athletics, which before the liberation of the country were poorly known, at the present time have been widely developed. Among them mention may be made of motor racing, sailing, shooting for sport, etc. Previously, only a few people were occupied in these types of athletics because of the costliness of the equipment. At the present time, the equipment is public property or the property of the athletic societies. Therefore, all types of athletics are becoming progressively more available to the youth and adults at large. Athletics in the Chinese People's Republic have stopped being only a spectacle and diversion for the rich. It has become an inalienable part of education of youth and serves the purposes of strengthening the health of the entire society.

During the period from 1953 through 1957 Chinese athletes

set 1,725 records for the country. In 1957 there were about 10,000 "excellent" athletes /an honorary title/.

Considerable attention has been given to the training of physical culture personnel. At the present time, there are six institutes and 15 physical culture and athletic schools in the Chinese People's Republic, in which, according to 1957 data, 3,341 students and 5,000 pupils of the secondary schools have been trained.

Exercises in physical culture and athletics are carried out under strict medical supervision. Each athlete is given a medical examination no less than twice a year, and athletes of the highest category are under the constant supervision of physicians.

Chapter I

The Planning of Scientific Research Work

In 1956, at the order of and under the direct supervision of the Government Council a prospective 12-year plan of development of science in the Chinese People's Republic was worked out. The Committee for the Planning of Scientific Research Work and for the supervision of it on a country-wide scale was created in the Government Council. In making out the 12-Year Plan (including that for medicine) eminent scientists of China participated -- representatives of the principal branches of science, the national economy, culture, etc. The 12-Year Plan of development of science is a document of great governmental importance which determines the principal routes in solving the most important national economic problems of socialistic China and a marked increase in the level of theoretical investigations. In accordance with instructions of the Central Committee of the Communist Party of China Chinese science is to achieve the progressive level of world science in a period of seven to 12 years. The Premier of the Government Council Chou En-lai said the following on this subject in his report "The Problem of the Role of the Intelligentsia" 14 January 1956:

"It is now very difficult to correctly determine how much time is required so that our science might reach the progressive world level.

However, even now we should put the following problem: Achieving a situation whereby at the end of the third five-year period the most important branches of our science might approach the level where the latest foreign achievements might be most rapidly mastered through our efforts. Given such a foundation we can make a further step forward in the matter of achieving the world level of science and technics. In order to cope with this great problem we should first of all put an end to dependent attitudes generated by a lack of confidence in our own nation".

In the report the importance of a proper interrelationship between scientific research in the field of theory and practice in the building of socialism was emphasized: "A proportionality should be observed between personnel and facilities in theoretical and technical work, in the satisfaction of the requirements of a long period of time and the requirements of the present day, in achieving a proper distribution of work and actual collaboration to avoid a unilateral development ... without having any definite scientific-theoretical research as a foundation, fundamental improvements and transformation in the field of technics are imposible. However, the growth of the theoretical forces always occurs more slowly than the growth of the technical forces. Here, the results of theoretical work, as a gener rule, are indirect, and are difficult to see right away. Specifically for this reason many comrades even now have a tendency to be near-sighted; they do not want to agree with the fact that the necessary

forces should be directed toward scientific research work and thereby that they constantly require from scientists that they solve comparatively simple practical problems for them in the field of technics and the production process. Undoubtedly, theory should in no case be separated from practice, and we should fight against all theoretical research which is divorced from practice. However, at the present time the most serious trend is the neglect of theoretical research... all ministries should most rapidly create and consolidate the scientific research structure... they should also take upon themselves the task of planned systematic familiarization with the latest achievements of world science and the organization of their practical utilization so as to contribute to the most rapid and complete equipping of our country possible with the latest achievements of world technics".

In making out the 12-Year Plan for medical science both general principles and specific problems in the development of medicine were taken into consideration. The specific problems of medical science consist primarily of the requirements of public health as determined by the need for a complete elimination of some diseases, a marked reduction in others and the successful treatment of them. This naturally requires a permanent and considerable improvement in early diagnosis, correct utilization and expansion of new technical facilities both for diagnosis and for the treatment of various diseases, the creation of new highly effective antibiotic and chemical-pharmaceutical drugs and, finally, the extensive accomplishment of prophylactic

measures on a government-wide scale with the aim of eliminating the conditions for the occurrence of various and particularly infectious diseases. However, the tasks of medical science are determined also by the necessity for the maximum development of theoretical research which might contribute to the more successful development of medicine.

In the government 12-Year Plan of scientific research work for medicine five problems have been posed the solution of which is considered of first importence, corresponding to the main course of the Communist Party and the People's Government of China:

1) The scientific development of comprehensive measures for controlling the principal diseases of our people (25 general problems);

2) The mastery of existing production process and the development of new ones as well as a search for new antibiotics, drugs, medical apparatuses and instruments (six general problems);

3) The generalization and further development of experience and theory in Chinese people's medicine (four general problems);

4) The development of comprehensive measures in the field of hygiene and safeguarding of labor; prophylaxis and treatment of the main occupational diseases and occupational intoxications (five general problems);

5) Study of the problems of the environmental hygiene of inhabited places (community hygiene), of efficient nutrition for the population and of physical culture and athletics in the Chinese

People's Republic (ten general problems).

In all the problems of the plan the idea comes out with adequate distinctness that prophylaxis in Chinese public health is the main trend. In the resolutions of the Eighth Congress of the Communist Party of China concerning the second Five-Year Plan of development of the national economy the following was written on this subject: "The most dangerous diseases for the population should be prevented in every way possible".

It was emphasized in the plan that the successful control of the main diseases is possible only with the taking of extensive comprehensive measures: "Since ancient times experience has shown that the latter are the most important and most effective trend in controlling diseases generally. Study of the etiology and pathogenesis of the principal diseases and other theoretical problems with the aim of elucidating the rules and regulations of their occurrence and development is making it possible to work out scientifically grounded methods of controlling them".

It is well known that the successful accomplishment of the plan depends on the proper organization, specific supervision and effective control of the course of scientific research work. Beginning with 1956, important scientific-organizational measures have been taken in this direction. In September 1956 the Academy of Medical Sciences was created in China. At the present time, the Academy includes ten scientific research institutes: The Institute of the Hygiene of

Labor and Occupational Diseases, The Institute of Dermatological and Venereal Diseases, The Institute of Epidemiology and Microbiology, The Institute of Parasitic Diseases, The Institute of Pediatrics, The Institute of Hematology and Blood Transfusion, The Institute of Experimental Medicine, The Institute of Pharmaceutical Institute, The Institute of Obstetrics and Gynecology and The Institute of Medical Instruments. Clinical medicine is represented in the Academy by the following institutions: the "Sehe" clinic in which investigations are being carried out on the main clinical problems; the Pekin Hospital of Endocrinology, and the Public Health Organization, the Institute "Fu chen-meng-wei", in which investigations are concentrated on problems of chest surgery, an oncological hospital and hospital of orthopedic surgery.

The total number of workers in the Academy of Medical Scienc in 1958 amounts to 4,327 persons; of these, there are 629 scientific workers (without counting house physicians, nurses and laboratory technicians); of the latter there are 132 workers with higher qualifi. ations (professors and assistant professors). The main trends in scientific research work of the Academy for 1958-1962 are the followi elimination of the "four evils"; improvement in the sanitary status o inhabited places; prophylaxis, treatment and the elimination of the most dangerous diseases; the safeguarding and consolidation of the health of the working class. In accordance with these main trends in the plan of the Academy 19 problems have been set

Scientific Research Institute of Parasitology of the Academy of Medical Sciences of the Chinese People's Republic

apart as being particularly important; the principal ones of which are the following.

1. Elimination of the "four evils" and improvement of the sanitary condition of the country. In accordance with the urgent needs of practical public health mosquitoes, flies, rats, fleas and molluscs have been included in the "four evils". Therefore, the name"four evils" has become arbitrary. The problem was posed in 1958 of scientifically generalizing on the experience of mass elimination of rats and molluscs in the main epidemic areas; of studying the species and ecology of mosquito vectors of malaria, filariasis and Japanese B encephalitis by the end of 1959, and on this basis working out measures for their elimination. In fighting for hygiene and sanitation special attention is given to the improvement of the sanitary-hygienic status of the environment. By the end of 1959 simple, generally available and effective methods of rendering innocuous wastes, excrement and of disinfection of the soil will be worked out for the elimination of ankylostomes, ascarids, etc., as well as for combatting parasitic and infectious diseases which arise as a result of contamination of the soil. By the end of 1960 it is planned to solve such problems as the disinfection of commercial domestic sewage in cities, disinfection of water for the purpose of irrigating fields, purification and disinfection of drinking water in rural localities and unreclaimed areas. It is intended to carry out investigations at this time on the development of sanitary-hygienic

standards for the atmospheric air and inhabited places, hygienic standards . . . at industrial enterprises, chiefly metallurgical, for the preparation of nitrogenous fertilizer, cement, and synthetic fiber. The development of projects of rural constructions has been planned which would satisfy economic and hygienic requirements.

2. Looking for effective methods and facilities for prophylaxis and treatment of malaria. In 1958, research was carried out on a considerable scale for the purpose of clarifying the epidemiology of schistomiasis and the improvement of comprehensive therapeutic and prophylactic measures. The investigation of reservoirs of diseases among domestic animals was continued. In the same year, investigations were carried out in the field of looking for methods of eliminating the main vectors of malaria in mountain and plain areas as well as effective comprehensive measures controlling this disease. The problem has been posed of eliminating these two diseases, by and large, in many parts of the country by the end of 1960.

3. The problem of natural focalization of plague and the prophylaxis of brucellosis. It is intended to complete the investigation of natural foci of plague and areas of brucellosis epidemics by the end of 1960 and work out a plan of controlling these diseases so that by the end of 1962 epidemics of brucellosis might, for the

most part, be eliminated and the natural foci of plague be destroyed.

4. The problem of malignant tumors.

5. The problem of cardiovascular diseases.

6. The dysentery problem.

7. The problem of virus diseases (Japanese B encephali influenza, poliomyelitis and measles).

8. The problem of hygiene of labor and occupational diseases.

9. The study of drugs and a search for new antibiotics.

The main efforts in the field of looking for new antibiotics will be directed at a study of antivirus and anticancer antibiotics as well as antibiotics with a broad spectrum of action. It is proposed to obtain effective antibiotics against cancer in 1959 as a result of the study of 100,000 selected strains of microbe antagonists.

In the field of study of medicinal plants the problem has been posed of making a pharmacological study of 500 plant species by 1960 which are most frequently used in the people's medicine and 100 types of comprehensive medicines in the Chinese people's medic (complex prescriptions).

10. The problem of a planned birth rate. The problem

has been posed of improving existing contraception methods and looking for new, more effective agents by 1960 by means of studying the drugs used in the Chinese people's medicine, the synthesis of chemical preparations and immunization with sperm.

11. The problem of new medical technics. Considerable attention is being given to the problem of mastering and developing modern medical apparatuses, instruments and medical equipment. The problem has been posed of extensively incorporating isotopes and other of the latest achievements in the field of physics, chemistry scientific research work and biology into by the end of 1960.

In the plan of measures developed by the Academy of Medical Sciences of the Chinese People's Republic on the organization of scientific research the need has been emphasized for intimate collaboration in scientific research work on the problems mentioned above, particularly on the elimination of the main diseases and on the study of the Chinese people's medicine. Complete experimental research and clinical observations on problems of the Chinese people's medicine has the aim of evaluating the efficacy of its methods and facilities and of uncovering the mechanism of their action. Investigations on these problems are being carried out in complete accordance with the instructions of the Central Committee of the Communist

Party of China -- to master, study and systematize completely the experience of Chinese people's medicine and to achieve a further development of it.

Among the scientific-organizational measures which provide [illegible] for the successful accomplishment of the plan the coordination of scientific research work and the organization of comprehensi investigations on the most actual problems of medicine are of great importance. The accomplishment of these measures will make it possible to utilize the scientific medical personnel of the country most properly and effectively, to direct their creative efforts toward the solution of the main problems of theory and practice of medicine The Ministry of Health and the Academy of Medical Sciences of the Chinese People's Republic in recent years have carried out considerable work in this direction. We should like to present certain exam

In the field of coordination of scientific research considerable progress has been made on the problem of schistosomiasis. In many scientific institutions and at chairs of medical colleges comprehensive investigations have been organized for the active participation of medical workers in practical institutions. Thus, the chair of epidemiology of the First Shanghai Medical Institu is carrying out investigations on prophylaxis of schistosomiasis in

close collaboration with many institutions, including with workers of the district medical institutions of the Shanghai Rayon and of Ch'iangsi and Anhuei provinces. In the course of the scientific collaboration the effectiveness of the agents and methods of prophylaxis of schistosomiasis which are being worked out in the laboratories is checked by combined efforts, the plans of concurrent scientific research work are made more precise and are altered. In the Second Shanghai Medical Institute research on schistosomiasis is being carried out at ten chairs with the participation of medical workers of one of the districts. Through the combined effort of the chairs of hospital therapy and hospital surgery important problems of the treatment of the late stages of schistosomiasis are being solved by drugs and surgical methods.

At the Szuch'uan Medical Institute a special scientific research brigade has been organized from the workers in six chairs. The scientific duties are clearly distributed between the chairs, and meetings of the brigades are held systematically for the discussion of the results of scientific work and the determination of the current research problems, etc.

Comprehensive research is being conducted successfully on problems of labor and occupational diseases. In the First Shanghai Medical Institute the chairs of the hygiene of labor, internal medicine, roentgenology, pathology and the Shanhai Sanitary Epidemiological Station are participating in the scientific research on this problem.

A study is being made of occupational hazards in the lac industry and silicosis in the coal and other mines in the provinces of

Chiangsi and Anhuei.

In the Wuhan Medical Institute nine chairs are participating in comprehensive investigations on this problem, including clinical chairs of surgery and internal medicine. At one of the large metallurgical combines a study is being made of the problem of overeating in hot shops. Investigations are being made in the following directions:

a) A study of working and resting conditions in three hot shops and in a glass-blowing shop;

b) A study of metabolism in the workers (basal metabolism and salt metabolism);

c) A study of the blood composition when an increased quantity of salt (NaCl) is taken with the food and water;

d) A study of the composition of the food rations of workers, particularly the content of proteins, carbohydrates, calcium, vitamins and others;

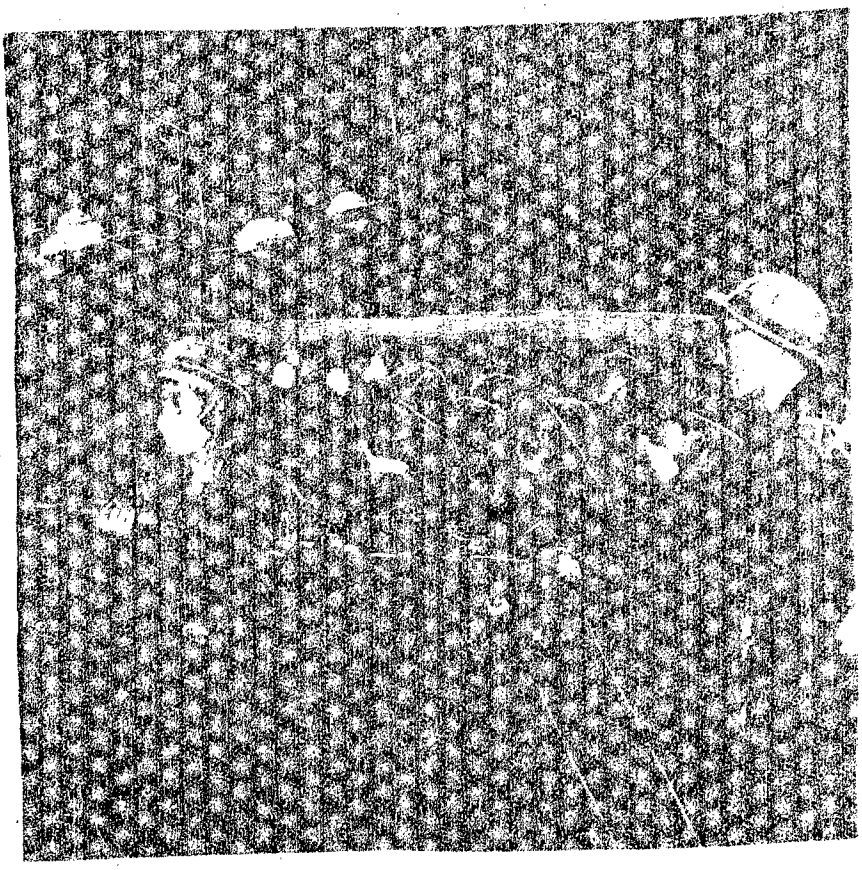
e) A study of the tone of the peripheral blood vessels and the minute volume [the word "metabolism" was written here, but volume is intended] of blood in the extremities;

f) The effect of high temperature on the filtration power of the kidneys;

g) Biochemical investigations of the content of acetone lactic acid, nitrogen, etc. in the sweat;

h) The accomplishment of a number of experimental investigations on animals under high temperature conditions;

i) A study of the total morbidity rate of the workers.



Scientists of a Research Detachment for the Study of Silicosis Familiarize Themselves with the Use of the Pneumatic Drill by Workers in the Tangch'ishang Tungsten Mines (Province of Ch'iangsi).

From the list of topics presented it is seen that the plan of research work was thought out seriously and has a strict scientific-practical purposefulness. The investigation material was enriched-also generalized, and on the basis of it specific suggestions were worked out for sanitizing the working conditions and for making relaxation and nutrition more efficient (normalization of salt metabolism, reduction of fats in the food of the workers and an increase in the carbohydrates, vitamins, calcium, etc., the incorporation of a new work routine of operation -- frequent interruptions over the course of the work day, etc.

Positive experience is available from comprehensive research on the problem of endemic diseases. As is well known, in a number of provinces of Chinese People's Republic certain epidemic diseases constitute a high proportion of the total morbidity rate. Investigations on this problem should be carried out in many directions: an epidemiological investigation and a record of the morbidity rate in unfavorable areas, a study of the causes of endemics and of clinical symptomatology, the development of comprehensive prophylactic and therapeutic measures, etc. As a positive example, mention may be made of the comprehensive research on this problem being carried out at the Hsian Medical Institute. In this

Institute a scientific composite brigade has been organized for the study of ta ku-tse disease (Urov's disease /endemic deforming osteoarthritis/). Chairs of hygiene, internal medicine, surgery, microbiology, pathology, biochemistry, roentgenology and the provincial sanitary epidemiological station are participating in the research work. The research is being conducted selectively in the most unfavorable areas. According to preliminary data of the brigade, ta ku-tse is widespread in the 42 districts out of 90 in the province. The highest morbidity rate is noted in the northern mountainous regions of the province. As a result of comprehensive investigations important data have been obtained concerning the distribution of this disease, the characteristics of its clinical course, the pathological changes in the bones, etc. Experimentally, a successful study is being made of problems of the etiology of this disease.

I daresay, the most important problem for the comprehensive investigation is that of drugs. In recent years, investigations in this field have been given a broad scope in a quantitative and qualitative respect. Many scientific institutions and chairs of medical colleges are carrying out investigations on the main trends: the synthesis of new chemical preparations and the perfection of existing

ones; the creation of new drug forms; the isolation of active chemically pure substances from medicinal plants and particularly from those which are widely used in the people's medicine; experimental and clinical checking of the extracts, infusions, pills, etc Under these conditions, coordination and comprehensiveness of scientific research are acquiring exceptionally great importance, because only with the proper organization of the scientific reseaxc work can the correct distribution of scientific personnel and the most rapid incorporation of modern scientific methods into research work be assured and, by the same token the acquisition of scientifically grounded results. Corversely, a deconcentration of scientific forces leads to an unnecessary parallelism and in many cases to an ineffective expenditure of money and materials. The Ministry of Health and the Academy of Medical Sciences of the Chinese People's Republic are applying great efforts so that research on the study of drugs might be most efficient and effective. As positive experience in the work mention may be made of comprehensive investigations conducted at the Ssuch'uan, Wuhan, Canton Medical Institutes and others.

Chapter II

Some Problems of Experimental and Clinical Medicine

In this chapter we shall dwell on some examples characterizing the level of scientific research work and the progress made on various problems of experimental and clinical medicine.

Experimental Arteriosclerosis. Investigations in this field have been begun entirely recently. In 1958 the main biochemical investigations of the blood were mastered. Thus, in the department of biochemistry of the Academy of Medical Sciences of the Chinese People's Republic methods were developed of determining lipoprotein, phospholipid and cholesterol in the blood. In the department of pathology an experimental model of arteriosclerosis was reproduced in rabbits. In this department investigations are being carried out on the topics listed below.

1. The effect of physical exercise on the development of experimental arteriosclerosis in dogs. Fifty grams of egg yolk and one gram of thiouracil daily are added to the food rations of experimental dogs in addition to the usual food products. In cases where the cholesterol level in the blood does not reach 450 milligrams percent vegetable oil is added to the food. The experimental dogs are divided into four groups. A definite routine of physical exercise has been

established for each group.

First group -- running at a rate of 24 kilometers per hour. The experiment is repeated four to six times a day, twenty minutes each.

Second group -- running at a rate of eight kilometers per hour. The experiment is repeated four times a day.

The state of rest. The diet of all three groups is the same.

Fourth group -- the experiment is performed in a state of rest without the addition of thiouracil to the food.

According to preliminary data, in severe physical exercise and with a definite diet with an excess of lipoid substances the process of arteriosclerosis in the aorta and large blood vessels develops considerably more rapidly than in the control experiment. In experimental dogs there is a considerable increase in the level of lipoproteins and cholesterol in the blood. The ultimate purpose of the investigation is of a systematic study of the blood biochemistry and the pathological examination of the coronary blood vessel, the cerebral blood vessels, the blood vessels of the kidney and aorta.

2. Arteriosclerosis in rats, brought about by feeding cholesterol with an insufficiency of iodine. The investigations were begun recently.

3. The development of arteriosclerosis in mice with increased cholesterol in the diet against the background of experimental neurosis.

4. The development of arteriosclerosis in rats with a disturbance of the liver function. A number of investigations have been provided on this topic in the first stage of the work: feeding pure cholesterol to the experimental rats in the presence of a normally functioning liver; the addition of thiouracil to the cholesterol diet; reproduction of experimental cirrhosis of the liver with a chemical agent (carbon tetrachloride in a dose of 0.1 cubic centimeter twice a week); resection of the major portion of the liver with a biochemical investigation of the blood for its content of lipoproteins and cholesterol. The experiments are being carried out on five groups of rats. In the first group the rats are given 30 cubic centimeters of cholesterol and three cubic centimeters of thiouracil; the second group is not given thiouracil; in the third group, the rats with cirrhosis of the liver are given 30 cubic centimeters of cholesterol and three cubic centimeters of thiouracil; in the fourth group, for the purpose of reproducing cirrhosis of the liver, the dose of carbon tetrachloride is increased to 0.2 cubic centimeter; the duration of the experiments is lengthened to 33 weeks; the fifth group is the control.

Some preliminary data have been obtained. Thus, for example, when rats are given thiouracil a hyperplasia of the thyroid gland epithelium occurs quite quickly. After the administration of carbon tetrachloride in a dose of 0.1 cubic centimeter a fibrous hyperplasia of the liver tissue is noted after six weeks, and after eight to ten weeks, a cirrhosis of the liver in a mild form. With a dose of carbon tetrachloride of 0.2 cubic centimeter the cirrhosis of the liver was expressed to a greater degree.

In the internal medical department of the Academy of Medical Sciences of the Chinese People's Republic a study is being made of the cholesterol level in the blood serum of healthy persons and those sick with arteriosclerosis as well as the significance of the changes in the electrocardiogram of persons investigated before physical exercises and after them. It is believed that the electrocardiographic data represent an important diagnostic sign for the early detection of arteriosclerosis. The cardiorenal laboratory of this department has suggested a micromethod for determining the quantitative content of cholesterol in the blood. In the use of this meth (in contrast to the Abell method) a total of 0.02 cubic centimeter of blood is required, which is taken from the finger by means of an ordinar puncture. The blood is applied to filter paper and dried, after which

it is subjected to examination for its cholesterol content. According to laboratory data, the difference in the cholesterol level determined by this method and the Abell method varies within limits of ± 10%. The method is technically simple and is readily available under conditions of rural hospitals and outpatient departments. Where there are no biochemical laboratories the blood tests are sent to the appropriate places, where there are such laboratories.

Cirrhosis of the Liver and Primary Carcinoma of the Liver. According to the data of Chinese physicians, hepatitis and cirrhosis of the liver are of a comparatively high proportion in the population's morbidity rate. This apparently, ... to some degree, is brought about by the extensive distribution of certain parasitic diseases. It is well known, for example, that in patients with schistosomiasis in the late stages quite frequently atrophic cirrhosis of the liver is encountered with extensive degenerative changes of the liver cell. A relatively high percentage of primary carcinoma of the liver is also noted.

According to the data of the chair of pathology of the Sun Yat-sen Canton Medical Institute, in 3,510 autopsies (in eight years) primary carcinoma of the liver was encountered in 31 cases (0.9 percent), which exceeds the data of European authors by six times (0.14 percent). With respect to the total number of carcinomatous

lesions primary carcinoma of the liver amounts to 24 percent, while according to the data of European authors, it is 1.2 percent. The data of this chair are in agreement with the general data for the entire country. Thus, according to the material of the Society of Chinese Pathologists, in 988 autopsies of persons who died from carcinoma primary carcinoma of the liver was found in 26 percent of the cases; carcinoma of the lungs, in 18 percent; carcinoma of the stomach, in 17 percent; carcinoma of the cervix, in 3.5 percent, et According to the data of this chair, the average ages of patients with primary carcinoma of the liver amount to 41 years; according to the data of foreign authors, 50-60 years. Not uncommonly, primary carcinoma of the liver is found in newborn children; thus, in five out of 31 cases it was found in newborn children and children 38 days, five months, one year and three years of age. In all these cases the tumor was of a large size in the form of a solitary nodule (massive form of carcinoma). In elderly people such a form of carcinoma is rarely found. In them multiple nodules predominate, as a rule, against the background of cirrhosis. Apparently, some parasitic diseases of the liver can be one of the etiological factors in primary carcinoma of the liver. It is possible that the development of primary carcinoma of the liver in the newborn and in children is

associated to some degree with infectious hepatitis in the mother. There is basis for the belief that the development of primary carcinoma of the liver in adults is associated with cirrhosis of the liver. However, this requires further study.

At the chair of pathology of the Sun Yat-sen Canton Medical Institute very interesting experimental research is being conducted on the morphogenesis of cirrhosis and primary carcinoma of the liver. Investigations in this area are being accomplished in a number of directions: study of the morphogeny and etiology of primary carcinoma of the liver in connection with cirrhosis of the liver; infectious hepatitis and primary carcinoma of the liver; morphological differences between atrophic cirrhosis of the liver of infectious origin and cirrhosis of the Laennec type; an experimental reproduction of a model of acute necrotic hepatitis and the elucidation of the part played by the latter in the pathogenesis of primary carcinoma of the liver.

Experimental research at the chair in reproduction of cirrhosis and primary carcinoma of the liver is being carried out on white mice. For this purpose 400 mice are used. In the first group, the experimental mice are given mixed food; in the second group, only rice. Both groups of mice are subjected to the effect of carbon

tetrachloride. Part of the mice are sacrificed after two, four, seven and fourteen days. Acute liver necrosis in the autopsied mice develops usually several days after the administration of carbon tetrachloride, with equal frequency in both groups. Cirrhosis of the liver develops, as a rule, 11 weeks from the beginning of the experiment. In its morphological picture it very much resembles cirrhosis in man. In 15 mice a tumor was found against the background of cirrhosis. The histological picture of these tumors has not yet been established. However, in some cases it resembles adenoma.

Cirrhosis of the liver is being studied also at the chairs of internal diseases of the First Shanghai Medical Institute (clinic laboratory investigations). The investigations have the aim of developing methods of early diagnosis and evaluation of the working capacity of the patient. In patients with cirrhosis of the liver a study is being made of the efficacy of treatment with glutamic acid.

At the chair of pathology of this institute investigat are being carried out of involvement of the liver in schistosomiasi Specifically, a study is being made of the pathological picture of atrophic cirrhosis. According to the autopsy material it has been established that the stage of atrophic cirrhosis is preceded by a

suppurative process in the liver tissue (necrotic changes as a result of blockage of blood vessels with schistosome eggs) and the proliferation of the interstitial tissue. Primary carcinoma of the liver in atrophic cirrhosis is encountered very rarely.

At chairs of the propedeutics of internal diseases and of faculty internal medicine of the Second Shanghai Medical Institute treatment of acute and chronic hepatitis is being accomplished successfully, as is also that of the initial forms of cirrhosis of the liver with large doses of testosterone. Fair results have been obtained with glucose and insulin treatment.

Some Problems of Physiology, Pathophysiology and Biochemistry. In the department of physiology of the Academy of Medical Sciences a study is being made of the effect of high temperatures on gastric secretion. Experimental animals (dogs) are put into a chamber at a temperature of 40° for two hours. The total duration of the experiment is 40-55 days. Daily investigations last five to six hours. The secretion curve of the stomach is being studied on the isolated stomach pouch according to the method of Pavlov's conditioned reflexes. The natural stimulus is the appearance and odor of meat; the reinforcement is 100 grams of beef.

These investigations have the aim of clarifying the condition

of gastric secretion in workers occupied in industries with high temperatures.

In this department, interesting investigations are being made on the problem of the pancreatic cells which elaborate lipocaic. The idea that this enzyme is elaborated in cells of the α-islets of Langerhans is far from being always confirmed in the experiments of the department. The investigations are still incomplete. A study is also being made of the problem of the association between the enzymogenic granules of the pancreas and the enzymes aminase, amylase and lipase.

In the physiology laboratory of the clinical department of the Academy of Medical Sciences a study is being made of the mechanisms of action of alloxan and histamine. It has been accepted that alloxan acts on the pancreatic function reflexly through the central nervous system. Experiments with histamine were carried out according to the well known Chernigovskiy method. A conditioned reflex was formed to the injection of histamine in a Pavlov pouch after 20-27 combinations and after five combinations in a pouch which had been formed from the lesser curvature. The histamine experiments confirm the fact that the effect of histamine on the gastric secretic is accomplished through the central nervous system.

In this same laboratory interesting experiments have been performed on 230 rabbits which had the aim of studying the acetylcholine level in shock under various experimental conditions. With the application of a tourniquet above the site of trauma no shock occurs; the level of acetylcholine in the blood does not increase; procain block and ligation of the blood vessels above the site of trauma do not prevent shock. In experiments on 165 dogs data have been obtained according to which there is an increase in the acetylcholine level in inhibition of the central nervous system. If the same dogs are given an injection of acetylcholine without a preliminary inhibition, a typical picture of inhibition occurs which is similar to that which develops after the effect of other factors on the central nervous system. In this laboratory a model of adenocarcinoma of the ovaries of the hamster has been reproduced, after transplantation of these ovaries in the pancreas and under the influence of estrogens in combination with conflicts of the higher nervous activity.

In the biochemical laboratory of the clinical department of the Academy of Medical Sciences practically important biochemical methods of diagnosis of certain diseases of the endocrine glands have been worked out. Of these methods mention may be made of those such

as the determination of the gonadotrophic hormone of the hypophysis (the activity of the hormone excreted in the urine is checked on white mice); a determination of the 17-ketosteroids in the urine and of 17-hydroxycorticosterone in the blood and in the urine; the interrelationship between albesterone /aldosterone ?/ and edema, etc.

At the chair of physiology of the First Shanghai Medical Institute investigations which deserve attention are being carried out on problems of interoception, particularly on the role of lung interoceptors in the regulation of respiration.

Investigations being conducted at the chair of faculty internal medicine of the First Shanghai Medical Institute, the theoretical basis of which is the teaching of N. Ye. Vvedenskiy of the dominant and of I. P. Pavlov of static pathological foci, are very interesting. In guinea pigs following the amputation of the hind paw and with an additional mild stimulation (slight compression of the neck) typical epileptic attacks developed. For the purpose o eliminating the attack extracts from the plant Gastrodia elata and glutamic acid have been used successfully. The use of the latter considerably reduces the ammonia content in the blood. On the basis of these data a study is being made of the effectiveness of glutamic

acid in the treatment of patients with epilepsy. At this chair it has been determined that the prolonged use of isoniazide (isonicotinic acid hydrazide) leads to some endocrine disorders (in men a hypertrophy of the breasts develops).

At the chair of biochemistry of the Second Shanghai Medical Institute it has been shown that isoniazide reduces the concentration of cortisone and hydrocortisone in the urine. Apparently, under the influence of isoniazide these hormones are retained in the body and exert their therapeutic effect. If mice from which the suprarenal glands have been removed are given cortisone for a week, the glycogen disappears from the liver by the eighth day; if, simultaneously with cortisone, isoniazide is administered, the glycogen is restored to the liver. It is believed that isoniazide delays the destruction of cortisone; therefore, it is considered expedient to use isoniazide in combination with cortisone. At this chair data have been obtained on the fact that the administration of glutamic acid to a patient with epilepsy lessens an attack and reduces the quantity of ammonia compounds in the blood. The mechanism of this effect has not yet been clarified.

At the chair of biochemistry of the Wuhan Medical Institute a study is being made of the effect of a tissue implant on the function of the suprarenal gland. Tissue implants are made in the form

of extracts of splenic and liver tissues (dogs and men). It has been made clear that tissue implants, like decorticosterone, increase the function of the suprarenal glands. The effect of the tissue extracts has been checked on a number of animals. The activity of the extracts was judged by the quantity of 17-ketosteroids and cholesterol excreted in the urine. Under the influence of the extracts the quantity of ACTH is increased markedly. However, the effect lasts 90 minutes in all, after which the ACTH level drops to the original. After the removal of the hypophysis the effect of tissu extracts stops. The active agent isolated from tissue extracts has been called hypophysotropic. It is heat stable. It is not destroyed at 130°, readily passes through a cellophane membrane, does not dissolve in ether, but dissolves readily in 90 percent aceton is readily absorbed by proteins and is readily separated by boiling th latter, is comparatively easily adsorbed by charcoal, but it is not possible to separate this substance from the charcoal. The hypophysotr agent is stable with respect to acids and less stable with respect to alkalis. In the opinion of the workers in the chair this substance is not of protein origin; and the presence of nicotinic or fumaric acid in it has been excluded also. The extraction of a chemically pure substance from tissue extracts is being continued. The effect of the

hypophyseal substance was studied after the operation of resecting the suprarenal gland in a patient because of a tumor (the other suprarenal gland was atrophic). It was shown that this substance is more effective than ACTH and ketosterone; however the effect is expressed only in the time it is used. When the administration is stopped the signs of suprarenal gland insufficiency return.

According to the data of this chair, glutamic acid does not noticeably influence the ammonia level in the blood.

Investigations on the problem of protein chemistry and the preparation of denatured protein preparations from the blood of animals for medical purposes are of important theoretical and practical significance. Scientists of the Academy of Medical Sciences have perfected methods of fractionating proteins of the blood plasma of man and the cow. Because of these methods albumin, gamma-globulin, prothrombin and fibrinogen have been obtained in pure form. Studies have been completed successfully on the elimination of antigenic properties in certain fractions of serum proteins from the blood of cows. It has been established that albumin deprived of its specific antigenic properties can be injected into the human body parenterally entirely safely in the form of a solution. This is of great import-

ance in the treatment of protein insufficiency and in the case of large blood losses.

In the Wuhan Institute of Vaccines and Sera studies have been carried out for a number of preparations from the blood of animals (cows, hogs, sheep). These preparations have been checked since 1956 in the hospitals of the Wuhan Medical Institute in the treatment of certain chronic diseases (schistosomiasis and others) and in some surgical operations. Initially, the use of therapeutic serum of animals for surgical operations produced complications, the most unpleasant of which were considerable capillary hemorrhages in the area of the operative wound and the formation of large hematomas in cavities. In connection with this, the use of therapeutic serum in surgery has been temporarily stopped. After the perfection of the serum and checking of it on monkeys it again began to be checked beginning with April 1957. The preliminary data show that the therapeutic serum is effective in the treatment of schistosomiasis in the late stages and in other chronic diseases. In the case of protein insufficiency and a disturbance in the albumin-globulin ratio the administration of therapeutic serum considerably raises the level of protein in the blood and normalizes the interrelationship of albumin and globulin. The reactions to the injection of therapeutic

serum are the same in their nature and strength as in the case of use of therapeutic Belen'kiy serum. These reactions in a number of cases disappear comparatively quickly. The slow administration of therapeutic serum, the preliminary intravenous injection of 0.5 percent solution of novocain or the injection of diluted therapeutic serum in five percent glucose solution represent prophylactic measures against the occurrence of reactions.

After a single infusion of therapeutic serum in large doses it has been determined that it does not exert any toxic effect on internal organs; the percentage of reactions does not exceed the number of reactions from blood transfusions by much; the quantity and quality of reaction depend on the rate of administration of the therapeutic serum; cases of anaphylactic shock are observed; the serum from the blood of hogs is less toxic than the serum from the blood of cows.

In the case of prolonged and repeated administrations of therapeutic serum for chronic diseases it has been determined that anaphylactic reactions are observed comparatively rarely and, in the majority of cases, have a mild course; the therapeutic serum is non-toxic; its antigenic properties are expressed only weakly; the reaction depends to a certain degree on the patient's age and the nature of the

disease; the protein of the therapeutic serum is well assimilated by the body, particularly in the case of protein insufficiency. Good results have been obtained in the treatment of cirrhosis of the liver. Beginning with 1958 a study has been done of heterogeneous proteins from the blood of animals at the Institute of Hematology and Blood Transfusion of the Academy of Medical Sciences of the Chinese People's Republic.

Some Nutritional Problems. Over the course of a number of years and particularly in recent years important research work has been carried out at the Academy of Medical Sciences (prior to 1956, at the Central Scientific Research Medical Institute) on the determination of the chemical composition of the principal food products of China and primarily of products of plant origin. On the basis of the data obtained a Table has been made out and published (the second publication was in 1955), in which a detailed characterization is given of 450 types of food products of the Chinese population, for example, rice, beans, vegetables, berries, fruits, nuts, mushrooms, as well as eggs, milk and meat. In the Table a characterization is given of certain types of food products used as food by the population of regions of the national minorities. For each type of food product an indication is given of the content of salt, vitamins, trace elements

etc. Data are also presented concerning the results of thermal processing of certain types of food products. In connection with the fact that the population of a number of regions of China uses food products prepared from wild plants in considerable numbers, data are presented in the Table concerning 70 types of these products.

Important work has been carried out on the composition of amino acids in cereals and beans. It has been determined that in food products of plant origin a sufficient quantity of amino acids is contained with the exception of methionine.

Preliminary data obtained experimentally have shown that proteins of plant origin are assimilated just as well and sometimes better than animal proteins. From this point of view investigations on the rate of splitting of the protein matter in plants in vitro and in vivo are of definite interest. It has been determined that the more rapidly the splitting of proteins proceeds in vitro the more rapidly the process is accomplished also in vivo.

Investigations on the determination of riboflavin, vitamin A, vitamins of the B group, etc. in plant products are very interesting. It has been noted that, despite the poor content of riboflavin in plant food, its quantity, excreted in the urine after the use of this food, is approximately the same as after using food products of animal

origin as nutrition. Apparently, riboflavin synthesis in plant food occurs in the human intestine from starch.

It is well known that among Chinese anemia is rarely encountered despite the insufficiency of animal food. As it is believed, vitamin B_{12} is contained in fermentative products, for example, in bean sauce. Bean sauce /soy bean oil/ is one of the favorite condiments in the food of Chinese.

Considerable attention is given to the study of the problem of methods of processing food products which would assure the preservation of the principal nutrient substances in them and methods of keeping them, etc.

Beginning with 1957, investigations on food intoxications have been carried out in the Academy of Medical Sciences of the Chinese People's Republic. A study has been made of salmonella contamination of egg powder during the course of preparing it in the factory. For the next few years investigatinns have been planned for developing nutritional standards for the Chinese people and particularly for children with consideration of the conditions and the possibilities of the country. A study of the chemical compositio of cereal products as well as of fresh-water fish, etc. will be continued.

Beginning with 1953 investigations have been carried out on the preparation of a complete substitute for cow's milk. At the present time, such a substitute has been obtained. The main ingredients are rice, soy, a powder made of egg yolk, etc. The industrial production of this substitute has been begun. The completeness of the food value of this substitute has been checked in observations on children. It has been determined that in its composition and in its degree of nutrition it is not much different from natural dairy products. This substitute, when used to feed children of suckling age, does not cause any disorders in digestion and is easily assimilated.

Investigations on the nutritional problem are being carried out also in other scientific research institutions. At the chair of biochemistry of the Canton Medical Institute imeni Sun Yat-sen they are being carried out in the following directions:

a) A study of the chemical composition of food products used by the population of Canton and certain groups of workers;

b) Study of metabolism;

c) Study of avitaminoses and hypovitaminoses.

As a selective study of the nutrition of inhabitants of Canton has shown, the content of vitamin C, B_1 and P in the food

products is within normal limits; that of vitamin B_2, below normal. The content of vitamins B_1, PP /nicotinic acid/ and riboflavin in rice depends on the manner of processing it and the variety of it. A study was made of 100 types of food products for their content of vitamin C and B_2. It has been determined that all of the food products as studied in vitamin C is present in large quantities. According to preliminary data, the vitamin B_2 content in green vegetables is two times greater than in preserved and cooked vegetables.

Chapter III

Problems of Experimental and Clinical Oncology

Experimental oncology is still in the stage of study and of mastering modern scientific methods. This mastery has been accomplished at rapid rates, and one may be sure of the fact that in the very near future the level of research work in the field of this important and complicated problem will reach the progressive world level.

In the department of pathology of the Academy of Medical Sciences of the Chinese People's Republic a study is being made of the effect of disturbances of the central nervous system on malignant tumors, the characteristic of the histological structure of the nerve endings in tumor tissues, and work has been begun on the reproduction of models of sarcoma, Ehrlich carcinoma, carcinoma of the breast, etc. In cooperation with biochemists research is being conducted on the study of enzymes in tumor tissues. Along with the department of antibiotics a study of certain microbe-antagonists with an antineoplastic effect is being studied on experimental models.

In Ssuch'uan Medical Institute investigations are being conducted on the cancer problem comprehensively at chairs of pathology, surgery, biochemistry, microbiology and roentgenology. Aside from the usual concurrent work

the scientific brigade is making investigations on experimental oncology. At the present time, all modern methods of experimental oncology are being mastered, including methods of tumor tissue culture and methods of biochemical research. Attempts are being made at grafting transplants of human tumors. The tissue of the human tumor is introduced under the skin of animals in the form of a ground up mass. It is hard to speak of the results of this work as yet because of the brevity of the observation period. In the first experiments on 900 animals (white mice and rats) it was noted that 10-20 days after the grafting the tumor tissue was alive in 22 experimental animals: the carcinoma cells maintained their structure and are well stained with hematoxylin, true enough somewhat paler than in the fresh biopsy material. Karyokinesis of the carcinoma cells was found in transplants of three animals. It was possible to passage carcinoma cells from eight animals, including triple passages from three animals. In the carcinoma cells of the second passage there were no morphologic changes noted; in the tissues of the third passage the carcinoma cells were absorbed in an intensified manner and replaced by connective tissue. X-irradiation has no influence on the acceptance of the heterotransplants if the experimental animals are given

cortisone after the grafting. In such a transplant the cells multiply in an active fashion and proliferate into the normal adjacent tissue. The heterotransplantation is more successful in the late stages of carcinoma with metastases. Cultivation of carcinoma cells is accomplished on chick embryos, cardiac muscles and subcutaneous tissue. The experiments have not yet been successful. Experiments with acellular filtrates of human carcinoma has not given any results either.

At the present time, research on experimental oncology has been extensively developed and is being carried out in a number of cities of the country. A special oncological clinic with an experimental division has been organized in the Academy of Medical Sciences.

Research is being conducted for antitumor preparations from drugs of the Chinese people's medicine. Assistant Professor Sung Hung-chao, a gynecologist, has, as an experimental matter, been studying the antitumor effect of one of the people's medicines — Lithospermum erythrorhizon. Preparations from this plant have been tested in the treatment of chorionepithelioma in six patients. The preliminary results show that the preparation inhibits the development of the tumor and improves the general condition of the patients. A certain antitumor therapeutic effect has been

determined in the so-called "white people's medicine" named "yunnan". Workers of the oncological hospital have designed a new radium applicator for the treatment of carcinoma of the nasopharynx. The use of this applicator is more convenient; the therapeutic effect is apparently greater than those from existing applicators.

From the clinical divisions of oncology great progress has been made in the field of surgery of carcinoma of the esophagus. In the former surgical clinics of the Sehe Medical Institute and in the hospital of thoracic surgery and internal medicine of the Academy of Medical Sciences 542 patients with carcinoma of the esophagus have been observed in the past 10 years. The majority of the patients (95 percent) are inhabitants of the northern provinces of China. The consumption of rough, hot and dry food, which is poorly masticated and rapidly swallowed, is characteristic of the inhabitants of these provinces. These data have been confirmed by an investigation made of the inhabitants of four provinces of North China: it has been determined that the number of patients with carcinoma of the esophagus in these provinces is considerably greater than in the provinces of Central and South China; of the four provinces of North China the greatest morbidity rate from carcinoma of the esophagus is observed in Shansi Province.

In the hospital of thoracic surgery of the Academy of Medical Sciences thoracoplasties have been performed on 411 patients. Of these, a union of the tumor with the posterior wall of the stomach and the descending aorta was found in 32 patients; in 32, there were diffuse metastases into the pleural and retroperitoneal lymph nodes; in eight, metastases to the liver. The localization of carcinoma of the esophagus is not a contraindication to a radical operation. In the majority of cases it is possible also when it is localized in the upper portion of the esophagus. Of the 200 patients on whom a radical operation was performed, 29 died in the hospital, which amounts to 14.5 percent. The highest postoperative mortality rate was noted from operations in the central portion of the esophagus; with operations in the lower and cardiac portions the mortality rates are almost the same (11.7 and 11.1 percent).

In the past 10 years the postoperative mortality rate has been reduced considerably: from 31.4 percent in 1947-1948 to 14.4 percent in 1948-1956. In the past 62 radical operations performed in the hospital of thoracic surgery and internal medicine there has not been a single fatal outcome. The main causes of the postoperative mortality are perforation and hemorrhage at the site of the anas-

tomosis, pulmonary edema and bronchopneumonia, embolism of the pulmonary artery, renal and hepatic insufficiency. With the improvement of anesthesia and the extensive use of antibiotics the number of complications has been reduced considerably.

The late results are characterized by the following figures: of 135 patients followed for a year 88 were alive of 119 patients followed up to three years, 32 were alive; of 94 patients followed up to five years, 16 patients were alive.

The fact deserves attention that patients without a trial thoracotomy live for an average of 9.4 months, and after a trial thoracotomy, two years and eight months. This fact has not been explained.

According to material obtained in the surgical treatment of carcinoma of the esophagus, great variety in the morphologic picture and in the developmental process of this disease has been determined. The director of the Hospital of Thoracic Surgery and Internal Medicine, Professor Wu In-kai has worked out an original classification for carcinoma of the esophagus. The material of a careful study of 100 patients on whom a radical operation was performed was made the basis of this classification. Carcinoma of the cardiac portion of the stomach and of the

glandular portion of the lower third of the esophagus have not been included in this classification. According to the classification of Wu In-kai, carcinoma of the esophagus is divided into five types: cirrhous, fungating, medullary, ulcerative and infiltrative.

The Cirrhous Type. The tumor has the shape of a ring or a short tube measuring from 1.3 to five centimeters. With this type, as a rule, a constriction of the esophageal canal is noted and a considerable dilatation of it above the site of constriction with a hypertrophied wall. In the area of the tumor clearly expressed mucosal folds are formed. The surface of the tumor is uneven, nodular, and ulcers are sometimes found. The histologic structure is characterized by the following features: the massive connective tissue of the tumor is permeated by carcinoma cells in the form of islets, streaks and fine bands; the carcinoma tissue is massive, and it deeply infiltrates the muscle layer of the esophagus. In all cases the carcinomatous infiltration penetrates the entire thickness of the muscle layer and sometimes goes beyond its limits. On the X-ray film a typical ring-shape narrowing is found up to the point where the contrast substance does not pass through.

The Fungating Type. The carcinoma has the shape of a round or oval structure resembling a dense cauliflower with

a smooth surface. The tumor projects into the esophageal canal. On the surface of the tumor superficial ulcers with necrotic onlays are noted. The infiltration of the carcinoma is not very intense. Usually, it spreads to the muscle layer. The diameter of the tumor is 3.8-eight centimeters. In the majority of cases, one-fifth and two-fifths of the circumference of the esophageal wall remain uninvolved. On histologic examination it is noted that carcinoma cells are arranged in the form of individual islets in the depth of the mucous membrane. Only in four cases did the carcinomatous infiltration penetrate through the entire muscle layer. Metastases to regional lymph nodes were noted only in three cases. On the X-ray film a filling defect was found. The degree of narrowing and the degree of dilatation of the esophagus above the site of constriction depend on the size of the carcinoma.

Medullary Type. The carcinoma includes the entire thickness of the esophageal wall and projects into its lumen. The tumor grows outward. On section, the tumor tissue is grey in color. As a rule, the tumor spreads throughout the entire or major part of the circumference of the esophagus. The surface of the tumor is ulcerated. On histological examination a massive proliferation of tumor tissue is found in the muscle layer in the form o:

islets with a small quantity of connective tissue separating them. On the X-ray film a massive involvement of the esophageal wall is found over a great extent with the presence of ulcers. The filling defect is clearly expressed. Narrowing of the esophagus is found to a severe degree.

Ulcerative Type. The main symptom is a large carcinomatous ulcer, usually oval. Its diameter is from 2.5 to 7.7 centimeters. The base of the ulcer is covered with necrotic tissue or a fibrin film. The muscle layer is massively infiltrated with carcinoma cells.

Infiltrative Type. The carcinoma proliferates chiefly in the mucosa or in the submucosa in the form of individual dense nodules. The tumor involves the entire circumference of the esophageal wall. The carcinoma cells are arranged in islets in the depth of the mucous membrane or in the submucosa, rarely in the muscle layer.

In the opinion of Wu In-kai, the development of different types of carcinoma of the esophagus is apparently associated with biological and reactive characteristics of the body. The condition of the circulation in the area of the involvement, the nature and the severity of the secondary infection as well as the nature of the external stimulus exert an effect on the rate of growth and the type of the carcinoma.

Different types of esophageal carcinoma have different localizations.

The data of X-ray examinations can not always be used in classifying carcinoma of the esophagus in one type or another. This certainly does not mean that the X-ray film is of no assistance at all in diagnosing the types of esophageal carcinoma. In the study of the X-ray film attention should be directed to its characteristics, typical of one type of carcinoma or another, and the following should be taken into consideration:

1. Narrowing and complete closure of the esophageal lumen are most often observed in cirrhous, medullary and fungating types of carcinoma. In the cirrhous type the area of carcinomatous involvement is comparatively small; dilatation of the esophagus over the site of constriction is uniform and has a typical funnel shape.

2. The localization and depth of the carcinomatous ulcer determined by means of the X-ray examination may be used for determining the type of tumor. Thus, in the fungating type the ulcer shadow is found, as a rule, on a tumor mass projecting into the esophageal lumen. In the ulcerative type the shadow of the ulcer projects to the outside from the esophageal wall and usually occurs in the depth of the esophageal wall and even outside of its

shadow. In the medullary type the ulcer shadow is comparatively rarely distinguished and is indistinct.

3. According to the data of Wu In-kai, the shadow of the tumor itself in the cirrhous and fungating types of malignant tumor, as a rule, does not go beyond the limits of the esophageal wall, whereas in the medullary and ulcerative type the shadow quite often projects beyond the limits of the esophageal wall.

The clinical significance of the classification of carcinoma of the esophagus consists in the fact that it makes it possible to draw a parallel between the clinical symptomatology and the X-ray data. This, to a certain degree, assists in detecting the signs of carcinoma in an earlier period of the disease. The latter is particularly important, because carcinoma of the esophagus has an asymptomatic course for a long time or the symptoms are so slight that neither the patient himself nor the physician pays any attention to them. The principal sign -- dysphagia -- is usually encountered with the cirrhous type; in the ulcerative and infiltrative type, even in far advanced cases of carcinoma dysphagia is expressed to a moderate degree, and in severe neglected cases esophageal obstruction has not been observed even once (tumor degeneration).

The classification of carcinoma of the esophagus is of

definite importance also for the postoperative prognosis. On the basis of observations made the preliminary opinion has been expressed that the most favorable postoperative results are noted in the fungating type. In the cirrhous type the results are somewhat worse, and in the medullary and infiltrative types the result is poor. Certainly, as the author justifiably indicates, the postoperative results depend on the structure, size of the carcinoma and the presence of metastases; with different types of carcinoma success of operative treatment varies. We can not help but agree with the author that investigations in the field of studying various types of carcinoma of the esophagus are promising. For the purpose of developing a scientific classification of carcinoma of the esophagus a deep study is needed of the pathology of this disease in its various aspects — clinical, roentgenological, macroscopic and microscopic. These investigations undoubtedly are of great importance for the diagnosis, treatment and prognosis of carcinoma of the esophagus. The development of the scientific classification for carcinoma of the esophagus may also give valuable material to the study of the pathogenesis of this disease.

Chapter IV

Problems of Thoracic Surgery and Vascular Surgery

Experimental and clinical investigations on the problems of thoracic surgery are being conducted actively in scientific institutions and at chairs of the Shanghai, Pekin, Hangchow, Wuhani medical colleges and those of other cities. In a number of divisions of this problem scientific research is being carried out at the level of the achievements of modern science. Surgeons in China have in a comparatively short time achieved great success in the field of treatment of diseases of chest organs. Surgical treatment of pulmonary tuberculosis has become widely developed. Chinese surgeons believe that the radical operation for certain forms of chronic tuberculosis is an undoubtedly effective method of treatment. On the basis of a large number of observations and careful study of the late results of operative treatment of pulmonary tuberculosis detailed indications for operation have been worked out, many aspects of the pathogenesis of postoperative complications have been clarified, methods of effective control of them and methods of postoperative treatment of patients have been worked out up to the time that they recover their ability to work. We are presenting several examples as illustrations.

Radical Operation for Pulmonary Tuberculosis

In a work based on the material of the Hospital of Thoracic Surgery and Internal Medicine an analysis was given of the results of radical operations on the lungs of 300 patients. The authors of this work expressed the firm opinion that resection of the lung for certain forms of tuberculosis is an indubitably effective method of treatment. In the opinion of the authors, which in the main coincides with the opinion of other Chinese and foreign surgeons, the indications for radical operations on the lungs are the following:

1. Tuberculomas in the presence of tuberculosis bacteria in the sputum, cough, hemoptysis, caseous degeneration in the center of a tuberculoma with a comparatively large size of it (diameter of more than two centimeters), as well as in those cases where it is difficult to differentiate them from a true tumor (carcinoma). In the case of small tuberculomas with signs of calcification as well as without the signs mentioned above the operation is not indicated. Of 120 patients operated for tuberculoma a good immediate result was obtained in 119; a poor one in one patient. The late result (more than a year) was studied in 29 patients. They are all in good condition.

2. A cavity with a thick and strong capsule localized

in the upper or lower lobe of the lung, in a fibrocavernous form of tuberculosis. Of 101 operated patients a poor result was observed after six months in 16. After a year or more after the operation a poor result was noted in six out of 27 patients.

Of 300 persons operated a pneumonectomy was performed in 24; in 141, a lobectomy; in 90, a segmental resection; in 45, a wedge-shaped resection. Postoperative complications developed in 43 patients (14.3 percent). The largest number of complications were bronchial fistulas and empyemas, which were observed in 14 patients. In 10 patients the complication appeared a month after the operation; in four, after two-five months. In the majority of cases the complication was eliminated under hospital conditions.

The main cause of formation of bronchial fistulas (aside from specific involvement of the bronchus itself) is considered by the authors to be improper technique in treating the bronchial stump and a large residual pleural cavity, in which exudate is excreted for a long time preventing the primary healing of the bronchial stump.

Profuse postoperative hemorrhages were observed in nine patients. Recently, cases of postoperative hemorrhage have increased in frequency. This is possibly explained by

the fact that the patients are obtaining a large quantity of chemotherapeutic preparations.

For the purpose of closing the pleural cavity which remains after resection of the lung the authors recommend, if necessary, an additional thoracoplasty, which was performed on 40 patients (out of 300). If the patient's condition is satisfactory, an additional thoracoplasty is performed immediately after the conclusion of the main operation. If the patient's condition is serious or if an entire sick lung has been removed, the thoracoplasty is performed a certain time after the main operation. An additional thoracoplasty on the left side is used more often than on the right.

Of 300 patients good immediate results were observed in 90.1 percent. A poor result was noted in 22 patients; one of them died. With an observation period of more than a year a good result was noted in 87.8 percent of the patients.

Unsatisfactory results depend on the duration of the disease and, to a certain degree, on the dose of streptomycin received by patients before the operation. The best results are observed in those patients who received 20-50 grams of streptomycin before the operation. A large dose considerably worsens the effectiveness of operative treatment.

In a collective study by surgeons of Nanking composite data of three hospitals have been presented concerning radical operations on the lungs in 412 patients with pulmonary tuberculosis. Ninety-three percent of the patients were from 20 to 24 years of age; the oldest was 46 years old. Out of 412 patients 397 were treated actively before the operation with antituberculosis antibiotics. Some patients were first subjected to thoracoplasty. The average hospitalization period before the operation was 22 months. Bronchoscopy was performed in 399 patients; in 68 of them bronchial changes were found in the mucous membranes of the bronchi, whereby in 19 of this number a definite bronchial stenosis was found. Before the operation, tuberculosis bacteria were found in 248 patients (59.3 percent); after the operation, in 24 (5.8 percent).

The main indications for operation were the following: upper-lobe cavities, in 196 patients; fibrous cavities, in 105; fibrocavernous foci, in 69; tuberculomas, in 62; bronchial tuberculosis, in 57 patients. On pathologic study of resected preparations it was shown that bronchial tuberculosis is encountered more often than has been determined by the method of clinical and bronchoscopic examination (117 cases instead of 57).

Patients with upper-lobe cavities were first given a prolonged medical treatment, but in all cases without results. Conservative treatment of patients with lower-lobe cavities was also unsuccessful.

Observations of 412 patients showed that the postoperative mortality rate amounts to 1.5 percent (early death, in four cases; late death in two cases). Of 406 surviving patients 294 were discharged practically healthy according to the evaluation of the authors; the other 112 are continuing treatment. On the basis of a careful study of autopsy preparations and a comparison of the pathological data with the clinical data the authors conclude that involvement of pulmonary tissue in chronic tuberculosis is usually expressed to a greater extent than is believed from the clinical picture.

In the collective work of Shanghai surgeons data were presented on the surgical treatment of pulmonary tuberculosi in 13 medical institutions of Shanghai during the period from 1947 through 1955.

The total number of patients operated was 1376. The ages of the patients varied from 11 to 54, but the majority of patients (85 percent) were from 20 to 40 years. Before the operation, 1,304 patients were subjected to various types of drug antituberculosis therapy.

In 645 patients one of the following palliative operations was performed prior to the radical operation: artificial pneumothorax, pneumoperitoneum, an operation on the phrenic nerve, or thoracoplasty. In all these patients the need for a radical operation was brought about either by lack of closure of the cavity or by the presence of complications in the pleural cavity.

The operations were performed for the following indications:

1. Bronchial tuberculosis, the most frequently associated form of pulmonary tuberculosis. Four hundred and fifty patients were operated. While bronchial tuberculosis in the early stage can be cured by means of drug therapy, in the presence of such complications as scars, bronchiectasis, atelectasis and elastic cavities, the only method of treatment should be radical operation on the lung.

Bronchial tuberculosis may proceed in the form of tuberculous bronchiectasis, bronchial stenosis with atelectasis and bronchial stenosis with an ulcer of the bronchial mucosa.

Fifty-seven patients were operated for tuberculous bronchiectasis. The operations were performed for the following symptoms: the presence of tuberculosis bacteria

in the sputum; repeated hemoptysis or the development of secondary infection. In the majority of patients the tuberculous process spread throughout the entire lung and frequently was accompanied by stenosis of the main bronchus of the affected lung.

In the presence of bronchial stenosis with atelectasis 295 patients were operated. In the majority of cases the tuberculous process was localized to the upper lobe of the lung. On X-ray films in the area of the lesion a typical uniform shadow was noted like ground glass. On bronchoscopy a bronchial constriction was frequently found. In a small number of patients, in connection with the complete blockage of the bronchial lumen, tuberculosis bacteria temporarily disappeared, and the clinical signs lessened. However, after a certain time tuberculosis bacteria appeared again in the sputum. Sometimes, the tuberculous process spread. In such patients operation should not be postponed, despite the apparent quiescence of the tuberculous process and the disappearance of tuberculosis bacteria.

Forty-two patients were operated for bronchial stenosis with an ulcer of the bronchial mucosa. The diagnosis was confirmed by bronchoscopy. In this group of patients atelectasis or cavities were not found by fluoro-

scopy.

2. Elastic cavities with a diameter of more than four centimeters with a thin capsule. Fifty-seven patients were operated. In many patients of this group a fluid level was found on X-ray examination in the cavity.

3. Tuberculomas. Two hundred and forty-one patients were operated. In recent years the number of patients with tuberculomas has increased notably. The indications for radical operation in tuberculomas were the following: a change of the tuberculomas into cavities with a diameter of more than two centimeters; a frequent exacerbation of the tuberculous process; the impossibility of distinguishing a tuberculoma from a true lung tumor by clinical or X-ray methods.

4. Cavities with a Dense Fibrous Capsule. The sizes of the cavities vary. The methods of collapse therapy have proved to be ineffective. One hundred and sixty-four patients were operated.

5. Cavities of the Upper Lobe of the Lung. Drug therapy was ineffective. In this group of patients no lesions of the bronchi were noted. Two hundred and twenty eight patients were operated.

6. Caseous Foci. In some patients the caseous foci spread throughout the entire lobe of the lung; in others,

they were limited to a segment. In this group of patients there were no cavities. Drug treatment produced a temporary improvement. One hundred and ninety patients were operated.

7. Diffuse Tuberculous Involvement of the Lung. The tuberculous process spreads throughout the entire lung with a multitude of cavities in all the lobes of the affected lung. The operation of choice was pneumonectomy. Sixty-three patients were operated.

8. Cavities of the Lower Lobe of the Lung. Nineteen patients were operated. Artificial pneumothorax and avulsion of the phrenic nerve did not give any effects.

9. Cavities Complicated by Secondary Purulent Infection. Seven patients were operated. In all patients, with the exception of one, the operation was performed under endotracheal or endobronchial anesthesia. Drug therapy (streptomycin and isoniazide) were used in almost all patients (with the exception of nine) before and after operation. The average duration of treatment before operation was one week. After operation the streptomycin treatment was continued from two weeks to one month; isoniazide treatment, from three to six months.

The following operations were performed: 698 lobectomies; 248 segmentectomies; 220 pneumonectomies; 22

resections of two lobes of the lung; 48 wedge resections; 36 resections of the lung and pleura, etc. Two hundred and twenty-four patients were given a combined operation — resection of the lung and thoracoplasty. In 143 of them both operations were performed simultaneously; in the others, the thoracoplasty was performed a certain time after the resection. Of 220 patients who underwent pneumonectomy, an additional thoracoplasty was performed in only eight.

Of 1,376 patients operated 44 died (3.2 percent). With respect to years, the mortality rate changed considerably: in 1947-1952 17 of 159 operated persons died (10.7 percent); in 1953, eight out 181 (4.4 percent); in 1954, 12 (2.2 percent) and in 1955, seven (1.4 percent).

The causes of the postoperative mortality were the following: postoperative shock, 14 cases; failure of cardiac activity, six; pyothorax, nine; pulmonary edema, two; pneumothorax, three; pulmonary thrombosis, one; cerebral thrombosis, two; bilateral pneumonia, two; dissemination of the tuberculous process, two; stoppage of respiration during operation, one; pyelonephritis, one; sepsis, one case. The greatest mortality rate came from pneumonectomy (8.2 percent) and resection of two lobes of the lung (13.6 percent). The lowest mortality rate was

noted after lobectomy (2.6 percent) and segmentectomy (0.4 percent). In operations for diffuse involvement of the lung the mortality rate was 18.7 percent; for bronchial tuberculosis, 6.9 percent.

In the postoperative period the following complications were observed.

1. In 82 patients a pyothorax developed, which in 37 of them was complicated by a tuberculous infection; in 41 patients a pleurobronchial fistula was formed. Of this group, nine persons died in the hospital and one six months after the operation because of acute yellow atrophy of the liver. Of the 73 surviving patients the pyothorax was cured completely in 55. In nine patients, after discharge, a small pleural cavity remained; in eight, the pyothorax was not cured to the present time.

2. In 55 patients after operation an exacerbation occurred or dissemination of the tuberculous process; of these, it was in the operated lung in 19; in the other lung, in 36; two patients died in the hospital; the rest are continuing treatment.

3. In 28 patients a massive hemorrhage was observed in the pleural cavity. A repeat thoracotomy was performed on three of them with the aim of ligating the bleeding blood vessels. The results were good.

In all, 1,332 patients were discharged from the hospital, and six died at various periods after discharge. The immediate and late results of treatment was studied in 1,170 patients; of these, satisfactory results were noted in 1.090 (94 percent).

On the basis of their rich, completely studied experience in radical surgical treatment of certain forms of tuberculosis of the lungs these authors formulated the following principles.

1. The indications for radical operation on the lungs are being extended every year. Radical operation is now being performed successfully on many patients in whom, according to previous concepts, only thoracoplasty was indicated.

2. In recent years, the operation of segmentectomy rightfully occupies the leading place in surgery of pulmonary tuberculosis.

3. The principle that radical operations on the lungs are a more dangerous method which should be used only in cases where collapse therapy is ineffective should be revised.

4. Surgical treatment is carried out in the shortest time compared with other methods; therefore, the patients eagerly agree to a radical operation.

5. The postoperative mortality is closely associated with the size of the tuberculous foci. The larger the focus and the more lung tissue is removed the higher the mortality rate. Therefore, all patients in whom radical operations are indicated should be operated as soon as possible.

6. The cause of the postoperative deaths may also be a lack of perfection of the operative technique and of postoperative care. In the event of massive hemorrhages a second operative procedure should not be delayed.

7. The postoperative mortality rate increases with combined operations (pulmonary resection and thoracoplasty particularly if these operations are performed simultaneously.

8. The problem of the time and dosage of specific drug therapy of patients before and after operation deserves greater attention. The problem of drug resistance of tuberculosis bacteria has not yet been well studied.

Palliative Operations for Pulmonary Tuberculosis

In developing and perfecting the method of radical surgical treatment of pulmonary tuberculosis Chinese surgeons have also used the so-called "palliative operations" quite extensively in certain forms of it. A group of physicians from the Hospital of Thoracic Surgery and Internal Medicine, in the work "The Reevaluation of Thoracoplasty in Treatment of Pulmonary Tuberculosis",

shows the late results of thoracoplasty in 180 patients. Good immediate and late results were noted in more than 80 percent of those operated. The postoperative mortality rate amounts to 4.4 percent. One of the main causes of fatal outcomes is the performance of thoracoplasty when there are incorrect indications. If strict indications for this operation are observed the results are much better. Thus, in the caseous form good immediate and late results were noted in more than 90 percent of 135 patients.

In determining the indications for thoracoplasty the authors gave great importance to the condition of the tracheobronchial tree. The performance of bronchoscopy has become a usual rule. Of 180 patients a bronchoscopy was performed on 120 before operation.

On the basis of thoroughly analyzed data the authors come to the following conclusions concerning the site of thoracoplasty in surgery of pulmonary tuberculosis.

1. The Absolute Indications for Thoracoplasty are Unilateral Fibrocavernous and Caseous Forms of Chronic Pulmonary Tuberculosis with Good Compensation. In the presence of slight changes in the bronchi (edema, hyperemia of the mucous membrane) or asymptomatic bronchiectasis the operation of thoracoplasty is not contraindicated. Thoracoplasty undoubtedly is contraindicated in patients

with large cavities, with a diameter of more than three centimeters and with a thick capsule, as well as in cavities localized to the central-inferior portion of the lung and nearer to the mediastinum. In this case, in the presence of an appropriate good condition of the patient and the necessary technical opportunities, the pulmonary resection is absolutely indicated.

2. In the diffuse forms of chronic fibrocavernous tuberculosis, in the authors' opinion, thoracoplasty is indicated and pneumonectomy is contraindicated. Although the results of thoracoplasty in this case are not always excellent, still, according to the authors' data, they are better than in the case of pneumonectomy and are connected with less risk.

The most important criterion for the selection of various operations is the condition of the patient and the nature of the tuberculous process. Each of the operations under analysis has its own indications under definite conditions and with an appropriate condition of the patient. We can not compare these operations mechanically or abstractly analyze the advantages and disadvantages of each of them, and we should not substitute one operation by another without any good basis.

The work of the group of physicians of the Hospital

of Thoracic Surgery and Internal Medicine on the topic "comprehensive study of the clinical aspects, pathology and tuberculous bacteriology of tuberculomas" is very interesting. The work was the result of a complete investigation of 89 patients with tuberculomas on whom a pulmonary resection was performed during the period from March 1956 through March 1957 with removal of this pathological focus. Before 1956 the authors had observed another 82 patients with tuberculomas who were treated conservatively. This made it possible to compare the results of the surgical and conservative methods of treatment.

As is well known, in recent years a number of works has appeared in the literature concerning isolated pathological foci in the lungs which are of round or of oval shape. These foci have been given different names: "tuberculomas", "tuberculous spheres", "caseomas" and others. The resected preparations are subjected to a detailed pathological and bacteriological study. The clinical-roentgenological data were compared with the pathological data. On the basis of the bacteriological and experimental research the authors came to the following conclusions.

1. Although all patients with tuberculomas were treated before operation with antituberculosis drugs, still,

in the majority of cases the tuberculosis bacteria isolated from the removed tuberculomas proved to be pathogenic. Even prolonged use of antituberculosis preparations does not affect the viability or sensitivity of tuberculosis bacteria of tuberculomas to these preparations. This is explained by the fact that during degeneration of tuberculosis the anti-tuberculosis treatment is effective [ineffective ?].

2. The divergence of the data of bacterioscopic investigation from data on the pathogenicity of tuberculosis bacteria after infection of animals is explained by the authors by the fact that not all the bacteria which do not show growth on synthetic media and are not active with respect to experimental animals are dead. It is possible that for the purpose of demonstrating the activity of such inactive microbes special conditions are required. The authors referred to the experiments of Forward, according to which the infection of guinea pigs with material from nine tuberculosis preparations gave a negative result. After mixing of the ground up mass of these preparations with quartz dust the material from five preparations proved to be pathogenic with respect to the guinea pigs. The data obtained by the authors concerning the pathogenicity of tuberculosis bacteria of tuberculomas, despite prolonged treatment with antituberculosis agents, is of importance in

the evaluation of surgical methods of treating tuberculomas. The authors believe that tuberculomas, as a rule, should be subjected to operative treatment with consideration, to be sure, of the patient's condition and his living conditions.

A comparison of the results of conservative treatment of 82 patients and operative treatment of89 patients with tuberculomas is evidence of the undoubted advantages of the latter. Thus, of 82 patients, despite prolonged treatment with antituberculosis preparations, a worsening occurred in 20. The observation period amounted to from six months to four years. The results of operative treatment of 89 patients are considered very good by the authors. There were no fatal outcomes. Forty-one patients were observed for periods up to a year after the operation; tuberculosis bacteria were found in the sputum in only one patient; all the other patients were practically healthy.

Surgical Radical Operations for Nonspecific Diseases of the Lungs

Great progress has been made in the surgical treatment of nonspecific pulmonary diseases, particularly bronchiectasis. In a thorough work of Shanghai surgeons a detailed analysis is given of the results of surgical treatment of bronchiectasis in 206 patients for eight and a half years (from December 1947 through June 1956). Patients with forms

of bronchiectasis which developed against the background of tuberculosis, surgical abscesses and lung tumors were not included in this group.

Of the clinical symptoms a chronic cough, the excretion of sputum and hemoptysis predominated. In 45 patients only hemoptysis was observed; in 44, clubbed fingers.

The authors indicate that in their material they could not determine any relationship between the duration of the disease and the degree of spread of the process, on the one hand, and the severity of the clinical manifestations of the disease on the other.

Two hundred and twenty radical operations on the lungs were performed on 206 patients. Of these, there were segmentectomies in 15; lobectomies in 89; segmentectomies and lobectomies, in 49; double lobectomies, in 19; and pneumonectomies, in 48. As a rule, the operations were performed under endotracheal anesthesia with ether; in four cases, under spinal and in one case, under local anesthesia.

In 33 patients postoperative complications were observed; in 17 of them, postoperative atelectasis of the operated lung, which was quickly eliminated after aspirating the sputum through a bronchoscope. In nine patientspostoperative empyemas were noted; in four patients they were eliminated only by drainage; in four, by drainag

and thoracoplasty. One patient, whose condition initially after removal of the middle and lower lobe and the posterior segment of the upper lobe of the right lung for a bilateral bronchiectasis was entirely satisfactory, died from empyema three months after discharge. In two patients there was a massive postoperative hemorrhage: in one, as the result of slipping of a ligature from a pulmonary vessel; in another, as a result of rupture of the spleen. Both patients recovered after treatment and were discharged in good condition.

The postoperative mortality rate amounted to 2.4 percent; five patients died (a sixth patient died two years after the operation from another disease). The late results of treatment were evaluated on the basis of an observation of 152 patients. In 113 of them (74.4 percent) the ability to work was completely restored. In 23 patients (15.1 percent) a considerable improvement occurred with restoration of the working capacity but with the presence of some residual symptoms. Unsatisfactory treatment results were noted in 16 patients (10.5 percent).

The authors believe that the following factors influence the late results of the operative treatment.

1. Residual bronchiectasis. In eight out of 39 patients in whom various signs of the disease remained at a

late period after the operation, residual bronchiectasis was found on bronchograms, and in seven out of eight the lesion had not been completely removed because of the inadequately careful study of bronchograms before the operation.

2. Exacerbation of the tuberculous process. In two out of 14 patients with pulmonary tuberculosis in the stage of quiescence after the operation an exacerbation of the tuberculous process occurred, the clinical manifestations of which were observed also in the late period. In one of the patients cavities were formed. These patients were not given any tuberculosis treatment either before or after the operation.

3. Granulomas in the area of the bronchial stump. T presence of granulomas was accurately determined in three patients. The authors believe that the main cause of thei development is the silk with which the bronchial stump is sutured. In some patients the symptoms of granulomas disappeared rapidly after the silk was expectorated.

4. Long stumps. In 30 patients with residual signs there were long bronchial stumps, which served as the cause of residual signs after the operation.

Among the associated diseases which accounted for residual postoperative signs the authors note bronchial

asthma and chronic inflammation of the nasal cavities.

The indications for pulmonary resection in patients suffering from various associated diseases should be very cautious and very limited. This applied particularly to the patients with diseases such as bronchial asthma, pulmonary tuberculosis, etc. In the authors' opinion, pulmonary resection for bronchial asthma (accompanying tuberculosis) should be performed only when the suppurative process is so severe that it does not submit to conservative treatment, and profuse hemorrhages threaten the patient's life.

The principal cause of the unsatisfactory result of operative treatment of bronchiectasis is incomplete removal of the pathological focus, which leads to the so-called "residual cavity" or to an improper selection of patients for operation.

The work of the chair of thoracic surgery of the First Shanghai Medical Institute for mastering the method of creating interbronchial anastomoses deserves attention. Extensive experimental research is being conducted in this field, and the use of interbronchial anastomoses clinically has been begun.

Heart Surgery

Chinese surgeons are successfully developing this

difficult and most complicated field of modern surgery. During recent years in the Chinese People's Republic scientific research and practical achievements in the field of the operative treatment of some heart diseases is at the level of the progressive experience of a number of foreign countries.

Among the most significant works in this field are investigations of the surgical clinic of the Second Shanghai Medical Institute. During the past three and a half years (beginning with 1954) 270 patients were operated in this clinic for mitral stenosis. Before 1955, 54 such operations were performed; after 1955, 159. Of 159 operated patients three died: two, from hemorrhages during operation, and one, from thrombosis. cerebral

In the majority of those operated a diffuse lesion of the valves was noted in the form of fibrosis and a considerable thickening of them with shrivelling. The degree of dilatation of the opening is the main factor in the effectiveness of the operation. The authors, studying this interrelationship through the example of 110 patient determined the fact that in 79 the size of the opening after the operation was equal to 2.5 centimeters or more; good results were noted in 74 patients. With dilatation of the opening of less than 2.5 centimeters good results

were obtained in 25 out of 31 patients; with dilatation of the opening to 3.5 centimeters, in 100 percent of the patients.

The commissurotome is used in the case of considerable fibrous thickening of the valves, where digital dilatation with the use of considerable force threatens catastrophe (rupture of the cardiac wall and embolism). One patient died 13 hours after operation from cerebral embolism.

In the authors' opinion, the operation of dilating the mitral orifice should be terminated when there are any circumstances arising during the course of the operation. A violation of this rule leads to serious consequences. As in illustration the following example has been given. In the course of an operation, after the pericardium was grasped with a holder the patient developed a severe arrhythmia (pulse rate of 210-240 beats a minute). The intravenous injection of procaine did not help. The operation was continued and completed successfully. Ten minutes after the commissurotomy the cardiac rhythm was restored to normal.

The authors expressed themselves in favor of obligatory drainage of the pericardial cavity. Of the first 50 patients in whom no drainage was used acute enlargement of the liver and jaundice were observed in eight after the operation. Drainage was performed in all the other

patients, and no liver complications were observed in any of them. The drain is inserted through a small opening in the pericardium at the apex of the heart behind the phrenic nerve.

The most frequent complication is postoperative auricular fibrillation. Of 149 patients in whom the cardiac rhythm was normal before operation fibrillation occurred in 33 on the second to seventh day after the operation. Among the suggested causes of fibrillation are the advanced age of the patient, the duration of the disease, extrasystoles, considerable operative trauma and finally, a severe mental strain. The authors believe that the principal factors in the occurrence of auricular fibrillation are trauma and postoperative edema of the left auricular appendage. For the purpose of preventing fibrillation quinidine is used for three days before the operation. Small doses did not produce any effect, and large doses proved to be toxic: the patients lost their appetite, nausea, vomiting, diarrhea, ringing in the ears, etc. appeared. If the auricular fibrillation is not stopped in seven to 10 days, quinidine is prescribed in a dose of 0.4 gram every four hours. The effect usually occurs after one or two days. After restoration of the cardiac rhythm the taking of quinidine is continued for two weeks, three times

a day, in a dose of 0.2 gram.

Data are presented in the work concerning the results of commissurotomies followed for periods from six months to two years in 120 patients. The results were evaluated by subjective and objective data. The results noted were entirely satisfactory in 23 patients; there was a considerable improvement in 82; no change in 11; and a worsening in six patients.

In 1957, in this clinic experimental research was carried out successfully on the operative treatment of coronary thrombosis by the method of suturing the internal mammary artery to the muscle of the heart. The result was good. The operation of suturing a flap of fatty pericardium to the heart muscle was successfully accomplished in a patient with severe anginal attacks. After the operation the attacks stopped.

In this clinic experimental investigations are being carried out on the operative closure of defects in the interatrial septum.

Operations on the heart are being performed also in a number of other surgical institutions: the Sian, Wuhan Medical Institutes and others. Thus, in the Wuhan Medical Institute 20 patients have been operated in the past two years for a patent ductus arteriosus; 43, for mitral

stenosis; three patients for tetralogy of Fallot.

At the chairs of the medical institutes of the Chinese People's Republic experimental research is being conducted successfully in mastering the methods of operation on the heart under direct vision under hypothermic conditions with the circulation excluded. Specifically, these investigations are being conducted on a broad scale at the chairs of general and faculty surgery of the Second Shanghai Medical Institute, at the chair of the Wuhan, Pekin and other medical institutes. At the chair of surgery of the Wuhan Medical Institute these investigations are being conducted comprehensively with the participation of the chairs of pathology, pathological physiology, histology and others. In the Fourth Medical Institute in the city of Sian operations have been begun successfully on the "dry" heart in man with the use of artificial circulation.

Of the experimental research devoted to the prophylaxis and treatment of ventricular fibrillation from artificial refrigeration mention should be made of the studies of a group of workers in the Hospital of Thoracic Surgery and Internal Medicine. Experimental research was conducted on the basis of data in the literature to the effect that novocain block of the sinus node of the atrium prevents ventricular fibrillation. The operations were carried out

on the open ("dry") heart. A great difference was noted in the frequency of occurrence of ventricular fibrillation in cases with exclusion and without exclusion of the circulation. Ventricular fibrillation prior to exclusion of the circulation occurred in only two dogs; this was very rapidly eliminated by the single application of a defibrillator. After the exclusion of the circulation ventricular fibrillation was observed in 15 dogs. The pulsations were returned to normal in only four dogs following the repeated use of a defibrillator. As a result, the conclusion was drawn that the experimental data do not confirm the opinion of the relationship between the level of reduction of the body temperature in hypothermia and the frequency of occurrence of ventricular fibrillation. Ventricular fibrillation occurs more often after operations on the ventricles and much less often after operations on the atria. In the sense of prophylaxis of ventricular fibrillation the best results were obtained in dogs in which the area of the sinus nodes of the atria was smeared with a solution of dicaine [tetracaine].

Chinese surgeons agree with the fact that hypothermia is one of the methods of "comprehensive anesthesia". Artificial refrigeration, general anesthesia, block of the vegetative nerves supplement and augment one another.

Under the conditions of hypothermia and anesthesia the activity of the body at a minimum physiological level is assured. With artificial refrigeration a protective inhibition of the central nervous system develops. Chinese surgeons have a high opinion of the importance of artificial refrigeration in surgery and have not posed any kind of considerable restrictions against its use.

Investigations are being carried out on a large scale with respect to the problem of the artificial circulation. However, these investigations are in the first stage.

Of other material dealing with cardiac pathology the work "Rheumatic Mitral Stenosis" (clinical-hemodynamic parallels) accomplished in the Hospital of Thoracic Surgery and Internal Medicine, is of considerable interest.

Cardiac catheterization has been performed in 120 patients for two years. A disturbance of the hemodynamics was determined by the degree of variation in the blood pressure in the pulmonary artery and in the pulmonary capillaries, by the recovery of the minute volume of the heart and by other indices. Depending on the hemodynamic data the authors distinguished four stages of disturbance of it: stage 0 -- normal hemodynamics; stages I and II - moderate disturbance in hemodynamics; stage III -- severe disturbance of hemodynamics. The indices of the hemo-

dynamic disturbances were compared with various clinical symptoms of mitral stenosis as well as with the data of X-ray films and electrocardiograms. A comparison of the stage of mitral stenosis with the stages of the hemodynamic disturbances gives the following picture. In stage I of mitral stenosis the pressure in the pulmonary artery at a state of rest is normal or slightly elevated; the minute volume both at rest and after physical exercise is normal. In stage II the pressure in the pulmonary artery at a state of rest is quite high, and after physical exertion it is elevated even more; the minute volume at rest is normal; after exertion it increases but not always in parallel with the degree of strain. In stage III of mitral stenosis the pressure in the pulmonary artery corresponds to the pressure in the third stage of hemodynamic disturbances, and after physical exercise it goes beyond these limits; the cardiac minute volume at rest is considerably reduced, and after exercise it is far different from the pressure in the pulmonary artery. In stage IV of mitral stenosis the pressure in the pulmonary artery increases to the level of the pressure in the third stage of hemodynamic disturbances and higher, and after physical exertion it is slightly elevated; the minute volume at rest is reduced; after exertion it increases somewhat.

Vascular Surgery (Venous Anastomoses)

The development of vascular surgery in the Chinese People's Republic to a certain degree is associated with certain specific characteristics of nosologic disease entities. It is well known that in a number of provinces of China located in the Yangtze River Basin and to the South of it schistosomiasis is widespread. The parasites of this disease and their ova are localized chiefly in the portal vein and inside the liver. Among patients with schistosomiasis a severe involvement of the liver and spleen are observed in many. In neglected cases of the disease atrophic cirrhosis of the liver and a marked enlargement of the spleen accompanied by ascites develop. Specific treatment of these forms of schistosomiasis with antimony preparations is dangerous and in many cases, ineffective. Therefore, for the purpose of eliminating portal hypertension, which frequently leads to a fatal hemorrhage from the veins of the esophagus and the fundus of the stomach some Chinese surgeons use surgical methods of treatment for the corresponding form of hepatic cirrhosis creating venous anastomoses. The surgical clinic of the Second Shanghai Medical Institute has considerable experience in this.

In the article "Surgical Treatment of Portal Hyperten-

sion", published in the journal "Vestnik khirurgii imeni Grekova" [Herald of Surgery imeni Grekov_7 (1957, No. 7), a group of physicians in this clinic reports data concerning the treatment results of 47 patients by the method of shunting (the creation of venous anastomoses). In another work, published in the journal "Chinese Surgery" in 1956 as well as in a report to the All-Chinese Scientific Conference on Schistosomiasis (December 1956) the data of this clinic are given concerning 124 patients with severe portal hypertension on whom the operation was performed of creating venous anastomoses. Forty-seven patients observed previously were also included in this group.

In 50 percent of the patients the cause of the portal hypertension was schistosomiasis in the late stage. In 112 patients an X-ray examination was made of the esophagus with a contrast mass; of these, a considerable varicose dilatation of the veins of the esophagus and fundus of the stomach was noted. Hemorrhage from esophageal veins was observed in 78 patients, and in 49 of them it was repeated (up to 10 times). Forty patients has ascites; of these, 30 had hemorrhage at the same time.

The operation of splenc-renal anastomoses was performed in 95 patients; of porto-caval anastomoses, in 27. An anastomosis between the omental vein and the

kidneys was performed in one patient. As a rule, the spleno-renal anastomosis was placed end-to-side, and only in four patients was it made end-to-end. The porto-caval anastomosis was made side-to-side in two-thirds of the case in the others, end-to-side. The venous pressure in the portal vein after removal of the spleen was reduced by nine centimeters of water; following the spleno-renal anastomosis, by another seven centimeters. In the great majority of patients the portal vein pressure did not decrease to normal figures. After the operation of porto-caval anastomosis the pressure dropped by 13.5 centimeters.

Of the postoperative complications a prolonged temperature elevation was noted, severe weakness, separation of the wound edges, jaundice and hepatic coma, the occurrence of which was associated distinctly with the type of anastomosis. Of 95 patients on whom the spleno-renal anastomos was performed hepatic coma was not found in any of them; of 27 patients with a porto-caval anastomosis this complicati was encountered in 11. Usually, hepatic coma developed early, on the third - 15th day after the operation; less often, after three months. In the majority of patients the signs of hepatic coma remained for three days. In eight patients it was repeated several times; two of them died.

Of 24 operated patients 12 died (9.7 percent). In six cases early death was noted; in six cases, late death.

The causes of death were as follows: massive hemorrhage from the esophageal veins in two cases: thrombosis of the mesenteric veins, in one; traumatic rupture of the spleen, in one; carcinoma of the stomach, in one; hepatic insufficiency and hepatic coma, in seven cases.

A fatal outcome, as is indicated in the material, was apparently unassociated with the type of shunting. After the operation of spleno-renal anastomosis nine out of 95 patients died; after the operation of porto-caval anastomosis, three out of 27 patients.

Of the total number of patients operated six died in the hospital; six, at later periods; communication was lost with 20 patients; 92 patients were under prolonged observation for periods from five months to three years and nine months. Of these, 36 patients with varicosities of the esophageal veins were given a repeated X-ray examination. After 13-18 months, the varices disappeared in this group of patients. The blood composition improved considerably. The latter was confirmed by the observation data of 28 patients with a spleno-renal anastomosis for three years. Of these, anemia completely disappeared in 22; the blood returned to normal. In six patients anemia lessened but did not disappear; the blood did not become normal.

After the operation the reduction in the hepatic function usually is maintained for three months; then, it improves in part of the patients.

Attention is directed to the need for careful selection of patients for the operation of anastomosis. The patients suffering from jaundice, severe disturbances of the liver functions, a persistent ascites which does not submit to treatment should not be operated as a rule. This conclusion inevitably stems from observations to the effect that more than half of the fatal outcomes were in patients with far advanced cirrhosis of the liver which developed against the background of schistosomiasis.

The operations of creating venous anastomoses are quite widespread in other cities of the Chinese People's Republic. Thus, in the Wuhan Medical Institute in the past two years the operation of anastomosis has been performed on 105 patients.

As has been mentioned above, in a considerable percentage of the patients with schistosomiasis the late stage of this disease is noted. In such cases, antimony preparations are strictly contraindicated. However, after a preliminary preparation (pathogenetic therapy, the operation of removing the spleen and the creation of venous anastomoses) the portal circulation is considerably improved,

which makes it possible to use specific treatment with antimony preparations in part of these patients.

Therefore, the operation on the veins in schistosomiasis has a definite beneficial significance in the comprehensive treatment of this disease. In the case of threatening hemorrhages ligation of the veins of the esophagus and fundus of the stomach is used.

The operation of creating venous anastomoses is technically very difficult and is possible only for the highly qualified specialists. In connection with this, simpler methods of taking the load off the portal system are being worked out in a number of clinics of the Chinese People's Republic. The operation of removing the spleen, additional fixation of the greater omentum in the retroperitoneal space, and the operation of omentorenopexy are promising.

Surgeons in a number of foreign countries have a negative attitude toward the operation of creating venous anastomoses. They believe that after the laying of the anastomosis the liver is excluded from the portal circulation, in connection with which the body partially or completely is deprived of the detoxifying and filtering effect of it on the blood. However, as the experience of Chinese surgeons has shown in practice one can not always

count on this consideration. In the severe form of portal hypertension the operation of creating bypassing anastomoses not uncommonly is necessary because of the absence of any other methods of treatment. The results which have been achieved thereby indicate that the creation of venous anastomoses, particularly spleno-renal, at the present time is apparently the operation of choice. The mortality rate after operations of creating anastomoses, according to the data of Chinese surgeons, is considerably less than that according to data of foreign authors, according to whose reports it is within the limits of 22-35 percent or higher. As other authors mention, recurrences of postoperative hemorrhage, at times fatal, are encountered in 18-35 percent of the cases. According to the data of the surgical clinic of the Second Shanghai Medical Institute, the recurrences of massive postoperative hemorrhages were observed in only two patients.

Of other works on the surgery of blood vessels performed in the Chinese People's Republic the experimental-clinical research on homografting and heterografting and particularly on the use of Chinese artificial silk as a transplant are interesting. These studies are being conducted in Shanghai, Wuhan, Chengtu and other cities of the Chinese People's Republic.

From the far from complete material presented in the present review it is seen that Chinese surgeons in a very short time have made great progress in the development of thoracic surgery in their country. The main trends in research work and the practical results in this field are at the level of modern surgical science. The talent of Chinese surgeons and their self-sacrificing service to the interests of the public health of New China has had an influence in this.

Chapter V

Parasitic Diseases

Schistosomiasis

The pathogen of this disease is the parasite schistosoma japonica; the intermediate host, the mollusk Oncomelania hupensis. Schistosomiasis has a massive distribution among the population of 12 provinces (350 districts and cities) located along the Yangtze River and its tributaries. In the past, scores and hundreds of thousands of people have died from schistosomiasis; whole villages and rayons have died out. Knowledge of the epidemiology and treatment of this disease were very sparse at that time; there were no statistical data concerning the distribution of the disease and the numbers of patients. There were erroneous ideas with respect to problems of the epidemiology.

After the liberation of China the situation was markedly changed. The Central Committee of the Communist Party of China and the People's Government recognized that the control of schistosomiasis represents one of the definite political problems. It was decided to eliminate this disease, for the most part, in the seven years starti. with 1956. In the instructions of the Central Committee o the Communist Party of China it was mentioned with respect

to this problem: "one year for preparations; four years for control and two years for the elimination of what is left". In response to the appeal by the Party and by Mao Tse-tung in the work for controlling schistosomiasis broad masses of the population were brought in, at the head of which were party organizations and the people's administrative organs. At various places a broad network of specialized schistosomiasis institutions was created and committees with the local authorities. Along with this, tremendous work was accomplished in preparing appropriate personnel. For the purpose of general supervision of the entire work in controlling schistosomiasis a special commission of the Central Committee of the Communist Party of China composed of nine persons was organized. The supervision of the scientific research work was entrusted to the Scientific Committee.

For the purpose of the successful elimination of schistosomiasis in a short time it was necessary to solve many scientific and scientific-organizational problems of epidemiology, prophylaxis and treatment of this disease. Large groups of medical scientists, biologists, as well as practical workers in the therapeutic-prophylactic institutions and in agriculture in many provinces and cities were brought in for research work. It should be stated

that the work performed in this direction is truely tremendous. As a result of it new scientific data have been obtained on the principal epidemiological rules and regulations of schistosomiasis; the clinical aspect, pathogenesis and treatment of this disease have been carefully studied. Morphological, biochemical, pathophysiological research both clinically and experimentally were widely used in the scientific work. Chinese scientists for the first time in the world created an experimental model of schistosomiasis in rabbits. Numerous investigatio were performed on the study of the ecology of the intermediate host of the schistosoma parasite; facilities of collective and individual protection against schistosomiasis were successfully developed; reliable methods of treating feces containing the parasite ova are being incorporated into practice on a broad scale. Much has beer done for the purpose of developing most available methods of mass treatment of patients with schistosomiasis. Now, on the basis of scientific data, prophylactic and therapeutic measures are being taken on a broad scale.

Epidemiology and Prophylaxis of Schistosomiasis

On the basis of the data of mass epidemiological investigations of areas unfavorable with respect to schistosomiasis morbidity rate it has been shown that this

disease is widespread in 12 provinces with a great population density and with an irrigated soil which is very rich for rice. All these provinces, as has been mentioned above, are located along the Yangtze River and its tributaries. According to tentative data, there were about 10,000,000 people afflicted with schistosomiasis, and about 100,000,000 people subject to the direct threat of infection. The degree of involvement of various provinces and various rayons of the same province was far from being homogeneous. This was apparently associated with the inhomogeneous colonization density of the intermediate host.

It has been shown that the distribution of schistosomiasis among the people is in complete accordance with the area of distribution of mollusks, and, therefore, schistosomiasis has a strictly endemic character. The area of distribution of mollusks in the North is bounded by Paun in Chiangsu province (33°25' north latitude); in the South, at Hingsen in Kuangsi province (22°5' north latitude); in the East, in the maritime rayons of Chiangsu province; and in the West, at Tsengch'uang in Yunnan province (100° east longitude).

It has been determined that the degree of infection of people in various age groups depends on their contact with infected water. In children younger than five years of age

the morbidity rate is very low. Beginning with the age of 10 it increases and reaches its highest figures at agee from 15 to 30 years. Then, the morbidity rate decreases again and reaches a minimum in persons older than 50 years. Some investigators believe that elderly persons acquire a partial immunity to schistosomiasis as a result of repeate infections. We can not agree with this idea. None of the research workers to date has been able to show the presenc of an immunity to any parasite. In this connection schistosomiasis is no exception. Elderly people less often suffer from schistosomiasis for the reason that they are less occupied in agricultural duties and are in less contact with polluted water. It is also possible that in elderly persons with a reduced reactivity of the body the schistosomiasis may have an asymptomatic course, whereas in young persons with a high degree of reactivity of the body this disease is accompanied by striking general and local symptoms.

For the purpose of making out a real program for the elimination of schistosomiasis it was necessary for research workers to study very complicated problems of t epidemiology of this disease, which in many cases are sti unclarified. Among these problems are the following: a precise determination of sources of pollution of water

and fields, particularly the part played by animals in the epidemiology of schistosomiasis; the optimum conditions of viability of the parasite ova in the stool and the conditions under which the ova die; a determination of the feces of the intermediate host and a study of its ecology; a development of effective and available methods and means of rendering the ova innocuous and destroying the mollusks; development of methods of individual protection, etc. All these problems have been solved in an illustrious manner in a very short time.

The data obtained as a result of painstaking and complete investigations conducted under natural and experimental conditions are of great scientific and practical value. These data do not have any equals in the entire world literature on schistosomiasis.

The data of the research on the intermediate hosts show that mollusks of the species Oncomelania hupensis are the only intermediate hosts of the causal organism of Japanese schistosomiasis in China. This species of mollusks is distributed over an area of several scores of billions of square meters. The breeding places of the mollusks are the following.

1. A broad plain in Chiangsu and Chengchiang provinces crossed by a dense network of rivers and irrigation

channels. The mollusks live chiefly near the irrigation channels and along the shores of relatively large rivers. The population density of mollusks along the shores of the rivers is greater than in the irrigation channels. A considerable number of mollusks lives along the edges of fields and ~~in~~ at places where irrigation channels come off water bodies. There are no mollusks in stagnant water.

2. A mountainous-hilly locality marked off by irrigation channels. The mollusks live chiefly in the channels and along the edges of fields as well as at the places where irrigation channels leave the bodies of water in the field. Mollusks do not live in fast-flowing streams; however, there are many mollusks at the bends of these streams and before sluice-gates, where the stream of water is slowed up.

3. Lowlands and reedy river valleys, which in the summer and autumn are flooded with water from the Yangtze River and lakes. In the spring-winter period the water goes into the shores of the river, and extensive areas of ground are freed of water; these, however, have a high moisture content. Here, reeds, cane and many weeds grow in abundance. These areas are the most favorable places forthe existence of mollusks. The peasants who live in these areas are readily subject to infection with schistosomiasis.

The mollusks live in the water and in the moist soil. The highest population density of the mollusks is noted at the surface of the water or at a slight depth. At a depth of more than four chi (one third of a meter) there are no mollusks; they are not found on the bottom of rivers if they are more than four chi in depth. There are much more mollusks on the flat slopes of river shores than on steep slopes. In the case of a rapid rise in the water level the mollusks are left on the ground. It has been noted that in places which are flooded for more than eight months no mollusks are found, while there are many of them in areas which are flooded from one-half to five months. The highest population density of the mollusks is noted in places with thick vegetation. Where there is no vegetation there are no mollusks. Apparently, the mollusks also look for places where they are protected from the severe solar irradiation, where a high degree of moisture of the soil is maintained, and where there is adequate material for their subsistence (rotting grass and roots). Soil rich in organic substances is the best for the existence of mollusks.

A detailed study has been made of factors influencing the viability and multiplication of mollusks (temperature, moisture, illumination, oxygen, etc).

Mollusks are very sensitive to temperature variations.

The optimum temperature for their existence is within limits of 18-30°. With a temperature of more than 33° the mollusks hibernate at the roots of grass, in cracks in the earth, etc. In water, at a temperature within limits of from two to 40°, the mollusks can live for several hours. In open places with dry air at a temperature of 9° the mollusks die after two hours.

Humidity is of very great significance for the existence of mollusks. In open dry places under direct solar irradiation they die after one or two days. If the soil is wet, under otherwise equal conditions, they survive readily. For this reason, the population density of the mollusks is high along the shores near the water; the death rate there is low. The higher and the further from the water the fewer the mollusks and the higher the mortality rate of them.

At a temperature of 20° mollusks eight-nine millimeters in size consume 3,648 ± 1,638 millimeters of oxygen per hour. The oxygen consumption per unit of body size is greater in young mollusks than in old ones. With the increase in temperature of the environment the oxygen consumption also increases. At the same time, the mollusks are resistant to a lack of air. This explains the fact that the mollusks maintain their viability in the soil at a depth

of more than three centimeters and in water at a depth of 1.3 meters. The activity of the mollusks depends on the illumination. With an illumination of 3,600-3,800 luxes the mollusks show the greatest activity.

The food of the mollusks is various, but chiefly of vegetable origin (algae). Earthworms and other species of mollusks as well as protozoans can serve as their food.

Very important data have been determined by experimental research and observations under natural conditions with respect to the development and multiplication of mollusks, which have made it possible to work out the most effective measures (methods and facilities)for eliminating them.

It has been shown that fertilization of mollusks occurs almost the year round, but most often in the spring and autumn and very rarely in the cold and hot weather, particularly in July-August. As a rule, the sex act is accomplished on the ground near water, rarely in water. The seasonality of the sex act corresponds to the seasonal change in the genital organs of the mollusks.

Egg-laying begins in December-January and ends in June. The maximum egg-laying occurs in April-May and in June. One female mollusk can deposit no more than 100 eggs per year. The eggs are layed on the wet surface layer of the soil.

The eggs can be found on the stems and leaves of plants growing in the water and on the ground, on pieces of brick, etc. Sometimes, the eggs are deposited in a hole dug by the mollusk itself. The time of hatching of the miracidia depends on the temperature of the air and the soil. With a temperature of 16.8-19.5° 22-61 days are required for hatching; at a temperature of 19.4-24.4°, from 12 to 34 days; and at 28.8-30°, from eight to 28 days.

On wet soil up to 75 percent of the miracidia hatches out; on dry soil, 40 percent. In distilled water a very small percentage of the miracidia hatch. In provinces with a comparatively temperate climate and a high humidity (Chiangsu) the development of mollusks to an adult state takes four to five months. In the warmer provinces this process is accelerated. The development of the young mollus stops in the wintertime (December, January, February) and continues in the spring of the following year. The life span of mollusks under experimental conditions is equal to three months.

Investigations devoted to the study of the conditions of infection of the mollusks with the parasite miracidia and the conditions of the developmental cycle of the miracidi to the cercaria stage. The data obtained were used for the development of methods and facilities of destroying the mollusks.

The investigations show that regardless of the nature of the locality there is a high infection rate of the mollusks noted in those places which are most often polluted with human and animal excretions. These places are chiefly river valleys where long-horned cattle graze; water near where small boats are berthed; at p'ers where feces is dumped; and in water bodies where tubs are washed free of feces.

In river valleys, where the population density of the mollusks is very high, the degree of infection of them is considerably less than in other places because of the large area and the small number of inhabitants. Year-round observations under natural conditions in various months have determined the fact that in the autumn the degree of infection of the mollusks is much greater than at other times of the year; the degree of infection of female mollusks is greater than in males; in adults, greater than in young ones. Experimentally it has been shown that the body of every mollusk can be penetrated by a large number of miracidia, but, as a rule, only one of them can mature to the cercaria stage. The best temperature for the development of mollusks is 32-33°. The developmental cycle lasts 44 days; at a temperature of 16°, 160 days.

A detailed study has been made of the ecology of

cercaria and the routes of infection of man by them. When human skin comes into contact with the cercaria the latter attach themselves firmly to its surface, gradually dig themselves down into the underlying tissues and then penetrate into the lymphatics and blood vessels. The incorporation of the cercaria into the human body continues even after the person has come out of the water. The cercaria may come into contact with the human skin through a drop of water, after contact with grass, etc.

A large number of experimental investigations has been devoted to the study of the ova and miracidia of the schistosome. It has been determined that every mature female can lay 3,000-7,000 eggs per day. The length of life of the egg depends on the temperature of the surrounding medium. In feces and in human urine at a temperature of 53.3° all the eggs die after one minute; at 46.5°, after 60 minutes; at 44.5°, after 130 minutes. At a temperature of less than 40° the length of life of the ova in the feces may attain several months. In moist soil the ova live up to 26 days. In feces with a water content of less than five percent of their total weight the ova die. Hatching of the miracidia occurs at a temperature within limits of 5-37°. The higher the temperature the more rapidly the process of hatching occurs, but the more rapidly

the hatching miracidia die.

In recent years it has been determined that a great part in the epidemiology of schistosomiasis is played by domestic animals, chiefly long-horned cattle. Schistosomiasis is encountered also among small animals and rodents. In the bodies of animals other species of parasites are found besides the Schistosoma japonica. In Yunnan province spontaneous infection of wild rodents has been found. A special species of schistosome which is not pathogenic for man has been found in their bodies. An indubitable interrelationship has been established between infection of people, animals and mollusks. Where there are sick people and infected mollusks there are also sick animals, and vice versa. Among animals oxen are most often afflicted. The disease has a more severe course in them than in other animals. The routes of infection of animals are different. Aside from infection through direct contact with water the parasites can penetrate through the mucous membrane of the mouth. Cases have been noted of spontaneous infection of the fetus through the placenta. Schistosomiasis in animals has a course with definite clinical signs: delayed development, loss of weight, diarrhea, with mucus and blood, anemia, loss of the ability to work, etc. In epidemic foci schistosomiasis in animals is the most widespread parasitic

disease. In winter months animals die en masse from schistosomiasis. A certain difference has been noted in the course of schistosomiasis in people and in animals. In animals schistosomiasis has a course without ascites and without enlargement of the spleen. After intrauterine infection the pathological changes in the newborn and embryos are of the same nature as in adult animals.

In evaluating the specific importance of animals in the epidemiology of schistosomiasis in people the very great difficulties in the control and disinfection of feces should be kept in mind. The animals defecate and urinate in places which are sometimes impossible to put on record. In addition, the quantity of excretion in animals is incomparably greater than in people. It has been calculate that the quantity of excretion from hogs and rabbits is 15 times greater than in people; in long-horned cattle, 100 times. From this it follows that in the combination of measures for controlling schistosomiasis control of this disease among the animals is of very great importance.

On the basis of a complete study of all branches of the epidemiology of schistosomiasis Chinese scientists have worked out an entire system of comprehensive measures for the prophylaxis of this disease. However, these measures are not taken according to a pattern, but rather in consid-

eration of local epidemiological characteristics and the specific conditions of spread of schistosomiasis in every rayon, city, etc. At the same time, methods and measures of general significance are included in the combination of prophylactic measures. It has been recognized that one of the most important methods of prophylaxis of schistosomiasis is the disinfection of the excretions of sick people and animals. At the present time, in many districts and cities the collection of human excretions into special vats with covers has become widespread. The time of death of the ova depend on the quantity of urine in the excretions. If the interrelationship of the stool and urine is equal to 1:4, the ova die in the summer after three days; in the winter, after seven days. The temperature factor is of secondary importance. After the addition of ammonia to the excretions, calculating 0.4 gram per 100 grams of the mixture of feces and urine the ova die after two days; with a calculation of 0.3 gram per 100 grams, after four days; 0.2 gram, six days. In cases where the feces have to be brought promptly to the fields, an accelerated method for destroying the ova is used: one percent urea solution or 0.25-0.5 percent of chloroform solution is added to the excretions. Under these conditions, the ova die after 24 hours. The keeping of the excretions in vats requires consid-

erable energy and the use of special people for control. With the organization of people's communes the storage and disinfectionof excretions will be considerably simplified (the construction of public toilets).

An important measure in the prophylaxis of schistosomiasis is the destruction of mollusks in all endemic rayons. As a result of considerable scientific research activity a whole series of reliable methods and facilities has been worked out for destroying mollusks. In various rayons various methods and facilities are used depending on the relief of the terrain, the number of rivers and channels, lakes, the degree to which the ground areas have been reclaimed, the nature of the vegetation, specific conditions, etc. It should be noted that in selecting methods of destroying mollusks the interests of agriculture must be kept in mind. In making out plans of development of agriculture (expansion of sowing areas, increase in the harvest, perfection and expansion of the irrigation system, reclaiming of virgin territory, etc) measures for the destruction of mollusks must be taken into consideration. The control of schistosomiasis, as has been noted in the instructions of the Central Committee of the Communist Party of China, should be combined closely with the efforts for a good harvest, increase in the material welfare of the working class.

The Principal Measures for the Destruction of Mollusks

The principal measure is drying of the river valleys. In recent years, in epidemic rayons many dams and dikes have been constructed. After deep plowing of the tracts of land in these areas the mollucks die. This experience is being used extensively in provinces rich in lakes and marshes such as Chiangsi, Human, Hupei. Thus, in Hunan province in the spring of 1953 a large dam was constructed in the area of the east-to-west lake. As a result, an area of 600,000 mu (one mu is equal to 1/15 of a hectare) was dried. This measure markedly reduced the population density of the mollusks. In another area an area of 30,000 mu was dried and sown with crops which need little water. It was determined that the census of mollusks before the reclaiming of these tracts of land was equal to 14.9-122.2 per square chi. After the reclaiming, the census of mollusks in the dry-crop fields decreased to 0.3-1.2, while on the irrigation fields, it was reduced to 0.01-1.56 per square chi. On one of the experimental tracts of land in Hunan province the area on which mollusks bred was reduced from 7,500 to 175 mu after the drying.

In river valleys, where the construction of dams and dikes was impossible, the earth was treated during the winter months, when the water receded.. The harvest was

gathered in the spring before the advent of the usual flood. It was determined that for the purpose of reliable destruction of mollusks in reclaiming virgin territory a double plowing is required to a depth of 20 centimeters.

In mountainous areas where the mollusks breed chiefly in irrigation channels, reliable destruction of them is achieved by burying the old channels and digging up new ones. These measures are usually dictated by the need for reconstructing irrigation structures. The first such experiment was carried out in 1957 in one of the districts in Hupei province. As the result of measures taken schistosomiasis in this area was eliminated. In areas with a multitude of rivers the burial method is inapplicable. In such cases, the upper layer of soil is taken from the shores there the mollusks breed, and then it is buried at a depth of 16-17 centimeters. After such treatment the mollusks die after 70-100 days. The method of burning the grass on the shores of rivers or of composting it after cutting has been used successfully also. The method of removing and burying the upper layer of ground is less effective than the drying of water bodies and the filling in of irrigation channels.

On the basis of these observations, work on the temporary drying of large and small rivers was carried out on a

tremendous scale in a number of areas. Hereby, a double gain was achieved: first of all, the mud taken from the bottom of the river was used for fertilizer; secondly, the river course was deepened.

The great scale of river drying may be judged by the following data. In the districts of Shanghai Rayon there are 5,350 large and small rivers in a territory of 59 square kilometers having a total length of their shores of 5,670 kilometers. In the spring of 1958, under the direct supervision of the Shanghai City Committee of the Communist Party of China all the rivers flowing through this area were dried and over the entire extent of the shores the upper layer of soil was removed and buried. Two million man-days were used for these operations over the course of 20 days. As a result, 95 percent of the mollusks were destroyed; 7,500,000 tons of earth were taken from the bottoms of the rivers, and 18,000,000 cubic meters of earth were taken for the purpose of expanding the irrigation structures.

In some areas the destruction of the mollusks was achieved by the conversion of irrigation fields to dry-crop fields. After destruction of the mollusks the dry-crop fields can again be converted to irrigation fields if necessary. Such experience has justified itself. Good

results have been achieved by the method of treating the affected areas with boiling water. However, this method, according to general observations, is very laborious, requires considerable labor, and is less effective than the methods described above. Good results have been obtain in the treatment of the affected areas with calcium arsenite and arsenate, calculating five-10 grams per square meter of area.

Investigations have been made in the matter of looking for facilities for destroying the cercaria. Among the agents studied the most effective has been shown to be the oil-cake of seeds of the plant Camellia oleose. An infusion of this oil-cake in a dilution of 1:500 destroys the cercaria in six minutes; after treatment with an infusion dilated 1:5,000 the cercaria lose their ability to move. Cercaria can be destroyed by this method in comparatively small numbers.

The methods listed above and the agents for disinfecti feces and destroying mollusks are effective in the prophylaxis of schistosomiasis but the realization of them requires considerable time. Particularly great difficulti arise in the accomplishment of measures for the destruction of mollusks over large marshy tracts of land. Hence, it is understandable how important the search is

for reliable agents of individual protection of people against the incorporation of cercaria.

Many scientific institutions in the past several years have carried out considerable research in this direction. However, the results of this research are still very modest. The agents proposed either cost too much and for that reason are not available to the broad masses of population or are not reliable enough. For the purpose of protecting the skin against the penetration of cercaria various ointments have been proposed, for example, cedar oil, cypress oil in the pure form or in solution, colophony with alcohol, colophony with turpentine and ether, colophony in tung oil, etc. Some of the agents listed have been used for impregnating fabric socks, sleeves, puttees, etc. After contact with polluted water these agents protect one against the incorporation of cercaria for two to four hours.

Extensive measures are being taken for the disinfection of water for drinking, laundering and other needs. These, in brief outlines, are the results of the scientific research work and practical achievement in the field of prophylaxis of schistosomiasis.

The Clinical Aspects and Treatment of Schistosomiasis

Until the recent past various Chinese scientists had developed a theory, according to which the principal and

decisive condition for eliminating schistosomiasis was ubiquitous and complete destruction of molluske in endemic foci. Treatment of patients, in the opinion of these scientists, is a secondary matter, which pursues only humanitarian purposes. This theory was not successful and did not gain the support of the majority of the scientists. It was pointed out reasonably that under normal conditions the task of complete and universal destruction of molluske over large areas in short periods of time can not be accomplished. In addition, certain problems of the ecology of the molluske remain unclarified; there are no particular reliable or cheap measures for their destruction. It is well known that mass active treatment of patients is in itself a most important part of the prophylaxis, since the cure of a large number of patients limits the scale of the sources of infection. This point of view which has been generally accepted in science does not require any particular proof; it is correct in all cases where a war is waged against mass diseases.

The treatment of schistosomiasis has two purposes: the first purpose is the elimination of the sources of infection; the elimination of the parasite carrier; the second purpose is the recovery of the health of the patient. Modern epidemiology teaches that for the purpose of

successful prophylaxis of every disease it is necessary to carry out a combination of measures stemming from the characteristics of the epidemiology of the disease. For the successful prophylaxis of schistosomiasis the proper combination of measures for the detection of patients, radical treatment of them and measures for the destruction of the mollusks — the intermediate hosts — are decisive. Therefore, for the elimination of schistosomiasis it is necessary to give a course of active prophylaxis and active therapy.

Up to 1956 the main attention in scientific research was devoted to the study of the parasite and its intermediate host. An insufficient study was made of the clinical aspects and particularly of the pathogenesis of schistosomiasis. The study and experimental verification of various methods and courses of treatment were chiefly of a parasitological nature, that is, the principal attention in the research was concentrated on the sterilization effect of the antimony preparations used. Here, an inadequate study was made and no analysis was given of the side-effect of antimony, which was noted in treatment with it in a considerable percentage of cases. The effectiveness of treatment was judged only by one index — the presence or absence of schistosmose ova in the excretions.

The inadequate knowledge of the clinical aspects of schistosomiasis and the lack of a scientific classification of it complicated the development of scientifically grounded indications for the use of specific agents for treating this disease. To a considerable degree, the firm opinion existed prior to 1957, for this reason, that in the late stages of schistosomiasis treatment with antimony preparations is strictly contraindicated. As we shall see below, this opinion has been repudiated by practice.

Knowledge of the pathogenesis of the disease is basic for developing a comprehensive therapy, that is, therapy directed at eliminating the parasites, and pathogenetic treatment.

In the summer and autumn of 1956 a brigade of the Ministry of Health of the Chinese People's Republic with the participation of a large number of scientists and practical workers made a complete study of the status of scientific research work on schistosomiasis and acquainted themselves with the experience of incorporation of the scientific achievements into practice. The investigation material was discussed at two All-Chinese conferences on schistosomiasis (August and December 1956). The August conference adopted a whole series of important recommendations dealing with the main trends in research work. A study of

the prophylactic agents and the most rapid incorporation of them into practice was considered essential. The principal attention of the conference was directed toward the accomplishment of research work in the field of experimental and clinical study of the methods of treatment, particularly of shortened courses of therapy, looking for new synthetic and popular remedies. It was considered necessary to include problems of the complete study of the clinical aspects and pathogenesis of schistosomiasis as well as problems of pathogenetic therapy in the plans of the scientific research work.

At the end of 1956, on the basis of the experience of treating 10,000 patients, shortened courses of treatment were approved, and detailed instructions on their mass application were worked out. Preliminary data were presented concerning the efficacy of schistosomiasis treatment in the late stages with antimony preparations in combination with certain types of pathogenetic therapy (protein preparations, tissue grafting, the combination of surgical treatment of portal hypertension with drug therapy, etc.).

Throughout 1957-1958 scientific investigations on the problems mentioned above were developed further. Chinese scientists obtained new valuable data which up to that time had been unknown in the world literature concerning the

clinical aspects, pathogenesis and treatment of schistosomiasis.

The clinical manifestations of schistosomiasis are very varied, which depends on many factors. In severe cases where a large number of cercaria penetrate into the body, the disease occurs acutely, with a large variety of symptoms. In the late stage, the signs of involvement of the liver, spleen and heart become most prominent (rarely, the lungs and brain). In mild cases, the disease proceeds asymptomatically for a long time. The clinical picture of the disease depends a great deal on the localization of the ova and of the parasite itself as well as on the reactivity of the patient. Above, it has been stated that in elderly persons the clinical picture is expressed slightly; young persons react vigorously to the incorporation of cercaria. We should like to present a description of the clinical picture according to the data of Chinese scientists.

Acute Schistosomiasis. A large outbreak of acute schistosomiasis occurred during the great flood of 1954-1955. In the past three years acute schistosomiasis has been encountered comparatively rarely and has a striking seasonality: it has the nature of small outbreaks or sporadic occurrences in the summer and autumn. Acute schistosomiasis is more often encountered among men of

young and middle age and, as a rule, among persons coming into the area of distribution of schistosomiasis from other localities. The majority of the patients is in frequent contact with polluted water. The incubation period lasts from 21 to 84 days; in 80 percent of the cases, from 30 to 60 days. Pathological changes are most often expressed in the form of suppuration in the organs of the portal vein system. Pulmonary and brain lesions constitute a total of only one percent. Eosinophilic leukocytes ~~and less~~ predominate in the pus; less often, there are neutrophils.

The acute schistosomiasis clinically is expressed chiefly in a temperature elevation. In the seriously ill signs of a typhoidal state is observed: a confused consciousness, swelling of the abdomen, decrease in sensitivity, hearing, etc. These signs are brought about by a severe schistosomal intoxication. The acute period of the disease can last for a month. In the late period of the disease a marked wasting develops, severe anemia, edema, ascites and cachexia. The prognosis of such patients is poor. Treatment with antimony preparations is not very effective and is dangerous. Among the allergic reactions urticaria is observed most often (11-48 percent of the cases); less often, neurovascular edema (0.5-17.7 percent

of the cases). In almost all of the patients the eosinophil count is markedly increased in the peripheral blood against the background of a general leukocytosis (10,000-30,000). In half of the patients it amounts to 20-70 percent. The eosinophil count is markedly increased in the bone marrow. Enlargement of the liver and spleen is observed in 92-96.5 percent of the patients. Here, as a rule, only the mesenchymal tissue is involved as a rule; the liver cells are not involved in the pathological process. Therefore, in patients with acute schistosomiasis jaundice is encountered extremely rarely. Considerable changes are observed in the composition of the serum proteins; the globulin content, particularly its γ fraction, is increased. A positive cephalin flocculation test and other reactions of serum flocculation are observed in 56-60 percent of the cases. In the opinion of Chinese scientists, the positive flocculation reactions are an expression of increased proliferation and of increased functional activity of the reticulo-endothelial system and do not indicate involvement of liver cells. These reactions disappear after treatment with antimony preparations. In the patient's serum frequently a large number of cross antibodies is found. The titer of the cross reaction may reach 1:12,800 or more; it is markedly reduced after

specific treatment.

Cirrhosis of the Liver of Schistosomal Origin. It has been determined by numerous clinical observations that cirrhosis of the liver in schistosomiasis develops usually often in cases of repeated infection. As a result of the ingress of a large number of schistosomal ova into the liver numerous thromboses and pseudotubercles are formed in it, and proliferation of fibrous tissue develops, chiefly along the courses of the branches of the portal vein. Against the background of hepatic fibrosis a portal hypertension develops, which in its turn produces a whole series of serious pathological changes in other organs:

1.) enlargement of the spleen; the spleen here not uncommonly reaches tremendous sizes, and symptoms of its hyperfunction are marked (anemia, thrombocytopenia, etc);

2.) varicose veins of the esophagus and fundus of the stomach; this disturbance is encountered in 70.6 percent of the patients with portal hypertension; in the mass examination of patients with cirrhosis of the liver it was found that in 10-12 percent repeated profuse hemorrhage from the esophagus and stomach are observed;

3.) varicose veins of the abdominal wall; this is observed in 40-80 percent of the cases;

4.) ascites of various degrees of expression; this is

noted in all cases;

5.) wasting and signs of alimentary dystrophy [poor food absorption from the intestine];

6.) considerable changes in the abdominal organs: adhesion of the greater omentum to the intestine; thickening of the colon; stenosis and obstruction of the intesti carcinoma of the intestine, etc.; frequently, pains occur in the abdomen, and diarrhea.

The degree of portal hypertension does not always correspond to the degree of liver fibrosis. In a number of observations in patients operated for a marked portal hypertension the fibrous changes in the liver were insignificant. A disturbance in liver function in cirrhosis is expressed chiefly in a change in the globulin-albumin ratio. Electrophoresis shows that the quantity of globulin, particularly γ-globulin, increases markedly (on the average by 36.7 percent), and the quantity of albumin decreases, on the average, by 42.5 percent. The thymol turbidity test is positive in 12-67 percent of the cases; the cephalin flocculation test, in 45-56 percent; the zinc turbidity test, in 81-82 percent of the cases. Jaundice is rare.

According to the data of the Shanghai Professor, Huang Ming-sing, cirrhosis of the liver of schistosomal origin is much different from cirrhosis of other etiology. The

liver cells in schistosomal cirrhosis are changed to a slight degree. Under the microscope (in cases of pronounced cirrhosis with considerable enlargement of the liver) a large number of areas are found with normal liver cells. After specific treatment of the cirrhosis the liver acquires its normal size and consistency after a year; after one or two years the normal liver function is restored. Profound irreversible degenerative changes develop in liver cells in late and very much neglected cases of schistosomiasis. The data of clinical observations are confirmed by the experimental investigations. In infected animals, even after two weeks, a rich network of anastomoses and an abundant proliferation of fibrous tissue is noted in the liver. After treatment with antimony preparations the fibrous tissue quite rapidly is absorbed.

These data have served as the grounds for more extensive application of antimony preparations in the late stages of schistosomiasis with already developed liver cirrhosis.

A characteristic feature of schistosomiasis in endemic foci is the inhibition of the growth and development of those who were sick in the early period of life. In areas which are most unfavorable with respect to schistosomiasis, dwarfism is noted comparatively frequently in the inhabitants. According to incomplete data, the number of persons of

dwarf height is equal to 400,000. On mass examination of one of the areas it was shown that persons of dwarf height amounts to about four percent of the total number of patients with schistosomiasis. A detailed study of the clinical, anthropometric and endocrine characteristics indicates the fact that schistosomal dwarfism has the same course as hypophyseal dwarfism, that is, the cause in both cases is the same — underdevelopment of the anterior lobe of the hypophysis. A dwarf height is encountered most often in persons who have been infected repeatedly. The main causes in the pathogenesis of dwarfism should be considered prolonged intoxication by the metabolic products of the schistosomes, disturbances in the general metabolism in the body of the patient because of liver involvement as well as a disorder of function of the gastrointestinal tract.

The conclusions based on the data of clinical observations have been illustriously confirmed experimentally. A model of dwarfism was successfully reproduced in rabbits. In rabbit sucklings infected with a certain number of cercaria a typical picture of dwarfism developed: atrophy of all of the glands of internal secretion (hypophysis, thyroid gland, sex glands and suprarenal glands) and a cessation or a very slow growth of the bone (softening of the bone tissue and thinning of the bony

trabeculae, cessation of the growth of cartilaginous cells, etc.). The same data have been obtained on pathological study of organs in two adult dwarfs who died.

Heterotypical involvement is produced chiefly by schistosome ova and very rarely by the adult schistosome. At autopsy of the cadavers it is noted that the ova are found in almost all of the human organs: in the lungs, brain and spinal cord, in the pericardium, cervix of the uterus, the fallopian tubes, muscles, conjunctivae, etc. Most often, the ova are noted in the lungs, and then in the brain. According to autopsy data, involvement of the lungs was found in 200 cases. In the acute stage of schistosomiasis involvement of the lungs is encountered in 76.8 percent; in the late stage, in 9.1 percent of the cases. On the basis of experiments on animals and autopsy data it has been established firmly that the pathological process in the lungs is expressed chiefly in the form of suppurations and the presence of pseudotubercles. In the purulent exudate, as a rule, eosinophils predominate and only in the case of very active disease, neutrophils. Changes characteristic of an inflammatory reaction were not noted even once. At the same time, schistosome ova are found chiefly in the interstitial tissue of the lungs. Clinically, it is very difficult to detect this pathology.

The diagnosis is made on X-ray.

Cerebral involvement was encountered in 56 cases. Of these, schistosomal changes in cerebral tissue were found in 14 cases at the time of operation and on autopsy. These cases have been described in the Chinese literature. Pathological changes in the brain are varied: thickening and adhesion of the meninges, exudation, the presence of gray tubercles in the cerebral cortex, edema and granulomas The pathological process is localized usually in the deep layer of the parietal and occipital lobes in the area of transition of gray matter into white. The mature schistosomes have not been found in the brain even once. Clinical involvement of the brain is manifested in the form of general epileptic attacks or focal spasms. Sometimes, the clinical picture resembles brain tumor.

Complications in the gastrointestinal tract are most often expressed in hematemesis. The latter is encountered in eight-15 percent of the cases of schistosomal cirrhosis of the liver and represents the main cause of death.

According to the data of Chinese scientists, no relationship has been established between schistosomiasis and primary carcinoma of the liver. It is difficult to say the degree to which such a conception is sound. It is known that in a number of areas of China primary carcinoma

of the liver is encountered many times more often than in European countries, whereby this applies to areas which are unfavorable with respect to schistosomiasis. Keeping in mind the fact that in schistosomiasis cirrhosis of the liver is noted in quite a considerable percentage of the cases, we can hardly categorically deny the connection of the schistosomal cirrhosis of the liver with primary carcinoma. In any case, further study of this problem is necessary. The connection of schistosomiasis and intestinal carcinoma is more reliable. In the Chinese literature about 104 cases of carcinoma of the intestines have been described which develop in areas affected by the schistosomal process.

The Laboratory Diagnosis of Schistosomiasis

Success in the control of schistosomiasis depends on timely and proper diagnosis. In recent years, Chinese scientists have carried out tremendous work in perfecting the methods of early diagnosis of this disease. The most widespread and available method for mass diagnosis is the method of the stool examination. Here, a simultaneous account is made of the results of sedimentation and hatching of the miracidia, which is very important for accuracy of diagnosis. Investigation of the stool is carried out, as a rule, three times. A positive result

by this method is attained in 97 percent. The method has become widespread and has been used in tens of millions of patients. However, in mass examination it requires much time and effort. The improved variants of this method have shortened the time and the number of workers involved in this examination by several times.

One of these variants is the use of the temperature factor. Thus, with a water temperature of 40° the hatching period of the miracidia is reduced by 10 times. The method of wrapping up the stool and sodium hydroxide in paper (pH = 6.8-7.0; temperature 23-25°) reduces the time of a single examination to 1.7 minutes. Such an improvement has made it possible to increase the number of patients investigated by many times. While previously a group of three to six workers could perform approximately 200 examinations in a single work day, now the same number of workers can investigate 10,000-20,000 samples of stool. Mass application of perfected methods has repudiated the previously existing opinion that a temperature of 36-37° or higher retards the hatching and that change of the water is an inevitable condition for it.

Of the immunological methods the most widespread is the intracutaneous test. Antigens from mature female schistosomes produce positive skin reactions in 99 percent

of the cases. Antigens from cercaria and miracidia, although they possess a high titer, are difficult to prepare. Good results are given by antigens from ova and liver tissue affected by schistosomes. The antigen from the ova give positive results in 96-98 percent of the cases. These antigens have the advantage that in hot water at a temperature of 56° they do not precipitate, and at room temperature they maintain their titer for a year. Antigens from ova and liver tissue produce a cross reaction to paragonimiasis 10 times less often than antigens from adult schistosome female.

An essential defect of the intracutaneous test is the fact that a positive test occurs a long time after infection and is maintained for a long time after treatment (the test may be positive after a year -- six years after the treatment). Therefore, the intracutaneous test is not applicable to the early diagnosis or for the evaluation of the efficacy of treatment.

The complement-fixation reaction is technically difficult and is therefore not very available for mass examinations.

The reaction of formation of a membrane around the cercaria and the precipitation reaction of the ova possess great specificity and a high degree of sensitivity. As an

antigen, use is made of live cercaria and live ova. It has been shown that both antigens give positive results in 95 percent of the cases. The precipitation reaction of the ova is positive in 100 percent of the cases both in the acute and in the late periods of schistosomiasis. The reaction of membrane formation is best expressed in the early period of the disease. Both antigens practically do not give any false-positive cross reactions. The applicability of these methods to the early diagnosis of schistosomiasis has been shown in experiments on rabbits. The reaction of membrane formation and the precipitation reaction depend a great deal on the reactivity of the experimental animal. It has been noted that after the introduction of the same number of cercaria into various rabbits the reaction is expressed at different times. Sometimes, in rabbits with a mild form of involvement the reaction occurs earlier than in rabbits with severe involvement. Among the sensitive reactions is the carmine flocculation test. The antigen adsorbed on carmine is mixed with the patient's serum. In the case of a positive test the carmine precipitates in the form of clumps. The test is technically simple and possess a high degree of sensitivity. The original carmine solution can be kept at a temperature of five-10° for a

month; the working solution, for a week.

The defects of this method are the following: 1) a large percentage of cross reactions to paragonimiasis; 2) obtaining the material for the preparation of antigens is quite complicated; 3) the prepared antigen should contain as few nonspecific proteins as possible.

The chair of parasitology of the Second Shanghai Medical Institute has worked out a method for obtaining pure antigens. For these purposes, sexually mature schistosomes from rabbits are excreted through a fistula in the portal vein. Irrigation of the aorta with a special solution contributes to the active excretion of them from the liver and portal vein. By this method it is possible to expel all the schistosomes in 15 minutes.

For the purpose of excreting ova from the liver the following method has been proposed: the liver tissue is frozen and ground up twice by means of a special electrical apparatus. The homogeneous mass is passed through a sieve under great pressure. Then, the ova once again are frozen and are filtered many times. By this method it is possible to obtain ova rapidly and in large quantities without any admixtures. From the liver of a single rabbit more than 620,000 ova are excreted, whereby two-thirds of them are ready to hatch. In the desiccated

form this amounts to a volume of 0.6-0.9 cubic centimeters; in weight, to 60-90 milligrams.

As an auxillary method of diagnosis use is made of rectoscopy and an impression from the mucous membrane of the rectum. According to the rectoscopic data one can judge the course of schistosomiasis and, to a certain degree, the effectiveness of treatment.

Of the methods of diagnosis listed above the most available for mass use are stool examination and the intracutaneous test.

Treatment of Schistosomiasis

The main preparation for the treatment of schistosomiasis continues to be potassium antimonyl tartrate (tartar emetic). Rich experience in the mass treatment has shown that this preparation, being a specific agent against schistosomiasis, produces a comparatively high percentage of complications, sometimes very dangerous, particularly in the practice of rural institutions. In connection with this, in recent years Chinese scientists have done considerable research work in looking for new preparations. A tremendous number of compounds has been synthesized which contain antimony and which do not contain antimony. Of the group of synthesized preparations about 400 have been tested on animals. In addition, 500 preparations of the Chinese people's medicine have been studied.

Compounds Containing Antimony. Compounds of the Tartar Emetic Group. The most promising preparationsof this group are ammonium salts. In experiments on animals it has been shown that ammonium salts possess a higher degree of efficacy than other compounds of this group and, in addition, are less toxic than tartar emetic. The use of ammonium salts in a concentration of 0.5 LD_{50} leads to the reduction in the number of images by 91.8 percent; the use of tartar emetic, by 82.7 percent. Experiments on rabbits and dogs have given similar

results. The quantity of antimony in the ready-made preparations of a given compound varies within limits of 9.9-46.5 percent. The highest degree of effectiveness has been noted after the use of a compound containing 27 percent antimony. Further increase in the quantity of antimony does not increase the therapeutic effect. It has been determined that after the intravenous injection of tartar emetic the concentration of it in the red blood cells is greater than in the blood plasma, and after the injection of ammonium salts no essential difference is observed. The concentration of the ammonium antimony salt excreted by the kidneys is two times greater than the concentration of tartar emetic.

The pentavalent sodium antimonyl gluconate, which is being successfully used for the treatment of kala-azar, has proved to be effective in the treatment of experimental schistosomiasis. However clinical observations have shown that it is not very effective in the treatment of people.

Compounds of the Mercaptoantimonate Group. The Pharmaceuti Institute of the Academy of Sciences of the Chinese People's Republic has investigated 48 compounds of this group. Potassium antimonyl oxalate and sodium antimonyl dimercaptosuccinate are of considerable interest. Encouraging results have been obtained experimentally.

Compounds of the Phenylantimonate Group. In their chemical

structure the compounds of this group are different from the other antimony preparations in the fact that the antimony atom in the molecule of the preparation is combined directly with carbon atoms of the benzene ring. In their effectiveness these compounds are no better than the tartar emetic, and the side-effects of them are considerable.

Of the other preparations which contain antimony, mention should be made of the chromium-antimony compounds and the complicated alkaloid compounds. In the opinion of Chinese scientists, the use of alkaloid compounds is promising. One of the representatives of this group which deserves the most attention is quinine antimonate, discovered in 1957 (the compound of quinine with antimony trichloride). The patients tolerate this preparation well when taking it by mouth in the pure form along with a rice infusion.

In experiments on animals good results have been given by thiouracil-1 antimonate and thiouracil-2 antimonate. The first of them has proved to be very effective in the treatment of schistosomiasis in mice. A sterilizing effect has been obtained in 100 percent of the cases. In the treatment of people the preparation has proved to be less effective.

Compounds Which do not Contain Antimony. Three hundred and

seventy-eight preparations have been synthesized and tested. Of these, the compounds of the rosaniline group are of a certain degree of interest. As experiments have shown, preparations of this group give encouraging results when used as prophylactic and therapeutic agents. However, a prolonged course of treatment is required for the purpose of achieving success.

From what has been presented here it is seen that a search for new, more effective and harmless agents for the treatment of schistosomiasis has not yet been crowned with success. In practice, only tartar emetic is being used.

The Antischistosomal Popular Remedy. Investigations are being carried out on a large scale in the area of studying anti-schistosomal popular remedies. In the past nine years a study has been made of more than 500 popular drugs and several scores of complicated prescriptions from the arsenal of the Chinese people's medicine by various methods. Investigations are carried out on a modern scientific level (in vitro and in vivo).

Of the large number of remedies studied those such as pumpkin seeds, tetrandrin, contavidin, and others have proved to be effective. As a diuretic decoctions from the plant Lobelia radicans are being used successfully. Substances which are contained in the decoctions of

this plant produce an increased diuresis, and in large doses exert a laxative effect. The active agent of Lobelia radicans is an alkaloid which is readily soluble in ether. This substance, like lobeline, stimulates respiration.

Preparations which are made from the plant Botryopteron villosilum possess a marked laxative effect. These agents should be prescribed in the late stages of the disease so as not to produce a very severe diarrhea. According to our observations, the improper and uncontrolled use of these agents leads to exhausting diarrheas, marked dehydration and debilitation. The main trend in the study of the popular remedies is a search for more effective diuretics for the treatment of patients in the late stage of the disease (with considerable ascites).

The Perfection of Medicinal Forms of Tartar Emetic. The intravenous administration of antimony preparations in the massive treatment of patients has the following defects:

1) It is technically comparatively complicated for the main mass of secondary-school medical workers in the rural locality;

2) It takes up much time and limits the possibility for mass treatment;

3) In a certain percentage of the cases it leads to

various complications which not uncommonly are severe and with which it is difficult for secondary-school medical workers to cope.

The most convenient and available method of giving the substance is that of taking it by mouth. Attempts to create such a preparation have been made for a long time but so far without any essential success. In the opinion of some foreign authors, even a small dose of tartar emetic taken by mouth causes severe vomiting, and the preparation is not absorbed through the intestine. The investigations of Chinese scientists have shown that the preparation introduced by this method into the body is comparatively well absorbed through the intestine, and therefore, a drug form can be produced which does not cause vomiting. A study has been made of a number of medicinal forms of tartar emetic for use by mouth: gelatin capsules, capsules filled with tartar emetic and potassium acid tartrate and sodium chloride, tablets consisting of stearic acid, tartar emetic and other substances, tablets of tartar emetic and potassium acid tartrate, a mixture of tartar emetic and others (for the preparation of mixtures substances have been found which lessen the emetic effect of antimony but these mixtures have not been used clinically).

The search for a drug form of tartar emetic for use by

mouth, however, has so far not produced any positive results: none of the preparations mentioned above can be recommended for use in therapeutic practice. True, these searches have shown the possibility of eliminating the emetic effect of antimony preparations and their good absorption through the intestine.

Antimony preparations have been obtained for intramuscular injection. These preparations are being incorporated into practice with a beneficial result.

Along with the search for new antimony and non-antimony preparations investigations are being accomplished on a large scale for the improvement and increase in efficiency of courses of treatment.

Shortened Course of Treatment. Before 1957 a 20-day course of treatment was given. For intravenous injection a one percent solution of tartar emetic was used. A total dose of the preparation amounted to 1.5 gram. A study of the late results showed that approximately a half year after the treatment schistosome ova appeared in the stools of one-third of the patients. The entire course of treatment, including the preparation and the rest period, took no less than a month. Therefore, the patients agreed to treatment without much enthusiasm. In the mass treatment agricultural produc-

tion sustained great loss. In 1956-1957 four-six-eight-24-hour and two-three-five-seven-10-day courses of treatment were studied. The three-day course proved to be most effective for mass treatment. It became widespread rapidly throughout the entire country. The total dose per course of treatment amounts to 0.07 gram of the preparation. The preparation is given in equal parts two or three times a day. The abbreviated course of treatment is indicated for the majority of patients with schistosomiasis. The contraindications are the following: severe cases of acute schistosomiasis, disturbance in the portal or general circulation, the presence of jaundice, cirrhosis of the liver with considerable ascites, cachexia, hematemesis, the active form of tuberculosis, etc. At the present time, the forms of schistosomiasis listed are noted in a comparatively small percentage of patients who need, generally, pathogenetic treatment. Side-effects of the antimony preparations are expressed as coughing, vomiting, dizziness, loss of appetite, dermatitis, etc. These relatively mild forms of reactions do not exert any essential influence on the treatment. Among the serious reactions are involvements of the liver and heart.

In patients with cirrhosis of the liver following treatment the working capacity is partially regained; in persons with a dwarf height the height is increased and the general development is

improved. In the majority of patients, on the 16th-18th day after treatment schistosome ova disappear from the stool. However, clinical recovery does not always proceed in parallel with the disappearance of ova from the stool. In a considerable percentage of cases the ova are found in clinically healthy people (parasite carriage). The use of two or three-day course of treatment has made it possible considerably to expand the scale of therapeutic work. Many patients have obtained the opportunity of being treated at home and even without any stoppage of work. While previously a group of three medical workers could take care of 30-60 patients in a month, now, in the same period they can give care to 3,000-6,000 patients. Their mortality rate from the side effects of antimony has been reduced to zero-0.5 percent as against 0.9 percent in 1957.

In acute schistosomiasis which occurs with signs of severe intoxication the course of treatment is lengthened, and the doses of antimony are reuced. In some cases such patients preliminarily receive hormone preparations (ACTH or cortisone). ACTH is given along with glucose by drip; cortisone, in a dose of 25-50 milligrams per day. The treatment with hormone preparations is continued 10-14 days. In some cases repeated blood transfusions in small doses and increased nutrition are recommended. Such a preliminary treatment lasts 10-14

days and then a course of treatment with tartar emetic is prescribed. In patients with acute schistosomiasis the course of treatment lasts 25-30 days; the total dose of the preparation should not exceed 25-30 milligrams per kilogram of the patient's weight. The results of such a combined treatment, as a rule, are good.

Considerable progress has been made in the treatment of schistosomiasis with cirrhosis of the liver and enlargement of the spleen. A three-day course of treatment is prescribed for such patients, as a rule, but the doses of the antimony preparation are somewhat less.

In the case of various complications or consequences of schistosomiasis the following agents and methods of symptomatic treatment are used:

1) In the case of an excessively enlarged spleen the operation of splenectomy with fixation of the greater omentum in the retroperitoneal space is being used successfully; in the past two years this operation has become quite widespread even in the rural rayons;

2) In the case of repeated profuse gastric hemorrhages the operation of ligation of gastric veins and of the lower portion of the esophagus is performed; the operation of venous anastomoses has

not become widespread because of its complexity; it is performed only in large surgical institutions;

3) In the case of considerable ascites certain agents of the people's medicine are prescribed; in the case of protein deficiency, a special diet rich in proteins, vitamins and carbohydrates.

Antimony Intoxications and Measures for Controlling Them. The symptoms of antimony intoxication are very heterogeneous. Usually, nausea, vomiting, headache, dizziness, chill with high temperature, rash with an itch, palpitation, systolic murmurs, arrhythmia and extrasystoles, collapse, jaundice, abdominal distention, etc. are observed. The direst complications are involvements of the heart and liver. Of the total number of fatal outcomes from antimony intoxication death occurs in 75 percent of the cases with signs of acute disturbances in the cardiac activity; in the other cases, as a result of acute hepatic necrosis. Severe disturbances in cardiac activity are usually encountered in women. The clinical picture of intoxication are characterized by the following symptoms: ventricular extrasystoles, ventricular fibrillation, tachycardia, Adams-Stokes syndrome. In experiments on animals and through clinical obeervations it has been determined that antimony preparations exert a marked inhibitory

effect on the cerebral cortex, increase the tone of the vagus nerve and the irritability of the myocardium. Some data have been obtained concerning the participation of the adrenal system in the development of the Adams-Stokes syndrome (the experiments were performed with a "heart-lung" apparatus). Apparently, the combination of the factors mentioned above underlies the development of the complicated combination of disturbances in cardiac activity during antimony intoxications.

The signs of antimony intoxication usually appear in the second half of the course of treatment. In the event of a developir Adams-Stokes syndrome the intravenous injection of atropine in large doses is used as emergency aid. Because of the use of atropine the number of fatal outcomes has been reduced from 80 to 10-30 percent.

Liver involvement is observed more often in the abbreviat courses of treatment. Thus, of 5,555 patients examined the treatment of whom had been accomplished according to this method liver involvement with jaundice was noted in 114 patients. Of these, two died; in the others, the jaundice disappeared after the treatment was stopped. More severe lesions were noted after a four-hour course of treatment. Of 25 patients who died 23 died from acute hepatic necrosis (severe hepatic coma). The patients could not be

saved, although the necessary measures were taken, namely: transfusion of blood and infusion of glucose solution, the administration of vitamins, liver extract, aureomycin, ACTH, cortisone and others. In one case even an artificial kidney was used.

With the aim of elucidating the mechanism of the toxic effect of antimony on the patient's body, the study of the pharmacology and toxicology of this preparation has been developed widely in the past two or three years in the following directions: improvements of methods of microscopic analysis of antimony in the urine, stool and organs; study of the absorption and excretion of antimony; determination of the antimony concentration in the blood; a comparative determination of antimony in schistosomes and in liver of animals; a study of the toxic effect of antimony depending on the age, sex, and other factors. A search for effective detoxifying agents (an antimony antidote) is being conducted on considerable scales. Of the group of mercapto-compounds the most effective preparation was sodium dimercaptosuccinate. In experiments on mice it has been determined that the intracutaneous injection of this preparation increases the LD_{50} of tartar emetic by 15 times and also considerably increases the excretion of antimony in the urine. At the present time, sodium dimercaptosuccinate is being tested clinically.

A good antitoxic effect is shown by the Soviet preparation unithiol [HS-CH_2- (SH)·$CH_2SO_3Na·H_2O$]. According to the data of Chinese investigators, this preparation increases the LD_{50} of tartar emetic by nine times. This preparation exerts a therapeutic effect when it is administered by mouth and by rectum. An aqueous solution of unithiol is stable and is convenient to use.

Of the antithyroid agents thiourea and thiouracil have proved to be effective. Both these preparations considerably lessen the toxic effect of tartar emetic and do not reduce its therapeutic effect. In experiments it has also been determined that thiourea lessens the toxic effect of antimony on the heart and liver.

The use of procain and hypertonic solution of glucose has proved to be ineffective. In experiments on animals some interesting data have been obtained concerning the influence of antimony preparations on the central nervous system function and on mechanisms of antimony intoxications. Experimental data on the influence of antimony preparations on the carbohydrate metabolism are of great scientific and practical interest. It has been determined that in dogs which died from antimony intoxication the glycogen completely disappears from the liver. Shortly before death, in the majority of cases hyperglycemia is observed in the experimental animals,

which is then replaced by hypoglycemia. During the phase of hyperglycemia the quantity of glycogen in the liver is markedly reduced; in the phase of hypoglycemia the administration of a large dose of glucose rapidly stops the hypoglycemic convulsions but does not increase the quantity of glycogen in the liver. The increase in the sugar level in the blood is a result of a very rapid splitting of the glycogen in the affected liver, the disappearance of which glycogen then leads to a acute hypoglycemia. The administration of insulin prevents the development of hyperglycemia and the reduction in the quantity of glycogen in the liver, whereas glucose, cortin, ergotoxin do not give any such effect. These observations permit us to suppose that the disturbance in carbohydrate metabolism in antimony intoxications is brought about by some hormone -- an insulin antagonist. This hormone possesses an antiinsulin effect on the enzyme system connected with carbohydrate metabolism, particularly with the glycogen synthesis in the liver. In experiments on animals a paralyzing effect of antimony on muscles and on the sucking discs of schistosomes has been established, which is apparently explained by the marked reduction in the quantity of glycogen in the bodies of the male schistosomes.

The control of schistosomiasis is one of the striking

examples of the exceptional concern of the Party and Government for the health of the working class of China. Under the direct supervision of the Party and Government scientific research and practical work which is tremendous in its scale have been developed in China. As a result, no less than three years schistosomiasis has in the main been eliminated in 100 districts (out of 324), including in one province and one city. Mollusks have been destroyed over area of 4,000,000,000 square meters, for the most part, and the treatment of 3,500,000 patients has been accomplished. The mortality rate from schistosomiasis in 1957 was reduced to 0.9 per thousand as against four per thousand in 1955, and in 1958, to 0.05 per thousand. This striking progress has become possible chiefly because broad masses of the population were brought in for the fight against schistosomia

Malaria

Malaria is widespread among the population of China, although in recent years it has shown a definite tendency toward a decrease. Scientific research work on this problem has become possibl only after the liberation of China, particularly in the past three to five years. During this short period of time new important data have been obtained concerning the distribution of malaria, its epidemiologi characteristics, methods of prophylaxis and treatment as applied to

specific local conditions of the republic.

According to the recent data of Chinese investigators, foci of malaria can be divided into three rayons (zones). Each of them has its own characteristics and differences.

The first rayon is located north of 32° north latitude. In this area the splenic index is no higher than 10 percent. The main type of mosquito of this area is Anopheles hyrcanus sinensis; in the river basin of the Sungari River A. maculipennis atroparvus is also found; in Sinchiang, A. maculipennis sacharovi. The great majority of the population of this area is not affected with malaria. In those who become sick only tertian malaria is noted, rarely estivo-autumnal (imported). The maximum rise in the morbidity rate comes about in August. Outbreaks are observed in the low marshy places.

The area with a moderate malaria morbidity rate is located between 25 and 32° north latitude within the limits of the 16-20° isotherm. The malaria morbidity rate is comparatively high, particularly in the mountainous regions. The splenic index is within limits of 10-50 percent; in the plains, less than 10 percent. In the mountain areas the main vector is A. minimus; in the plains, A. hyrcanus sinensis. In those who become sick tertian and estivo-autumnal malaria are found.

usually tertian. The maximum rise in the morbidity rate is in September and October. Outbreaks of malaria are more frequent than in the first area. rayon.

The rayon with the high morbidity rate is located south of 25° north latitude; in mountainous areas the morbidity rate is much higher than in the plains. In the mountains the splenic index is higher than 50 percent, sometimes 100 percent. The principal vector of malaria are A. minimus, A. fluviatilis and others; in the woods on the island of Hainan, A. leucosphyrus bucosphyrus. The epidemiological characteristics of this area are the following: the foci of malaria are spread over a large area; in adults estivo-autumnal malaria is usually found; in children, tertian malaria; the mosquitoes are active the year round; the maximum rise in the morbidity rate is in May-June.

Chinese investigators have done great work in determining the species of mosquitoes in the foci of malaria (43 species of mosquitoes have been described) and their breeding places. According to these data, broad plains on which irrigated rice is cultivated are the main breeding places of A. hyrcanus sinensis. This species of mosquito also breeds in irrigation channels, ponds, bottom lands of lakes and others. In mountainous areas other species of mosquitoes breed. The main ones are A. minimus, A. fluviatilis, A. candidensis

and A. leucophyrus. Therefore, the breeding places of the mosquitoes are chiefly running and stagnant water (rice fields, waterbodies overgrown with vegetation, bottom lands, ponds, etc.), stagnant water in ditches, wells, etc.

A detailed investigation has been made of the relationship between the mosquito census and the season of the year. Over the major portion of the territory of the continent the mosquito census in the winter time drops to its minimum level or disappears altogether. Only in some subtropical areas (the island of Hainan, the Southern areas of the province of Yunnan) and some areas of the temperate zone. The winter temperature exerts no essential influence on the development and census of the mosquitoes. The stage at which the mosquitoes pass the winter is different and depends on the species of mosquito: some spend the winter in the image stage; others, in the larval stage. In the more temperate zone A. hyrcanus sinensis passes the winter in the image stage; A. minimus and A. pattoni, in the larval stage. The Chunch'ing area is located in the temperate zone. In this area A. hyrcanus sinensis, which has passed the winter as an image, flies out in the second half of March. The first image generation appears in the second half of April. Then the mosquito census gradually increases and in June-July it reaches a maximum. In the third ten-day period of

October the curve decreases sharply.

The island of Hainan is in the subtropical zone. The maximum rise in the census curve of A. hyrcanus sinensis is observed in November and April, that is, during the dry and relatively cold season for this area. In the hottest months, that is, in June, July, August and September, the census curve drops. The maximum rise in the census curve for A. vagus is noted in June and September, that is, in the hottest part of the year. The census curve of A. minimus depends on the terrain in the plains. At a distance from the mountain the maximum rise in the mosquito census is noted in March-June, and at the foot of the mountains the census stays at a high level the whole year.

Data which have been collected on the mosquito census in various seasons of the year and in various areas of the country make possible to draw the following conclusions: the mosquito census according to seasons of the year depends on three factors -- the temperature, the quantity of atmospheric precipitation and the agricultural routine. In areas with extensive rice fields the greatest census occurs for the following species of mosquitoes: A. hyrcanus sinensis, A. phillipinensis and A. aconitus. Here, the maximum breeding of these species occurs.

The habitats of the anopheles mosquitoes were investigated after the liberation of China in Yunnan, Chiangsi, Kuantung, Fuchiang provinces and on the island of Hainan. The investigation was carried out in the daytime in houses, in cattle-sheds and in the open air. On the island of Hainan 15 species of mosquitoes were caught among which A. vagus, A. minimus, and A. fluviatilis predominated. The distribution of species according to rayons of the island appears to be the following: A. vagus constitutes 99.6 percent in the maritime areas; 98.2 percent in the hilly areas; and 58.1 percent in the foot-hill areas; A. minimus constitutes 0 in the maritime areas; 1.3 percent in the hilly areas, and 40.8 percent in the foot-hills; A. fluviatilis is encountered very rarely, only in mountainous areas and constitutes 0.8 and 1.9 percent of the total number of mosquitoes. In the open air 15 species of mosquitoes were caught. Of these, A. aconitus, A. kochi, A. hyrcanus sinensis and others are encountered most often.

In the provinces of Yunnan, Kuantung, Chiangsi, Honan, Fuchiang, Shansi and Chiangsu A. hyrcanus sinensis is the species found chiefly in the cattle-sheds; in the provinces of Yunnan, Chiangsi and Fuchiang A. minimus is encountered chiefly in the houses; in Kuantung, in the cattle-sheds.

It has been noted that anopheles mosquitoes, both endophil and exophilic, which live in the houses or cattle-sheds, can nge the site of their diurnal shelter depending on the season of year, time of the day as well as the nature of the locality. a result of a mass investigation dealing with the diet of squitoes the following material has been obtained.

In Nanking, of 167 mosquitoes (A. hyrcanus sinensis) ght in the houses, human blood was found in 141; animal blood, 19; in seven no blood was found. Of 766 mosquitoes caught in the ttle-sheds human blood was found in nine; animal blood, in 746; in 11 no blood was found. On the island of Hainan, of 1,211 squitoes (A. hyrcanus sinensis) caught in the cattle-sheds human od was found in 12; animal blood, in 1,199; of 69 mosquitoes ght in the open air human blood was found in three; animal bloo 66. These data speak for the fact that A. hyrcanus sinensis feed human blood and the blood of long-horned cattle, but nevertheless fers the blood of the latter. A. minimus, which lives on the isl Hainan, prefers houses and feeds chiefly on human blood. In the ttle-sheds and in the areas in which long-horned cattle are kept cies of mosquito is encountered very rarely. Of 1,417 mosquitoes s species caught in the houses, human blood was found in 1,348; 65, the blood of long-horned cattle. Such a diet of A. minimus

is characteristic only of the island of Hainan. In the southwestern provinces A. minimus sucks human and animal blood equally.

In 57 percent of the mosquitoes caught in the houses of Yunnan province human blood was found; in 42 percent, the blood of long-horned cattle. Of 455 mosquitoes of the species A. candidensis caught in the houses on the island of Hainan, human blood was found in 437; in 17, the blood of long-horned cattle; of 220 mosquitoes caught in the cattle-sheds, human blood was found in four; in 216, the blood of long-horned cattle.

All the species of mosquitoes which frequently inhabit the houses or cattle-sheds can be divided into three groups according to their diet: species preferring human blood, including A. minimus, A. fluviatilis and others; species which suck human and animal blood but prefer animal blood, A. hyrcanus sinensis and A. candidensis; species which suck animal blood, A. aconitus, A. philippinensis, A. kochi, and A. vagus.

From investigations made the year round valuable data were obtained for malaria epidemiology concerning the nocturnal activity of mosquitoes. It was found that in mosquitoes inhabiting houses and in those which attack long-horned cattle there are definite rules and regulations in this connection. Thus, A. minimus which prefers human blood, is active in houses all night long, whereby its greatest activity is at midnight. The catch from 11 p.m. to 3 a.m. of the next day constitutes 69.5 percent of the total catch for the

24 hours; the catch from 6 p.m. to 10 p.m., 15.1 percent; and from 4 a.m. to 6 a.m., 15.3 percent. The same rules and regulations with respect to activity were found also in other species of mosquitoes. The data presented are of important epidemiological significance in connection with measures of individual protection against mosquito bites at night.

In a number of areas of the country a mass investigation was made for the degree of infection of mosquitoes. On the island of Hainan during the period 1953-1954 44,425 mosquitoes (14 species), caught in the houses and cattle-sheds, were dissected and examined for the presence of infection. Infection was found in four species: A. minimus, A. fluviatilis, A. candidensis and A. leucosphy The last-named species is a new vector discovered after 1949. Among the other species, A. hyrcanus sinensis, A. vagus, A. aconitus and others, negative results were obtained.

In Yunnan province 87,921 mosquitoes (15 species) were investigated. Infection was found in A. minimus and A. candidensis in the others, no malaria plasmodia were found.

In Hunan province 8,056 mosquitoeswere investigated. Parasites were found in the salivary glands of A. hyrcanus sinensis. A. minimus was found to be infected under natural conditions in the provinces of Kuantung, Kuangsi, Kuichou, Hunan, Fuchiang, Chiangsi, Ssuch'uan and Yunnan. The average for infection of this species is much higher than that for other species of mosquitoes.

On the island of Hainan infection under natural conditions were found in all places investigated. In Yunnan province an investigation was made of mosquitoes in 13 rayons; in 12, an infection of the salivary glands was found. A. minimus is the principal vector of malaria in the foot-hill areas, which are located south of 32° north latitude in all areas where this species of mosquito is found the malaria epidemics are particularly severe.

As has been mentioned above, on the island of Hainan, where the average temperature in the wintertime is equal to 16°, the mosquitoes are active the year round. In all mosquitoes investigated at this time plasmodia are found. Therefore, in inhabitants of this island fresh cases of malaria are recorded the year round. In recent years it has been determined that A. leucosphyrus is a quite frequent vector of malaria. Previously, little was known about this.

In recent years, considerable work has been carried out on the investigation of foci and of resistance to disease among the population. It has been determined that in foci with the greatest population involvement and with a large number of parasite carriers the morbidity rate with malaria showing pronounced symptoms is very small. Among the local population there are no epidemic outbreaks. They have been called "silent" foci. They are located mainly in the southern provinces of the country. The problem was to detect and study the "silent" foci as quickly and completely as possible. In this connection, considerable work was done by the Hianan Antimalarial

Station. In foci with the greatest population involvement a selecti investigation of children was made under one year of age. According to the morbidity rate figures for children of this age, who are most susceptible to malaria, a characterization was made of the general population involvement. In accordance with this, prophylactic and treatment measures for malaria were developed. In 1954-1955 the Station investigated six volosts /small administrative division including several villages/ of the island of Hainan over an area of 70 square kilometers. In 1954, 130 of 251 children born were infected; in 1955, 136 out of 231 born. The majority of children investigated was infected with estivo-autumnal malaria. The maximum infection occurred in May and November; the minimum, in January, February, and March. Forty and one-tenth percent of the children were affected during the first three months of life; 74.4 percent, in the first six months; 85.5 percent, nine months; and 93.2 percent 12 months.

The degree of infection of the adult population was determined by the parasitological index. Among the population investigated a positive result was obtained in 90.5-97.3 percent. The data are typical of many mountain cities of the island of Hainan. Among those infected estivo-autumnal malaria predominated; tertian malaria was second, although the relationship between these two forms varied in different areas.

The splenic index was found usually in children from two

to 12 years of age.

In recent years (up to 1957) malaria epidemics in China were noted in the form of individual outbreaks in the provinces of Liaoning (1952-1953), Honan (1953-1956), Kuantung, and in the areas of virgin territory (1952); on the island of Hainan, chiefly in virgin territory (1955), the morbidity was registered chiefly among those coming in from uninvolved areas of the country.

Chinese scientists did great work in checking the efficacy of various antimalarial agents, among which are the following.

1. Chloroquine. This preparation proved to be most effective with respect to the asexual forms of the parasite. After taking this drug the temperature drops in 24-48 hours; the plasmodia disappear from the blood in from 40 to 72 hours. For the purpose of treating parasite carriers a single treatment was used. The direct result was that the asexual forms disappear in 100 percent of the cases. A three-month's observation after treatment showed that in the case of estivo-autumnal malaria no plasmodia were found throughout the entire period; in the case of tertian malaria, they were found in 89.3 percent of the cases. In 1955 Chinese chloroquine was synthesized which is equal to the English chloroquine in its effectiveness. The mass production of this preparation was begun.

2. Paludrine. This preparation is produced in large quantities by Chinese industry, and is used chiefly for the treatment of

parasite carriers. A positive result occurs after seven days in 96.8 percent of the cases. After prolonged used of paludrine forms of plasmodia appear which are resistant to this preparation.

3. Atabrine. This preparation is widely used for the treatment of malaria. After two courses of treatment (each course lasts seven days with an interval of 40 days) the parasite index decreases sharply; however, after two months it again increases to 54.8 percent. Atabrine has a good effect in the estivo-autumnal forms of malaria and is not very effective in tertian malaria. The combination of atabrine with Soviet plasmocide [pamaquine] gives a good immediate effect, but two and a half months after treatment relapses occur in a considerable number of patients. Good results ha. been obtained with atabrine treatment in combination with plasmoquine. In 1953-1955 about 100,000 patients were treated by this method. Recovery occurred in 93 percent. Fair results were obtained in the treatment of tertian malaria with primaquine (the Shanghai area).

Of the popular remedies infusion of Dichroa febrifuga and Pinella tuberifera as well as Chen-tsu therapy are used. The obser ations are still few. The general impression is good.

In recent years, Chinese scientists have done considerab research work on the study and experimental checking of comprehensi

measures for the elimination of malaria. In this respect, the considerable work carried out by the Hainan Antimalarial Station deserves attention. In 1955-1956, in the Nanfang area (island of Hainan) over an area of 100 square kilometers a single treatment of houses with DDT was accomplished; the cattle-sheds were not treated. The efficacy of this measure proved to be brief. Even in the first half of 1957 several species of mosquitoes were found in the treated houses, including the main vector, A. minimus. During the first period following the treatment a considerable reduction in the infection of suckling children and a reduction in the average morbidity rate of the adult population were found. However, in 1957, the morbidity rate [illegible] again increased. The results of these measures show that just a single treatment of houses with DDT does not give the necessary effect. In connection with this, the Hainan Antimalarial Station organized a simultaneous accomplishment of a combination of measures the efficacy of which, as is well known, was illustriously confirmed by the rich experience of the Soviet Union. Here, specific characteristics of malaria epidemiology were taken into consideration in China, particularly on the island of Hainan (the variety of malaria vectors, the high degree of infection of the population, the abundance of water bodies, the characteristics of the landscape, etc.). An

observation was made in two inhabited places. In the first inhabite place it was determined through a universal examination of the population that the parasitic index of the inhabitants amounts to 64.9 percent; the splenic index, to 77.7 percent. In the houses, A. minimus, A. aconitus, A. fluviatilis, A. vagus and others were caught. The A. minimus infection amounted to 7.7 percent. DDT treatment of the houses was accomplished twice a year. For the purpose of treating patients with clinically overt forms as well as parasite carriers atabrine, plasmocide and paludrine were used in combination. The results of two years of work in carrying out thi combination of measures proved to be very successful. A. minimus (the main vector) and A. fluviatilis (generally, it is encountered rarely in this area and is not of epidemiological interest) disappeared almost completely. The parasitic index was checked seven times in two years: it decreased from 64.9 to 2.5-f.8 percent. It was determined that the most resistant parasite carriage was found in tertian malaria, which, despite the measures taken, lasted for nine months. Parasite carriage in estivo-autumnal malaria decreased markedly after the first course of treatment, from 47.7 to 12.7 percent. The dynamics of the reduction in the monthly morbidity completely agrees with the dynamics of reduction in the

parasitic index.

The second inhabited place with an area of 80 square kilometers was located in the foot-hills of the island of Hainan. The average annual temperature is 25°. The quantity of annual precipitation is more than 2,000 millimeters. In this area, irrigated fields alternate with dry-crop fields. Severe malaria epidemics raged here in the recent past. In a popular proverb it has been said about this area: "Like water in the river, people who go there do not return". Before the realization of comprehensive measures the morbidity rate and parasite carriage were almost universal. Thus, a selective examination showed the following results: the splenic index in children younger than six amounted to 100 percent; the parasitic index, 97.6 percent; the splenic index in children, seven-14 years, 93.5 percent; the parasitic index, 96.9 percent; the splenic index in persons older than 15, 52.7 percent; the parasitic index, 58.8 percent. The bulk of the population of this area was affected with the estivo-autumnal form of malaria. The elimination of the vector was accomplished by complete treatment of houses with DDT twice a year (April and September). Universal treatment was accomplished for all those sick and parasite carriers. As a result of the measures taken (treatment of houses and cattle-sheds with DDT, mass

treatment of patients with clinically overt symptoms and parasite carriers) the morbidity rate dropped to five percent. It is interesting to note that as soon as the prophylactic treatment was stopped the morbidity rate again increased. Beginning with May 1956, along with these measures, such measures as individual protection of the population and preventive measures against the importation of malaria from without were also taken. The morbidit rate decreased steadily to one percent.

Before the comprehensive measures were carried out the A. minimus census amounted to 37.7 percent of the total census of mosquito species, and after the measures were carried out this species of mosquito was not found either in houses or in cattle-sheds. The data on the Hainan Antimalarial Station confirmed the fact that a single treatment of clinically overt cases of malaria is inadequate: a combination of this treatment with prophylactic treatment is required. However, the opportunities for prophylacti treatment are also limited. Only the accomplishment of comprehens measures assured a high degree of effectiveness in malaria cont in this area.

The experience of the Hainan Antimalarial Station was of very great importance in the organization of extensive government measures for the elimination of malaria. Chinese medical personnel

are very persistently studying the rich experience and the theoretical generalizations in the field of malaria control in the Soviet Union in all its details. Soviet malariologists participated in the development of comprehensive measures. In 1956, a brigade of Soviet scientists, in cooperation with Chinese scientists, was occupied for several months in a complete study of the principal epidemiological foci of malaria, including on the island of Hainan. The material of this brigade was used by the Ministry of Health of the Chinese People's Republic in making out a general plan of malaria control. Through this specific example we should like once again to emphasize the importance of creative collaboration of scientists of two great friendly powers -- the USSR and China.

On the basis of the results of considerable scientific research work and the performance of comprehensive measures for malaria control experimentally in the Chinese People's Republic extensive government measures are being carried out at the present time for the elimination of this severe mass disease among the Chinese population.

Ankylostomiasis

Before the liberation of China scientific research on the study of ankylostomiasis were carried out an extremely limited scale. Only individual scientists were occupied with this problem on their

own initiative. Therefore, at that time there were very sparse data concerning the epidemiology and distribution of this disease on the territory of China. After the liberation of the country a large group of parasitologists and epidemiologists from various scientific research institutes and practical institutions engaged in the study of ankylostomiasis. During a short period of time a mass examination and study of the principal areas which are unfavorable with respect to anklyostomiasis morbidity was carried out. Thus, for example, in the province of Ssuch'uan, a total of 11 districts were investigated in 40 years (in 1909-1949); from 1950 through 1957, 125 districts, with a coverage of 1,718,802 persons. Research work was performed on the same scale in other provinces.

According to recent data, ankylostomiasis is widespread in the provinces of Shansi, Fuchiang, Chiangsu, Anhoy, Hunan, Chiangsi, Hupei, Ssuch'uan, Yunnan, Kuichou, Honan, and in the cities of Canton and Shanghai. In the villages of the provinces mentioned the ankylostomiasis morbidity rate reaches 80-90 percent. The infection of 50 percent of the population is a rule.

In the cold and dry areas ankylostomiasis is not found; in a number of other areas (southern part of the island of Hainan, northern areas of the province of Liaoning, the Western areas of the

province of Yunnan and others) ankylostomiasis is rarely encountered. A large number of patients is registered also in some of the Northern areas, for example, in the province of Shantun and Hopei. A high ankylostomiasis morbidity rate is noted among miners.

A detailed study has been made of the part played by some agricultural crops in the spread of ankylostomiasis. It has been determined that soil on which non-irrigated crops are grown are a factor in the infection as a rule. Through the example of the province of Ssuch'uan it was shown that the parasite does not survive to the infective stage in soil with stagnant water.

A direct connection has been established between summer and autumn non-irrigated crops and the spread of ankylostomiasis. Soil on which winter and spring crops are grown (wheat, pumpkin, rape, and others) are of comparatively little importance in the spread of this disease. A high ankylostomiasis morbidity rate is encountered in those areas where such crops as sweet potatoes, corn, tobacco and rice are grown over large areas. The soil under these crops is usually fertilized with human feces. In samples from these soils a large number of ankylostoma ova is always found. The high morbidity rate figures are noted in places where mulberry, coffee and fruit trees are grown. The infection of peasants working in coffee tree fields

reaches 96 percent. A very high morbidity rate is noted among peasants working in orchards; it reaches 92.5 percent or higher.

The ankylostomiasis morbidity rate according to seasons of the year is distributed in the following way. In the province of Ssuch'uan, in fields where sweet potatoes and corn are grown, the maximum morbidity rate comes in February-June; minimum morbidity rate, in August-October. In the other months the morbidity rate is very low. The highest morbidity rate among the peasants is observed in May, June and July; rarely, in ~~August~~ April, August and September.

In the province of Chechiang (city of Hangchow) the population is sick with ankylostomiasis the whole year. In the province of Kuantsung the season of infection is the shortest of all the provinces.

Chinese scientists have worked out an effective method for destroying ankylostome ova in human excretions. It has been determined that the dilution of the stool with water considerably lengthens the life of the ova (in the summer, to 63 days; in the winter, from 100 to 164 days). In excretions which are not diluted with water the maximum viability period of the ova is 25 days (in the summer). A mixture of stool and urine even further shortens the lives of the ova: in the summer, to seven days; in the winter, to 20 days. Keeping the stool

and urine in closed vats or in ditches proved to be the best method of destroying the ova: in the summer they maintain their activity for one or two weeks; in the winter, up to a month. Of the chemical agents, one percent hexachlorane, calcium cyanamide and ammonia are used with satisfactory results.

For the treatment of ankylostomiasis tetrachlorethylene is being used successfully. The effectiveness of this preparation is considerable; however, in a considerable percentage of the cases it shows side-effects, producing dizziness (85 percent of the cases), headache (56 percent), nausea (36 percent), vomiting (23 percent). In individual cases, there are signs of nervous system disturbance up to the point of a comatose state.

Good results have been obtained in the treatment of ankylostomiasis with 1-bromo-2-naphthol. In 1956, the production of this preparation was mastered in the city of Chungch'ing. The effectiveness of the Chinese preparation was checked on 13,299 patients. A two-day course of treatment was used. Where necessary, the course of treatment is repeated. There were practically no side effects.

In the province of Ssuch'uan the experience and treatment of several millions of patients with ankylostomiasis has shown that the use of tetrachlorethylene without a purgative gives better results

than with a purgative. Side-effects are observed much less often this way. This method considerably simplifies the mass treatment of patients, particularly in the rural areas.

For the purpose of eliminating the side-effects Chen-tsu therapy is being used successfully. With the development of anemia a good result is given by iron preparations. Here, an interesting phenomenon has been noted: in patients who are given iron preparation the number of ova in the stool is gradually reduced. Apparently, as the Chinese investigators believe, iron retards the excretion of ova by the female ankylostomes. Therefore, iron preparations can be used successfully in combination with specific treatment. For the purpose of diagnosing ankylostomiasis the Chinese scientist Wang Ch'ing-i has perfected a method of detecting ankylostome ova in the excretions.

The scale and results of the therapeutic-prophylactic wo in controlling ankylostomiasis are clearly shown through the example of Ssuch'uan: in 1951, the number of patients who were given a course of treatment amounted to 13,038; in 1952, 47,943; in 1953, 892,229; in 1954, 684,353; in 1955, 705,856; in 1956, 1,400,000; in 1957, 2,784,419; in 1958, 15,035,000 (a total of 21,562,000 patients).

The population of this province amounts to 70,000,000 peo

of which approximately 40,000,000 suffer from ankylostomiasis. More than half of all the patients have been given timely treatment in just the past three or four years. In this group all the patients are included in whom the disease had occurred with overt clinical symptoms and a loss or reduction in working capacity, which constitutes approximately 4,000,000 people. Therefore, as a result of the mass treatment a tremendous army of people has been returned to work.

For the purpose of treatment chiefly tetrachlorethylene has been used. The preparation 1-brome-2-naphthol has been used chiefly for the treatment of sick children, pregnant women, elderly persons and patients suffering from cardiac valve defects, tuberculosis, etc.

Along with the mass treatment on a large scale disinfection of the stool and sanitation-education work has been carried out among the population. Similar work in controlling ankylostomiasis is being done in the other provinces. We refer to Szechuan province as an example of progressive experience.

Kala-Azar

Kala-azar is one of the serious diseases which are widespread among a number of provinces of China to the North of the Yangtze River (Shangtun, Chiangsu, Anhoy, Honan, Hupei, Shansi, Chensi and Kangsu). Shantun province is the most unfavorable with respect to the kala-azar morbidity; here, every year large epidemics of this disease break out. Kala-azar is encountered also in Hupei province (northern areas); Liaoning (southern regions), Ssuch'uan and Ch'inghai (eastern rayons), as well as in the Sinchiang-Uigurian Autonomous Rayon.

According to 1951 data, in the provinces mentioned the kala-azar infection rate amounted to 40-50 persons per thousand population. The total number of patients [illegible] in that year was 600,000. Persons of all ages were infected, with exception of suckling children, in whom this disease was rarely encountered. Men became sick much more frequently than women, approximately in relationship of 3:2 and even 7:3.

In 1934, in Mukden canine leishmaniasis was found for the first time. Subsequent investigations established the existence of this disease in 31 cities and districts. The examination data of 113,393 dogs in seven provinces showed that canine leishmaniasis

had its greatest distribution in the northwestern provinces of the country. In the East it was encountered considerably less often. In some areas a direct connection was established between the infection of dogs and the morbidity in people. However, such rules and regulations were not universal. In a number of the eastern provinces the epidemic of kala-azar was not much associated with the infection of dogs. The main source of the infection here was constituted by sick people (the provinces of Chiangsu and Anhuei). Among other species of domestic and wild animals (wolves, foxes, rodents, sheep, cows, oxen) no leishmaniasis was found in China. Leishmaniasis of the Indian type usually affects children, and this situation is noted in these areas where the highest infection rate of dogs is found. Usually, children under ten years of age become sick. Thus, for example, in Hopei province, with a very high degree of infection of dogs, the sick children under ten years of age amount to 88.9 percent; in the province of Shansi, 90 percent etc.

The main vector of kala-azar is the gnat Phlebotomus chinensis. Among 20 gnat species investigated it constitutes 75.4 percent; Phlebotomus mongolis is in second place.

In the majority of provinces gnats are found in the first ten days of May. Their number rapidly increases in the second and

third ten-day periods of June (first rise), and then there is a rapid fall in the census; the second rise is in the second ten-day period of July. The season for gnats ends in the second and third ten-day periods of September. The average optimum temperature for th life of the gnats is 20° (variations from 20 to 30°). In the great majori of areas 90 percent of the gnats live in the villages in simple and dark dwellings or in cattle-sheds. In the province of Kansu the gnats are found in caves (70-80 percent). The gnats fly out of their habitats before the sun sets and are outside of the houses for the first h of the night; then their number gradually decreases, and by dawn they disappear. In the houses the reverse phenomenon is observed: the g est number of gnats is found in the second half of the night and in early morning.

In the provinces of Shensi and Kuangsi a study has been m of the distance of gnat flights. It has been determined that the us distance of the flight is 30 meters; the maximum distance, 300 meters.

Blood examinations of several thousands of specimens of gnats showed that Phlebotomus chinensis drinks chiefly human blood; much less often, the blood of domestic animals. Dog's blood was found in only one-eight percent of the cases.

The female Phlebotomus chinensis lays eggs once a year; the female Phlebotomus mongolis, twice a year. Every female lays, on the-

average, 47 eggs; the percentage of hatching is 71.4; the duration of hatching of the larvae is 11-12 days. Maturation of the gnats at a temperature of 22-28° takes about 55 days . The majority of larvae hibernate. The larvae are resistant to cold and readily tolerate spending the winter in the upper layers of the soil at a depth of ten centimeters.

A detailed morphologic study of the larvae of Phlebotomus chinensis, and Phlebotomus mongolis has been made. Differentiation of the larvae is made according to the presence or absence of "crests" on the head, chest, and abdomen. According to this feature it has been determined that in one and the same place larvae of two or three species of gnats may hatch.

Under laboratory conditions it has been shown that the female gnats can live for five to ten days after they are fed with blood; individuals, up to 17 days. The longest period in which they have been recovered a second time is equal to 11.5 days.

In recent years, a detailed study has been made of the clinical picture of kala-azar in China.

In the province of Shantun (4,269 patients examined) kala-azar, as a rule, develops gradually, without acute symptoms. The symptoms most frequently found are fever, general fatigability, loss

of appetite, increased tendency toward perspiration, cough, enlargement of the liver and spleen, hemorrhage from the nose and gums. Th temperature elevation is noted in 95.3 percent of the patients; bleeding, in 40 percent; enlargement of the spleen is encountered in th majority of patients; of the liver, in approximately 40 percent. Leukopenia s is observed in approximately 74 percent of the patients; of these, the leucocyte count falls to 2,000-4,000 per cubic millimete of blood in 45.9 percent, chiefly because of a reduction in the polynucleated forms. A considerable percentage of the patients suffered from an overt anemia. In 77.2 percent of those investigated the eryt rocyte count decreased to two million. The hemoglobin, to 40 percent At the present time, serious forms of kala-azar are observed comparatively rarely.

Cutaneous leishmaniasis in China is encountered only exceptionally. In recent years, this form has been found in 20 pers.

For the purpose of diagnosing kala-azar extensive use is mad of a tap of the iliac bone and of the spinous processes of the vertebr column. Both methods give almost the same number of positive results (80-90 percent). A large percentage of positive results is given by liver biopsies, but fewer than from bone marrow punctures. Good result have been obtained in the study of lymph node punctures, although this

method is the simplest and safest. In addition, it is important that after treatment the leishmaniae disappear slowly from the lymph node, which is of prognostic significance.

Chinese investigators have obtained a kala-azar antigen from dried liver and spleen tissue. In using the antigen satisfactory results have been obtained from the complement fixation reaction: thus, of 319 patients in whom the diagnosis was made by means of an examining the bone marrow smear a positive complement fixation reaction was noted in 247 patients (77.4 percent); a doubtful one, in 14 patients. The percentage of positive results of the serologic test is higher in children. The antigen obtained from leishmania flagella gives a positive intracutaneous test. The observations are still few; therefore it is premature to evaluate this method.

At the present time, sodium antimonyl gluconate is being used for the treatment of kala-azar. The effectiveness of this preparation has been checked in 3,897 patients. In 89.4 percent of the cases the temperature drops after the fourth injection. With the reduction in temperature the appetite improves and the general condition of the patients becomes better. Approximately two weeks after the conclusion of the course of treatment the spleen decreases in size almost to normal. The blood picture improves quite rapidly. The leishmanias

disappear on the 15th day after the end of the course of treatment in 99 percent of those treated. Complications and fatal outcomes connected with the treatment amount to one percent. Two years after the treatment recurrences were observed in 7.4 percent of the patien

In Shantun province a three-day course of treatment was accomplished with a good result. The results of the six-day and three-day courses were the same. In a certain percentage of cases antimony preparations proved to be ineffective. In such cases, some non-antimony preparations are tried.

For the purpose of eliminating the vectors of kala-azar DDT and hexachlorane are being used successfully. Treatment of houses with these preparations is being expanded every year. Hexachlorane is being produced by Chinese industry in large quantities and at a very low cost.

Chapter VI

Virus Diseases

Among the virus diseases encountered in China Japanese B encephalitis is in first place. The first cases of the disease on Chinese territory were recorded in 1934. To be sure, Japanese B encephalitis was encountered even before 1934, but at that time it was not diagnosed, and therefore, was not registered. Systematic investigations of Japanese B encephalitis were begun only in 1949 -- the first year of the People's Regime. A complete study of the epidemiology of this disease has given considerable valuable material, which made it possible subsequently to define the main trends in scientific research and to take up the development of effective measures for controlling Japanese B encephalitis.

Epidemiological investigations of recent years have shown the Japanese B encephalitis is widespread in China.

The greatest increase in the morbidity rate comes about in July and particularly in August. Among patients the great majority are children. Before 1949 the mortality rate from Japanese B encephalitis amounted to 50 percent; in recent years, it has decreased considerably (nine-seven percent).

The principal scientific research center for the study

of Japanese B encephalitis is the department of virology of the Academy of Medical Sciences of the Chinese People's Republic. In the past six or seven years this department has been converted into a substantial scientific institution with a staff of 60 persons.

In research work considerable attention is given to the study of the virological entomology and entomological ecology. The results of these investigations show that the main vectors of the virus in North China are Culex pipiens var pollus and Culex tritaeniorhynchus, and in South China, possibly also Culex fatigans, Anopheles hyrcanus sinensis and others.

On the basis of numerous experimental investigations and observations under natural conditions it was determin that the virus of Japanese B encephalitis is maintained in the bodies of the mosquitoes after they have passed the winter in temperatures which are comparatively low for China. It has also been determined that the maximum period of wintering of the mosquitoes, during the course of which the viruses maintain their viability, is equal to three months.

Research devoted to the study of the transmission of the virus from one generation of mosquitoes to another deserves greater attention. Hereby it was confirmed tha'

the transmission of the virus occurs transovarially. For the purpose of confirming this very important fact in a scientific sense experiments were performed on the cultivation of mosquitoes from the ova of infected females. In many cases virus carriage was found. A study of transovarial transmission of the virus was checked on ducks, which were put into the same room as mosquitoes which had been artificially bred from ova taken in nature. Transmission of the virus of Japanese B encephalitis from generation to generation was confirmed by dog ticks infected with this virus. Undoubtedly, the determination of virus carriage in mosquitoes surviving the winter is of very important practical significance for the development of scientifically grounded measures for the elimination of them.

As is well known, at the present time in the Chinese People's Republic work is being conducted on a large scale for the elimination of the four pests, including the mosquitoes.

Investigations of the department of virology are producing valuable material for the proper organization of measures for the elimination of mosquitoes, both those which have passed through the winter and those in their places of hibernation.

In subsequent investigations a study was made of virus reservoirs of Japanese B encephalitis among animals. As mass virological and serological investigations have shown on the virus carriage of hogs, cows, horses, asses and goats, they can all be virus carriers, which has a direct connection with the spread of this disease among people. However, virus carriage in animals is an inconstant phenomenon; it varies depending on the intensity of the epidemic outbreak. Of the animals listed the most frequent virus carrier is the hog. It has been determined that in young pigs during the early period of their life a positive test is found to antibodies against the virus of Japanese B encephalitis, and then it disappears. In the summer months the antibodies reappear and increase to a maximum by September. The maximum virus carriage in hogs coincides with the highest morbidity rate among people, that is, it is noted in July and particularly in August. Viremia among hog-virus carriers is found in 100 percent of the cases.

In China hog raising is very well developed; therefor control of virus carriage among hogs is an essential problem in the prophylaxis of epidemic encephalitis. Other animals, as observations have shown, play a secondar part in this respect. Birds are of very little importanc

among the virus carriers. Chinese scientists explain this fact by the fact that chiefly continental birds occur on the territory of the Chinese People's Republic among which virus carriage is a rare phenomenon.

A considerable place in the work of the department of virology is occupied by research on variations in the virus of Japanese B encephalitis. The aim of these studies is the isolation of the immunogenically most effective non-pathogenic vaccine and diagnostic strains. For the purpose of studying the rules and regulations of the variations various methods of passaging are used. Preliminary data show that the passage of the virus subcutaneously and intraperitoneally increases its immunogenicity and reduces its pathogenecity, particularly for adult mice. After the intracerebral infection of mice, regardless of their ages, the pathogenecity of the virus is not reduced, as is observed after subcutaneous and intraperitoneal infection.

The results of investigations of the virus titer of Japanese B encephalitis among mosquitoes artifically infected under various temperature conditions deserve mention. At 18-22° the virus titer is considerably less then at 26-31°. In the former case the titer of 10^{-3}-10^{-5} was noted in five animals out of 46; in the latter, the

same titer, in 32 out of 46 animals.

A considerable place in scientific research is taken by a search for new vaccine strains isolated in epidemic areas as well as the perfection of methods of preparing and using the existing vaccine. Until recently, encephalitis vaccine was prepared from the Soviet strain M-47. As checking has shown, the immunogenicity of this vaccine is low, which apparently is explained by the many years of maintainence of virus culture under laboratory conditior A vaccine prepared from the Pekin strain R-3 has proved to be much more effective than the M-47 vaccine. The R-3 vaccine produces a high antibody titer even after a singl injection. The experimental research has been confirmed by epidemiological observations.

Important investigations have been made on the preservation and obtaining of purified vaccine. It has been determined that the vaccine, diluted in physiological solution with five percent lactose solution, maintains its immunogenic activity up to two years and longer, whereas storage of this vaccine in physiological solution alone assures the preservation of its immunogenicity for three months.

In its external appearance the new purified vaccine is entirely transparent, contains less than five percent

brain tissue of mice, and there are no anticomplementary factors in it. In its immunogenic activity it is the equal of the vaccine prepared by the old method. In intracutaneous immunization 10 times less vaccine is required than for subcutaneous immunization; the immunological effect is the same.

Data which are important for practice have been obtained to the effect that after vaccination the strength of the immunity and the duration of it are directly dependent on the duration of the intervals between the innoculations. According to experimental data, the maximum interval between the innoculations should be no greater than two months.

Experimental research on the effect of nonspecific stimuli on the course of the infectious process are of considerable scientific interest. Experiments have been performed with Japanese B encephalitis. The theoretical basis of these investigations is constituted by the works of the Soviet Academician A. D. Speranskiy. As a nonspecific stimulus use was made of croton oil. In experiments on white mice it was determined that the injection of the croton oil before or during the experiment increases the resistance of the experimental animals to the virus by 10 times. The mortality rate is considerably

less than in the control experiments. A single dose of croton oil is 0.03 cubic centimeters of the five percent solution. A mixture of croton oil and an emulsion of the virus increases the resistance of the experimental animals to the virus of Japanese B encephalitis by many times.

Pertussis vaccine also exerts a beneficial effect on the resistance of the experimental animals. The injection of this vaccine into the experimental animals along with a virus emulsion considerably reduces the morbidity rate from Japanese B encephalitis and the mortality rate from it. The opinion that innoculations of pertussis vaccine reduce the resistance of the experimental animals to Japanese B encephalitis is repudiated by these experiments.

In conclusion it should be emphasized that scientific work on the problem of Japanese B encephalitis is very closely connected with the practical problems of public health. The main efforts of Chinese research workers are concentrated on developing comprehensive measures for the prophylaxis and treatment of this serious disease. Hereby, special attention is being given to the study of effective agents for destroying the vector mosquitoes, the creation of more effective, harmless vaccines and the perfection of methods of using them.

A considerable place is given to research on detection of virus carriers among animals. An active study is being made on the effectiveness of methods and measures of the Chinese people's medicine which are being used for the treatment of Japanese B encephalitis.

Virological research on the influenza problem has been begun in 1950. In the past three years in Pekin, Shanghai and other cities extensive serological and virological investigations have been made. It has been made clear that among the virus types of influenza the A_1 virus is in first place; the B virus is also quite frequently isolated. The C virus also is widespread but it has not yet been possible to isolate it.

During the last pandemic of influenza (1957) the virus of asiatic influenza (A_2) was isolated. At the present time, investigations are being made on the study of the antigenic structure and biological properties of strains of this virus. In 1958, research on influenza was expanded considerably.

In Pekin and other cities research laboratories were organized, the so-called experimental rayons were isolated, in which a study was made and the effectiveness checked of comprehensive measures for the prophylaxis and treatment of influenza, and mass epidemiological investigations, etc. were carried out.

A study is being made of the variations in the influe viruses and the selection of vaccine strains.

Systematic investigations on the poliomyelitis problem have begun to be conducted only after the liberation of China. According to data which is by far incomplete, poliomyelitis has been recorded in 15 cities of various provinces. In 1955-1956 considerable poliomyelitis outbreaks were observed in the cities of Shantung and Ch'ingtao; in 1957, in Shanghai, Wuhan; in 1958; in Pekin, etc. A definite tendency has been noted toward the increase in the morbidity rate. In 1957, in Shanghai and Pekin investigations were made on the isolation of poliomyelitis virus and intestinal virus. In Shanghai 116 virus strains of poliomyelitis were isolated; in Pekin, 119 strains. Mass investigation of the population of Shanghai has shown that in the majority of children (70 percent) from one to five years of age there are antibodies against the poliomyelitis viruses. In 1958 a base was created for the production of the Salk vaccine.

Chapter VII

Drugs

Scientific work on the search for drugs is being carried out in the following direction:

a) study of the richest medicinal flora of China, analysing medicinal plants being used in the Chinese people's medicine;

b) a search for new antibiotics with special attention to the study of antivirus and anticancer antibiotics and the improvement of existing ones;

c) the development and perfection of medicinal forms and the analysis of recipes of the Chinese people's medicine;

d) the creation of new synthetic preparations.

Scientific investigations in the field of study of medicinal plants are being conducted in many scientific institutions, at chairs of medical colleges and in hospitals. In these investigations particular attention is being paid to the study of the pharmacological properties, chemical structure and the isolation of active agents from medicinal plants. The scientific-methodological center is the department of medicinal plants of the Academy of Medical Sciences of the Chinese People's Republic. In recent years this department, in cooperation

with other scientific research institutions, particularly with institutions of the Academy of Sciences of the Chinese People's Republic, has done considerable work in investigating and studying medicinal plants in the North-east, in the provinces of Hopei, Honan, Ssuch'uan, Kwangsi, Shansi, Shensi, Ch'inghai, Kuichow, Hunan, on the island of Hainan, etc.

The material which has been collected is of great value for research work in selecting and studying the most effective drugs. In addition, a study is being made and a systematization is being accomplished of drugs which have been described in the classic work of the most eminent man in the people's medicine, Li Shi-cheng. According to the material of scientific expeditions an "Atlas of Drugs of Plant Origin of Northeast China" has been written and will be published in the near future. In other areas an "Index of Chinese Medicinal Plants" has been written. By the end of 1960 it is planned to complete the investigation, in the main, of Chinese drug flora in all the rayons of the country and to write a composite work "Medicinal Plants of the Chinese People's Republic". The scale of the scientific research work in the field of studying the pharmacology, chemical structure and the isolation of active agents

from the medicinal plants can be judged by the examples presented below.

A thorough study of such plants as ergot, Chinese rauwolfia, wormwood, saltworts, dichroa, etc. has been made by the department of medicinal plants, the [illegible] Institute of isolating ergometrine, ergotamine and ergotoxin from wild ergot have been worked out and have been given over for experimental production. The technique of infecting cereal plants (rye) with strains of wild ergot has been mastered. Experiments with infection have shown that ergot cultivated on rye contains 0.22-0.40 percent of the alkaloids. From Chinese rauwolfia grown on the island of Hainan all the alkaloids (about 1.1 percent) have been obtained. Preliminary data obtained by the method of chromatography and electrophoresis indicate the possible content of serpasil in Chinese rauwolfia. Investigations on Chinese rauwolfia are being carried out also in other scientific research institutions.

In 1957, on the island of Hainan Indian rauwolfia was introduced successfully. In 1958 about 1.5 percent alkaloids was found in the roots of an annual rauwolfia. Cultivation of Indian rauwolfia is being expanded.

In 1953 about 0.97 percent santonin was isolated from wild Chinese wormwood. In cultivated wormwood the

quantity of santonin was increased to 3.83 percent. In 1958 about 10,000 mu in five provinces were given over to the culture of wormwood.

From the wild plant, Salsola ruthenica an α alkaloid has been isolated with a temperature of fusion of 294°. Experiments on animals have shown that this substance possess a pronounced hypotensive effect. The department has succeeded in introducing certain tropical plants into the island of Hainan: the Indian rauwolfia mentioned above then strophanthus, nux vomica, Erythroxylon coca, pilocarpus etc. In close collaboration with the departme of medicinal plants of the Academy investigations are beir conducted on this problem by the department of pharmacolo; This department is studying the medicinal agents at all stages of isolation of them from plants. It has been determined that in some cases the medicinal agents of intermediate stages of isolation possess greater effects than those in the last stage of processing. Apparently, this depends on the imperfection of the method. Experimental study of the pharmacodynamic properties of the preparations obtained is being carried out by the method of injecting the drugs intravenously and giving them by mouth. Intravenous injection of the preparation as a rule gives an immediate effect, and after oral administration the effec

frequently does not occur. Thus, for example, the intravenous injection of an extract of the Astragalus plant into an anesthetized animal in a quantity of 50 milligrams per kilogram of weight produces a hypotensive effect immediately. After the oral administration no effect occurs even after 20 days. Intravenous administration of the extract of Chinese rauwolfia in a dose of 100-200 milligrams per kilogram of the animal's weight exerts a hypotensive effect immediately; when administered by mouth, only after one to three days.

In the department, a study is being made of two antimalarial preparations from Brucea summatra and dichroa plants. The effective dose of the glucoside isolated from Brucea summatra possess a very great degree of toxicity. The two alkaloids isolated from dichroa are 100 times more effective than quinine. However, they also possess a very high degree of toxicity. In experiments on animals it has been shown that the active agents and decoctions of it isolated in the pure form from Magnolia officinale plants reduce the blood pressure and selectively block certain nerves. In the people's medicine decoctions from magnolia have long been used for the treatment of gastrointestinal diseases as antispasmodics. In the laboratory of biochemistry of the Academy of Medical

Sciences of the Chinese People's Republic a substance has been isolated from the glyceria plant (licorice) which is similar in its effect to desoxycorticosterone. The preparation has been used successfully in the treatment of Addison's disease (therapeutic clinic of the Second Shanghai Medical Institute). At the chair of pharmacolog of the First Shanghai Medical Institute a preparation has been obtained from oleander which causes an inhibition of the central nervous system and which lengthens the effect of barbiturates.

In Ssuch'uan Medical Institute (the city of Chengtu) a study is being made of 400 species of medicinal plants. Groups of many chairs are participating in this work. Even now a quite detailed study has been made of two medicinal plants which are used extensively in therapeutic practice, particularly in the people's medicine. In the study of one of these plants (Coptis chinensis) workers of five chairs are participating. Each chair is conductir investigations according to its category. Areas where th plants grow have been studied in detail, and it has been determined that Coptis chinensis grows in mountains, chiefly at a height of 2,000 meters. A study has been made of the morphological and physiological characteristic of the plant, and methods of cultivation of it have been

worked out as well as for the quantitative determination of the active agents (chromatography). The content of the alkaloid berbeline in the roots of the plant amounts to three to eight percent. This alkaloid has been isolated in the pure form and has been subjected to a detailed study. Experimentally and clinically a comparatively high antibacterial effect of berbeline has been determined: in a concentration of 20 milligrams percent berbeline kills Staphylococcus aureus. In the treatment of bacillary dysentery its effect is equivalent to the effect of sulfonamide preparations. The amino acids and vitamins are antagonists of berbeline. It is significant that infusions of Coptis chinensis have been included in the complex prescriptions of the old physicians for the treatment of amebic and bacillary dysentery.

The plant Lithospermum erythrorhizon is of considerable interest. Extracts from this plant have been successfully used in the treatment of certain dermatitides, particularly in the newborn, eczemas, urinary fistulas, inflammatory vaginal and cervical processes, inflammations of the vulva and others. In obstetrical practice the preparation from this plant is used in the form of the 2-5-10-40 percent oil extracts, or in the form of a one percent ether extract with the addition of oil. Preliminary data have

been obtained to the effect that the substances isolated from the plant possess a gonotropic [gonadotropic ?] effect -- they inactivate the sex hormone. In experiments on rats it has also been shown that these agents depress the function of the hypophysis and of the thyroid gland. In connection with this, experiments are now being performed on the study of the contraceptive properties of the extract of this plant. Mention has also been made of this, incidentally, in the works of foreign authors (data on Lithospermum ruberale). Investigations are being carried out on the isolation of a chemically pure substance. By the method of ether extraction an amorphous powder of a brownish color has been obtained which is soluble in oil. The powder does not crystallize; the point of fusion is inconstant. Attempts are being made to isolate a pure substance by means of adding copper to the powder with subsequent treatment with hydrochloric acid.

In the Scientific Research Institute of the Southwest (city of Chungch'ing in the province of Ssuch'uan) considerable work is being carried out on the study of the new species of medicinal plants of the Southwestern region. About 10,000 samples of plants have been collected. About 2,000 species are being cultivated on the experimental field of the Institute. The Institute has good laboratories

and vivaria. The institute group consists of 320 persons; of these, 200 are specialists with a higher education (agronomists, zoologists, biologists, pharmacochemists, pharmacologists, biochemists, technological chemists, people's physicians, etc). Clinical study of the preparations made by the Institute is being made in two hospitals. In a comparatively short time the Institute has worked out and proposed a number of effective preparations for practical application -- antihelminths, febrifuges, cardiac agents, etc.

Considerable research work in the field of looking for new therapeutic preparations is being carried out at the chair of pharmacology of the Wuhan Medical Institute. Specifically, a detailed study has been made of the pharmacological properties of the plant Anemonia chinensis, from which an active agent has been isolated for the treatment of amebic dysentery. From the plant Stephania tetrandra an alkaloid has been isolated -- tetrandrin. This alkaloid possess a hypotensive effect and is a specific agent for amebae, including those that are resistant to emetine. The hypotensive effect of tetrandrin is greater than the effect of Chinese rauwolfia. In addition, tetrandrin possess antipyretic and analgesic effects. Cardiac preparations obtained from the plant Strophanthus

divaricatus are very promising. This plant is widespread in the southern provinces of China (islands of Hainan, Kuangtung, Kuansi). The glycoside isolated from it has been successfully used clinically. The active substances which increase cardiac activity have also been isolated from the plants Periploca serprium and Asclepia chrussurica.

At the chair of pathologic physiology of the Canton Medical Institute 293 species of medicinal plants have been studied. Of these, 63 species contain substanc which possess clearly expressed antibacterial effects. As an example mention may be made of the plants Polygonatum officinale and caniculatum, Paterium Artemisia capillaris. Extracts from Polygonatum caniculatum are being used successfully in the treatment of typhoid fever. In their antibacterial effects they are the equals of synthomycin [Soviet chloromycetin]. Extracts from Paterium officinale are being used successfully for the treatment of dysentery. From these plants crystals have been obtained of a chemical pure substance. Extracts from artemisia are being used for the treatment of infectious hepatitis.

At the chair of pharmacology of this institute investigations are being carried out actively on the study of Chinese rauwolfia. According to the data of the chair, the roots and bark of Chinese rauwolfia contain one to 1.5

percent of the alkaloids, that is, much less than Indian rauwolfia. The hypotensive effect of the extracts of Chinese rauwolfia is being studied in acute experiments. In experiments on dogs with irrigation of the stomach with the extracts the blood pressure begins to fall after 30 minutes. The effect lasts for six hours. After the intravenous administration (minimum dose) the hypotensive effect appears after 15 minutes. After an hour, the maximum effect is noted: the pressure drops to 84/80 millimeters of mercury (original pressure 120/114 millimeters); one hour and 10 minutes later the pressure begins to come back to normal, and after two hours and 40 minutes reaches the original level. With the increase in the dose the effect occurs after five minutes: the pressure falls to 32/28 millimeters of mercury (original pressure 132/126 millimeters). The animals die.

In the acute experiment extracts of Chinese rauwolfia exert a more pronounced hypotensive effect than the total alkaloids of Indian rauwolfia. At the same time, Chinese rauwolfia (extracts) possess a much greater toxicity, approximately two and a half times as great, than Indian rauwolfia (tablets of the total alkaloids). It is possible that the high degree of toxicity of extracts of Chinese rauwolfia is brought about by toxic admixtures.

Investigations of Chinese rauwolfia are continuing.

Along with the study of various medicinal plants the clinical checking of a large number of complicated prescriptions of the Chinese people's medicine is being carried out. These prescriptions include a principal or chief substance, auxiliary agents and agents which increase the effect of the other substances. Thus, for example, for the treatment of diabetes 80 different substances are used which are included in a comprehensive prescription. The best effect is given by five plants:

Rehmania flutinosa (root)

Ranax ginseng (ginseng root)

Licium chinense (berries)

Cornus officinalis (fruit)

Astragalus falcatus (leaves, stem).

These plants are used in the form of the aqueous-alcohol solution. Under the effective treatment a pronounced improvement is noted in the subjective status and a reduction in the complaints of almost all patients. Many patients become capable of working, weakness, polyuria and polydipsia disappear, and the patients gain weight. In half of the cases, under the effect of treatment, the amount of sugar in the blood decreases somewhat. However, these data require further study and clarificatio

For the purpose of treating hypertensive disease two principal prescriptions are being used.

Prescription No 1

Gastrodia elata	(root)
Scutellaria baicalensis	(root)
Chrysanthemum sinense	(flowers)
Comboselinum univitatum	(root)

Prescription No 2

Rehmania glutinosa	(root)
Cornus officinalis	(root)
Liriope graminitalia	(root)
Schizendra chinensis	(berries)
Licium chinensis	(berries)
Eucomia nemoides	(root)
Ostrea cocalata	(root)
Achyranthes bidentuta	(root)

It has been noted that the prolonged use of these prescriptions gives a certain hypotensive effect.

Antibiotics

Scientific research in the field of looking for new antibiotics was begun in 1956. In this year, a special department was organized at the Academy of Medical Sciences of the Chinese People's Republic which combined a number of laboratories and groups which had worked previously in other institutions. Beginning with 1957 a search was begun in the department for new antitumor

and antivirus antibiotics. For one and a half years the workers in the department have been developing methods of determining antibiotics, the activity of actinomycetes with respect to bacteria, fungi, tumors and viruses. A system has been created for the primary selection of actinomycete antagonists. During this period of time 10,000 cultures with an antibacterial effect has been investigated; 280 antitumor cultures (Ehrlich ascites carcinoma) and 34 cultures with an antivirus effect (virus influenza). In the second half of 1958 investigatio in this direction were considerably expanded. Thus, during June-August a study was made and tests were made of 5,815 actinomycete cultures with an antibacterial and antitumor effect and 156 cultures with an antivirus effect. Of the group of strains studied for antitumor, two antibacterial and one antivirus strain are of conside able interest for further study.

In accordance with the plan of scientific collaboration between the Chinese People's Republic and the USSR, in the second quarter of 1958 an expedition for collecting samples was organized with the participation of Soviet specialists. This expedition collected 1,700 samples from the Southern provinces of China. At the present time, they are being investigated in parallel in scientific

institutions of China and the Soviet Union. The aim of these investigations is the selection of samples of actinomycete antagonists and study of the rules and regulations of the ecological-geographic distribution of them in the soils of the Chinese People's Republic.

As a result of scientific research work considerable progress has been made in the perfection of the production and improvement in the activity of the well known antibiotics. Thus, in a nutrient medium for the fermentation of penicillin corn extract and lactose have been replaced by cotton-cake and cornflour. With this substitution the activity of penicillin has been increased considerably. Investigations have been made for the development of a method of experimental production of erythromycin. Under experimental conditions the maximum activity of this antibiotic has reached 730 units per cubic centimeter of substance. With the isolation of erythromycin from culture fluid by the method of double extraction with an organic solvent (which has been adopted for the isolation of penicillin) the concentration of antibiotics in the extract of the solvent is considerably increased: the yield reaches 60 percent. The activity of the prepared erythromycin product amounts to 920 units per cubic centimeter. The laboratory routine which has been

developed by the department for the production of terramycin from the Soviet strain of Streptomyces rimosus has already been incorporated into industry. As a result of investigative work for the improvement of conditions of fermentation and the composition of the nutrient medium the terramycin activity has reached more than 4,000 units per cubic centimeter. The preparation obtained used by mouth.

The Medicinal Plant Raising Institute of the Academy of Sciences of the Chinese People's Republic has isolated a new antibiotic with an antitumor effect -- actinomycin K. The fungus from which this antibiotic has been isolated was obtained from samples of soil in the province of Kuangsi near the city of Kuiling. Experiments on animals and the clinical analysis have shown that actinomycin K is similar to actinomycin C (West Germany) which is used for the treatment of lymphosarcoma, but their chemical structures are not the same. From this point of view, actinomycin K is a new antibiotic. In experiments on animals it has been determined that the new antibiotic possess more pronounced inhibitory effects with respect t experimental tumors (sarcoma 180, intraperitoneal sarcoma, etc.) than actinomycin C and is less toxic.

A clinical checking of this new antibiotic has been begun.

Chapter I

Historical Outline of the Development of Ancient Chinese Medicine

Chinese medicine has traversed a long route of development and represents a great cultural heritage of the Chinese people. In the past and in the present the experience of Chinese medicine is being used widely in the control of various diseases by the Chinese people. In a present review the main trends have been presented in the development and study of the Chinese people's medicine and the principal methods and agents which are extensively used in the therapeutic practice of the Chinese People's Republic. We hope that these data are of considerable interest for physicians in the Soviet Union and countries of the people's democracy.

The first great Chinese physician was Pien Ch'iao (fifth century B.C.). According to the historical memoranda which have reached us, Pien Ch'iao was an outstanding internist, surgeon and dietologist for that time; he successfully treated the most varied diseases. In his medical practice Pien Ch'iao made extensive use of such diagnostic measures as

careful examination and questioning of the patient, investigation of the pulse, auscultation, et cetera.

The first noteworthy memorandum of ancient Chinese medicine was the book "Huang-ti Nei-ching" ("Nature and Life"), which consisted of two parts. In the first part, "Ssu-wen" (nine volumes) the anatomy, physiology, pathology, diagnosis and therapy of ancient medicine is given. The second part -- "Ling-shu" (nine volumes) is given over chiefly to a description of the ancient method of Chen-tsu therapy (acupuncture and cauterization). For that time the book represented an encyclopedia of medical knowledge. It was an important textbook for many generations of Chinese physicians and maintained its importance up to the present time. "Huang-ti Nei-ching" has been republished several times with various additions and changes. The copy of the book which has reached out time was revised in the seventh century by the physician Wang Ping, who systemized and presented the numerous means and methods of doctoring accumulated at that time by preceding generations of talented Chinese physicians in a strict sequence.

In "Huang-ti Nei-ching" information is presented concerning the role of the stomach and intestine in the digestion

of food. In this work it was shown that the liver and spleen are the main storehouses of blood, while the heart is the principal organ in the movement of blood through the blood vessels.

The ancient cultural ties between China and India, Central Asia and the Arabian countries exerted a most favorable effect on the development of medicine in these countries. This is evidenced, for example, by the fact that the theoretical bases for making a diagnosis from the pulse, which is contained in the "Medical Canon" of the very great scientist of antiquity, Avicenna (Ibn-Sina) are very similar to the principles worked out by representatives of the Chinese people's medicine. According to the concepts of the ancient Chinese physicians, all the varieties of the pulse can be divided into four main types: superficial, deep, slow and fast pulse. These four main types of pulse include a multitude of varieties, which characterize the various clinical symptoms of disease.

In the third century A. D. the physician Wang Shu-he in his work "Mochin" ("Treatise on the Pulse") presented a classification of pulse changes in the most varied diseases (diseases of internal organs, children's and female diseases, various types of fevers). After dividing all the various changes

in the pulse into 24 types he described in detail the state of the pulse during the period preceding various diseases and during the course of the disease.

In "Huang-ti Nei-ching" the main principles are presented by which one should be guided in his practical activity as well as the aims and problems of a given branch of knowledge: "the problems of medicine consist in curing the patients and in strengthening the health of the healthy". Therefore, the physician is obliged to combine therapeutic with prophylactic work every day.

In this connection, in the book an important place is occupied by problems of hygiene. In the section devoted to hygiene data are presented on the diet, therapeutic gymnastics, the role of respiration, the unity of the body and the soul (psyche).

Certain views of Chinese people's medicine in the field of diagnosis are of a primitive nature. The idea of the interaction of opposite principles underlies the teaching about diagnosis (the negative or female, "yin"and the positive or ma "ye n"). According to this teaching, these two principles are present in the entire universe and in the human body. They r

and fight against one another. A disturbance of the equilibrium between the "yin" and the "yen" leads to disease.

In making the diagnosis the Chinese physicians have for a long time used six methods of determining the presence of disease: interrogation, examination, palpation, auscultation, olfaction and examination of the pulse. The fact that such diseases as diabetes mellitus, apoplectic stroke, tuberculosis, tetanus were diagnosed and described in detail in China at least 1,000 years before they were described in Western Europe speaks for the value of these methods of determining diseases.

The great Chinese physician Chang Chung-ching, after carefully studying the most varied diseases associated by febrile states, wrote a book on typhoid fever, "Shanghan-lun" (second century A.D.). In the book 357 methods of treating febrile diseases are presented, 112 prescriptions are given, and the symptoms of various febrile diseases are described. The book by Chang Chung-ching was widely known not only in China but also outside of China.

In the first century B.C. the first works appeared on pharmacology in which about 400 types of drugs were described, chiefly of plant origin. The therapeutic effect of the medicinal

plants was discovered chiefly by peasants who frequently dealt with plants.

The eminent surgeon of old China, Hua T'o, worked out an original system of physical exercise.

During the Han dynasty (206 B. C. - 220 A. D.) the principal branches of industry were salt making and metallurgy. Experience showed that salt solutions can be successfully used for washing the eyes in case of disease of them, and Glauber's salt (sodium sulfate) can be used as a purgative. Progress in the area of metallurgy was an impetus for the preparation of certain medical instruments of metal (the preparation of metal needles for acupuncture specifically pertains to this time). The metallurgical industry accounted for the development of the mining industry, particularly the production of mercury and sulfur; contact with the latter demonstrated their therapeutic effects.

The production of paper was begun in the second century B. C., but the mastery of the technique of production did not take place until the second century A. D. Therefore, the majority of the books of the Ch'iang-Han period were inscribed on wooden boards or on silk.

In the middle of the second century A.D. Chinese physicians invented a method for preparing drugs chemically. The well known physician Ko Hung (281-351) worked out methods for making preparations of sulfides of mercury, copper, iron, et cetera. Later, new agents were discovered which were used for the treatment of various diseases. The physician Sun Ssu-miao, who lived at the end of the sixth and beginning of the seventh century, described in detail such diseases as hemeralopia, beri-beri and rickets. He suggested treating hemeralopia by means of preparations from animals' livers. Sun Ssu-miao wrote a book which was important for his time "A Thousand Gold Prescriptions", which consist of a general part and divisions devoted to the treatment of various diseases, particularly female and children's diseases, beri-beri, the treatment of acute intoxications as well as therapeutic diets. In the book a detailed description is given of methods of acupuncture and cauterization.

The outstanding Chinese pharmacologist Li Shi-chen (16th century) exerted a tremendous influence on the development of medicine and botany in China. Li Shi-chen was born into the family of a physician; his grandfather was also a physician. From

his early years Li Shi-chen showed great interest in medicine. He found that both ancient and the latest pharmacological treatises from which physicians studied had many errors and that the many years of experience which had been accumulated by the people had not found its reflection and was not generalized in them, nor was attention given to the many drugs which were widely used by the population and gave a therapeutic effect. This specifically stimulated the scientist to the idea of writing a book in which all the attainments of Chinese pharmacology would be reflected.

The monumental work which he created "Fundamentals of Pharmacology" ("Peng-ts'ao-kang-mu"), which consisted of 52 volumes and was illustrated by more than 1,000 figures, was published in 1578. It has not lost its scientific value even at present. In this book the very rich experience accumulated by Chinese physicians in the preceding centuries up to the 16th century was generalized. In it, 1,892 drugs were described, chiefly of plant origin.

Each drug was given its proper name, and methods of preparation of it were indicated, as well as its distinguishing characteristics and pharmacological features of the drugs, the

effect exerted by them on the body, et cetera. More than 1,000 prescriptions were given.

The book by Li Shi-chen was a definite contribution to the matter of studying and classification of Chinese plants and played an inestimable role in the development of Chinese medicine and pharmacology. A great influence was exerted by this work on the appropriate branches of science even in the countries adjacent to China. Thus, the first xylographic printed edition, "Fundamentals of Pharmacology" (1606) was widely distributed in Japan, and then this work was translated into Japanese twice (in 1783 and 1929). Material taken from "Fundamentals of Pharmacology" by Li Shi-chen has been found also in the literature of European countries. Thus, for example, in 1659 a book was published in Latin, "The Description of the Medicinal Flora of China". The book by the Russian physician-sinolog, A. Tatarinov, "Catalogue of Chinese Drugs", published in 1857, was constructed on the basis of Li Shi-chen's work, and individual chapters represent a translation of the corresponding sections of it. Individual sections were translated into the German and French languages (in 1735 and 1928), and from 1928 through 1941 seven volumes of Li Shi-chen's work have appeared

in the English language.

At the present time, Chinese physicians and pharmacologists are making an intensified study of the rich scientific heritage left by Li Shi-chen. The Chinese people highly reveres the memory of this outstanding scientist who mad such a significant contribution to the treasure-house of the people's medicine.

The medical scientists of the Ching dynasty (1644-1911) Wu Yu-hsing, Hu Chü-t'ung and Wang Meng-yin, described methods and drugs which are used for the treatment of infectious diseases. Such works by them as the treatise "On Plague", "On Cholera", "The Diagnosis of Plague" and "Plague Canon with Commentaries" played a great part in the control of infectious diseases not only in the past but also at present.

According to a directive of the emperor of the Ching dynasty T'ieng Lung (1749) 90 medical collections were written in China (like a medical encyclopedia) on 15 divisions of medicine: therapy, surgery, pediatrics, gynecology, ophthalmology, Chen-tsu therapy, bone-setting, diagnosis, prescription, et cetera. The collections contained a description of various methods and drugs used in treatment. They played an important

part in the subsequent study of the medical heritage of ancient China.

After the victory of the people's revolution more attention was given to Chinese medicine. The Central Committee of the Communist Party of China and its chairman Mao Tse-tung have repeatedly indicated the need for a union of the physicians of the modern and people's medicine. The important problem of a profound study and use of the cultural heritage of their predecessors has been set before the public health organs. At the present time, considerable scientific research and practical work has been developed in this direction.

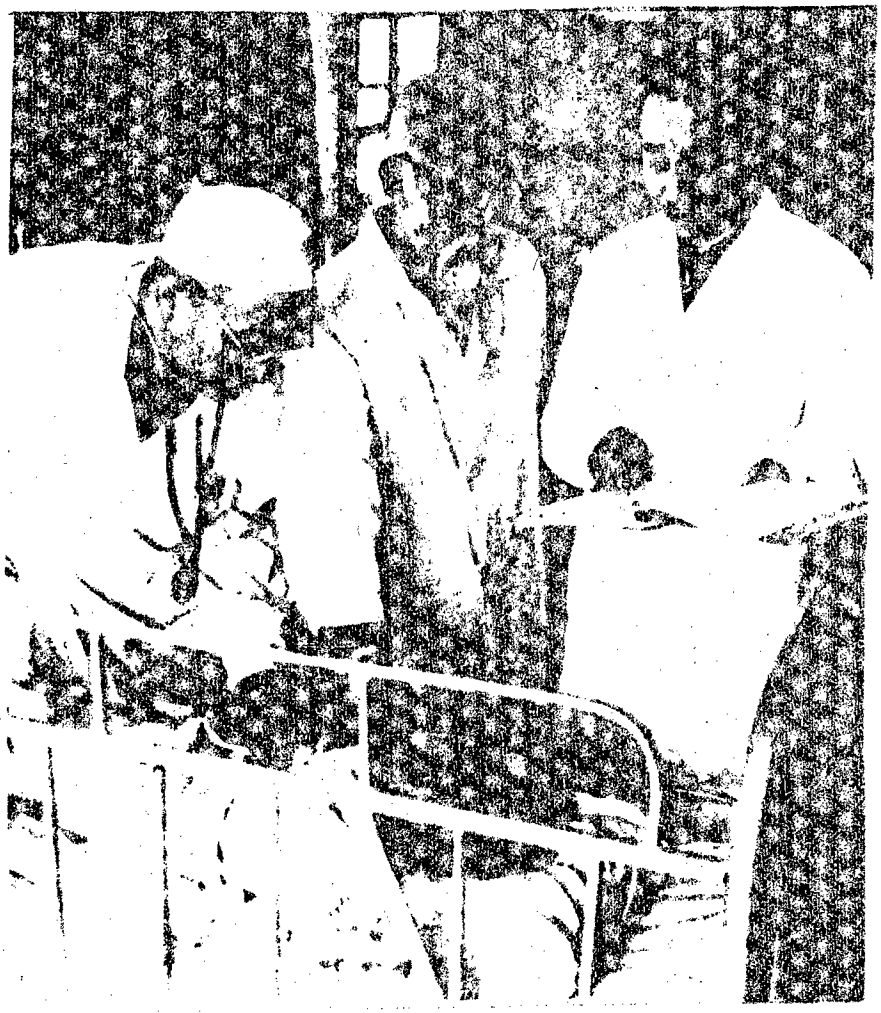
In 1955, in Peking the Academy of Chinese People's Medicine was organized. Research institutes and commissions on the study of the people's medicine and people's drugs were organized in the provinces of Hopei, Hunan, Shansi, Shensi, Kirin, Heilungchiang, Kuangtung, Chiangsu, Chechiang, Fuchiang, Chiangsi, Shanghai and the autonomous rayon of Inner Mongolia. These institutions are organizing and making a study of the methods of the people's medicine and the drugs used by it. Simultaneously, the same work is being carried out by chairs of higher medical teaching institutions and therapeutic-

prophylactic institutions.

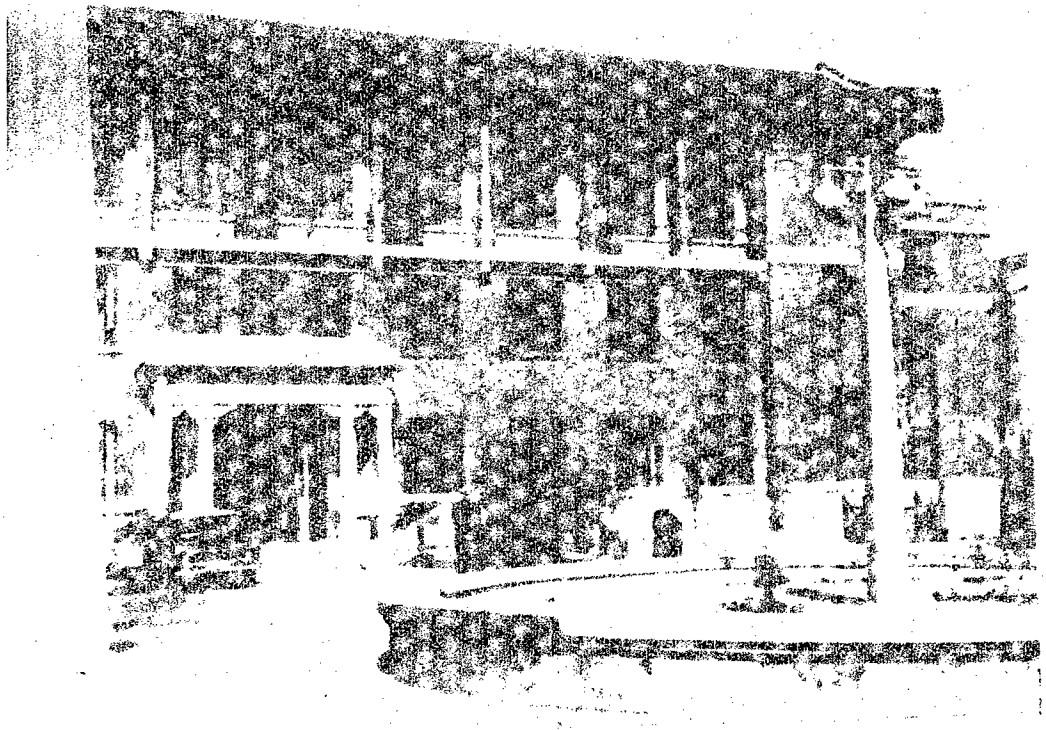
In order that physicians of the people's and modern medicine might have the opportunity of systematizing and generalizing on material on the theory and practice of the people's medicine in conjunction with one another as well as for purposes of subsequent development of it a plan of measures was developed for the training of modern physicians in the knowledge of the people's medicine. In 1956, in Peking, T'ientsin, Shanghai, Kuangchow, Wuhan and Chengtu special courses were organized on the study of the people's medicine. At the course 229 physicians of modern medicine with considerable clinical experience received training (heads of departments, senior house physicians, residents and assistants). After two years of training they obtained definite knowledge of the theoretical basis of the people's medicine, diagnosis and methods of treatment. This is playing an important part in the proper organization of the experimental research on the study of the Chinese people's medicine and its scientific foundation from the standpoint of modern medical science.

Courses on the study of the people's medicine were organized in all rayons of the country; more than 2,000 physici-

of modern medicine have been trained at them; in some areas of the country courses have been organized with a half-year training period; at these courses more than 4,000 physicians are being trained.



Senior Physician of the Chinese People's Medicine Fu Yu-chou Supervises Treatment of a Sick Child in the Peking Hospital



Academy of the Chinese People's Medicine

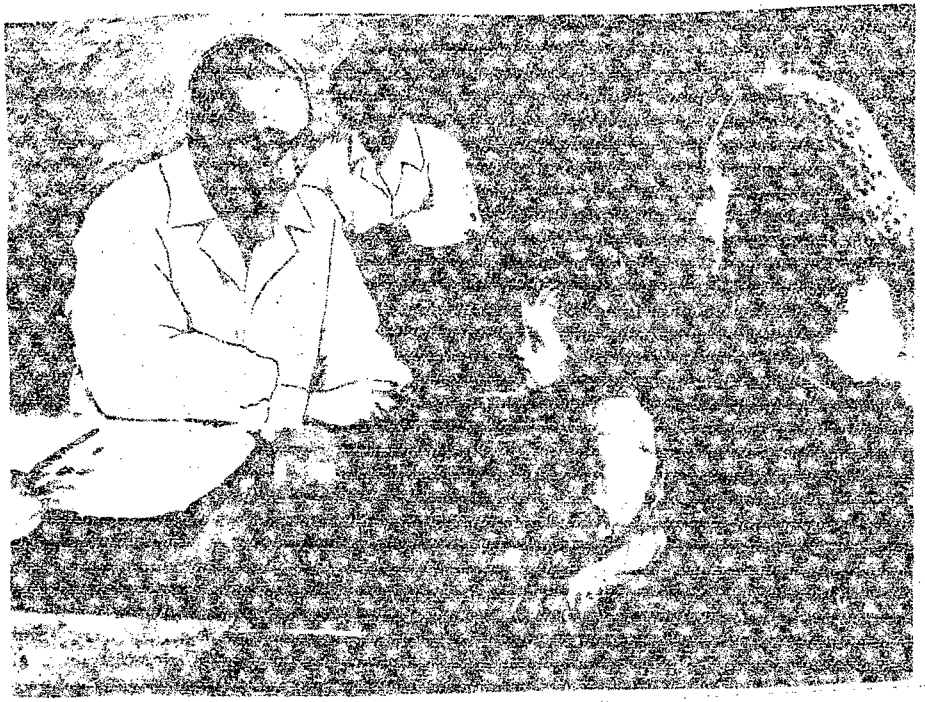
At the beginning of 1957 four institutes were organized (in Peking, Shanghai, Kuangchow and Chengtu), six medical schools of the people's medicine and 23 schools for the advancement of physicians of the people's medicine. In addition, more than 44,000 persons are being trained by means of apprenticeship to the experienced physicians of the people's medicine.

In connection with the increase in the people's requirem

for medical care 200 hospitals, 500 polyclinics, more than 50,000 joint polyclinics of the people's medicine and 10,000 medical aid stations in rural rayons have been created. A large number of physicians of the people's medicine has been brought in for work in these institutions.

At the present time a large number of books on the people's medicine has been published. By April 1957 more than 3,800,000 copies of books (209 titles) have been published. In Peking, Shanghai, the provinces of Chiangsu, Chechiang, Fuchiang, Kuangtung and Chiangsi nine journals have been published which are playing an important part in the exchange of experience of scientific work in the field of the people's medicine and study of drugs.

In 1958 considerable work was done in collecting effective prescriptions which had been kept by the population. The population gave the public health organs many prescriptions which are now being studied. These measures are contributing to the further development of medical science in China.



This Soviet Girl is Suffering from Nephrolithiasis. The physician Wang-I is treating her in a clinic of the Chinese People's Medicine.

Chapter II

Principal Methods and Treatment Principles of Chinese People's Medicine

Acupuncture and Cauterization

Treatment with punctures and cauterization -- Chen-tsu therapy -- represents one of the most important divisions of the Chinese People's Medicine. Acupuncture and cauterization have been used in China for several thousands of years. This method of treatment owes its creation to the exceptional power of observation and industry of the Chinese physicians. Even in very ancient times it was noted that wounds, cuts or punctures at certain points of the body notably facilitate the course of a number of diseases. For example, punctures in the Achilles tendons eliminate headaches in man; punctures in the upper lip make it possible to take the patient out of a syncopal state; the insertion of the needles into the dorsal surface of the hand, at the base of the first and second fingers, eliminates insomnia.

More than a thousand years ago acupuncture and cauterization began to spread in the countries of Asia, and in the seventeenth century penetrated into Europe. Now, these methods are being used by physicians in many countries, and they have acquired the greatest popularity

in Japan and in the other countries of the East, where they have been subjected to careful study.

Chinese, Japanese and other scientists are conducting scientific research work on the study of acupuncture and cauterization on the various bodily functions. In experiments on animals they have achieved definite results which show the beneficial influence of these methods of treatment. Acupuncture and cauterization are being studied in the USSR, France, Germany, Hungary and other countries. Recently, problems of Chen-tsu therapy have been discussed at international scientific conferences and in special journals.

Clinical study of the effectiveness of Chen-tsu therapy has shown that in a number of cases it gives encouraging results in the treatment of certain internal diseases, particularly of the digestive organs (acute and chronic inflammation of the stomach and intestines, peptic ulcer, functional disorders of the stomach and intestine) respiratory organs (acute and chronic bronchitis, bronchial asthma, etc.), cardiovascular system (hypertensive disease), nervous system (neuralgia of the trigeminal nerve, convulsions, pareses and paralyses of the facial and other nerves, sciatica), of the locomotor apparatus (acute and chronic joint and muscle rheumatism). Acupunc-

ture and cauterization have proved to be effective methods also in pediatrics, particularly in the treatment of dyspepsia and the residual signs of poliomyelitis and others, in gynecology in the treatment of disturbances of the menstrual cycle, in ophthalmology for the treatment of inflammation of the optic nerve.

Chen-tsu therapy produces an effect in the treatment of tonsillitis and laryngitis, mitigates the course of such infectious diseases as malaria, Japanese encephalitis, tuberculosis and others.

We can not, however, help but take into account the fact that methods of acupuncture and cauterization which have been passed on by the people's physicians from generation to generation are distinguished by their exceptional variety, whereby every method has its own characteristics. In order to clarify the effectiveness of various methods and the sphere of their application to medical practice, further intensified research is needed. In this direction, recently considerable work has been done. Study of the various methods of Chen-tsu therapy under clinical conditions is being carried out in China in many therapeutic institutions and primarily at the Central Institute of the Chinese People's Medicine. In this Institute alone during recent years more than 10,000

persons suffering from various diseases have been given courses of treatment; the majority of these diseases were of a chronic nature and had not submitted to cure by other methods for a long time. After treatment with acupuncture and cauterization the main mass of patients obtained relief, and more than 40 percent of them were recovered completely.

Let us now dwell in somewhat greater detail on the technique of acupuncture and cauterization.

Needles for the punctures are of different lengths, shapes, thicknesses and have different degrees of elasticity; usually, needles are used made of a silver or gold alloy with other metals or of soft stainless steel. The length of the needle varies within limits of from two to 12 centimeters. Selection of the shape, thickness and elasticity depend on the site and the nature of the puncture, which is primarily determined by the characteristics of the disease.

In ancient China nine types of needles were used: prismatic, double-edged, round, ring-shaped, needles with two or three blades, needles with a sharp or dull tip (Fig. 12). Needles with dull tips were used chiefly for massage of the skin or muscles; lancet- and spear- shaped needles were used for incising blood vessels (blood-letting

skin or muscles (drainage of pus); round needles with different lengths, thicknesses and degrees of elasticity were used for acupuncture in the true sense of the word.

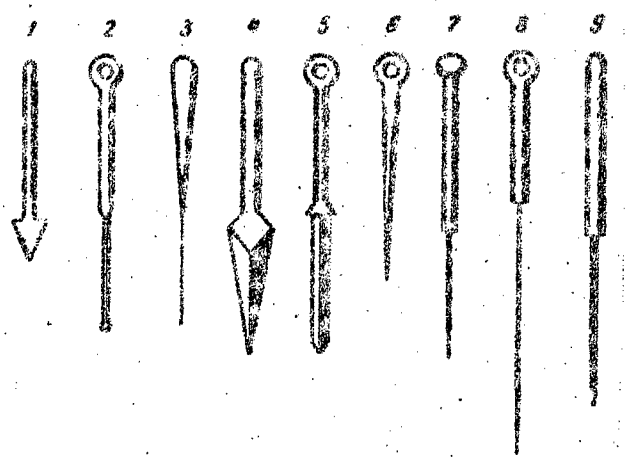


Fig. 12

1--sharp needle (arrow-shaped); 2--round needle; 3--fine needle with sharp tip; 4--pointed needle (three-edged needle); 5--sword-shaped needle; 6--round needle with sharp tip; 7--fine needle; 8--long needle 9--large needle.

At the present time, only more or less thin, round needles with sharp or slightly dull tips are used. Needles 10-12 centimeters in length are used for punctures in the gluteal area, for example, in the treatment of sciatica; needles five centimeters in length, for punctures at points distributed on the extremities, chest, abdomen, lumbar area and back; some needles two to four centimeters in length are used for the stimulation of nerve endings in the skin and ~~on the~~ of superficially located muscles and nerves in the head and face area. A bunch of ordinary

sewing needles are used for superficial punctures. Sometimes, acupuncture is combined with the passage of a galvanic current through the needles.

There are three methods of introducing the needles. The first consists of the insertion of the needle with slow rotation. Here, thin needles are used. The needle is held with three fingers -- the thumb, index and middle fingers, is introduced gradually; otherwise, the needle can bend and it would then be difficult to insert it.

The second method is that of rapid surface puncture. Here, short thin needles are used and they are held like a penholder. This method is usually used when giving urgent aid (in syncope, shock, or convulsions in childre etc.); the needle is introduced vigorously and rapidly t a depth of three to six millimeters.

The third method of introducing the needles amounts to punctures with subsequent rotation. By this method, an elastic, fine and long needle is introduced by a sudden sharp movement into the body, to a depth of 0.5-1 centimete and then it is advanced to a deeper level by slow rotary movements until the time that the patient obtains the sensation desired. After this, the rotation of the needl in situ is continued.

After the needle has been introduced the nerve has

be found; here, the physician is guided by the degree of sensitivity and the reaction of the patient. The search for the nerve trunk is carried out by means of successive advancement and extraction of the needle or pricking. The pricking increases the strength of the effect from puncture, extraction and rotation of the needle. Usually, the pricking is accomplished in the direction in which the intense sensation appears.

If, after introduction of the needle to a certain depth, the patient does not feel anything it is evidence of the fact that the needle has bypassed the nerve trunk, and then it has to be extracted a little. As soon as the desired sensation occurs during the extraction of the needle the rotation of it is continued in situ. The sensations experienced by the patient depend on the kind of disease, the point selected and the method of insertion, rotation and extraction of the needle. Thus, specifically, various methods of rotation produced different sensations in the patient. The more rapidly the needle is introduced at a particular place the more vigorous is the stimulation. During rotation the patient develops feelings of rheumatic pains, bursting, numbness, heat, cold, passage of an electric current, etc.

Needles are left in the body if the rotation of a

needle which has been inserted up to a certain point produces an intolerable stimulation; if sensation disappears after prolonged rotation of the needle; if the needle enters the tissue without any resistance, without producing any kind of sensation in the patient. Hereby, the needle is left still for two to three minutes, and then rotary movements are again made. If the muscle is in a state of tension the needle should be left motionless until the muscle relaxes. The main aim of leaving the needle in the body (frequently for 20-30 minutes or longer is the treatment of convulsions or pains.

The term "cauterization" is a reflection of methods which existed in ancient times, when clumps of a smoldering substance in the form of cones made of dried wormwood fibers or other material were applied to definite places in the patient's skin. As a result of cauterization, a blister appeared on the skin, and then an eschar was formed.

At the present time, such methods of cauterization have been stopped. In place of the cones wormwood cigarette or candles are used. The lighted end of such a cigarette is brought close to certain places on the patients skin, thereby affecting various active points with its heat. In addition to this, there are two other methods of thermal effect: the method of pecking cauterization,

where the cigarette is brought up to the point of the skin at a very small distance periodically, and the method of thermal cauterization with constant movements of the cigarette (ironing).

Cauterization is not uncommonly combined with acupuncture. Here, deeply situated tissues are acted on by the puncture, and the cauterization produces surface stimulation.

Thermal cauterization produces a good effect in the neuroses of the gastrointestinal tract and some other diseases. By the method of pecking cauterization an excitatory effect is obtained. This method is indicated in atonic constipation, collapse, and shock. The ironing method is used for the treatment of eczema, psoriasis, and dermatitis.

Cauterization is practiced in those cases where the patient has increased sensitivity, suffers from eczema or other skin diseases which complicate the rendering of needle therapy.

As we have already noted, the nature of acupuncture consists of the insertion of special needles into the so-called "active points", which at the surface reflects functional changes in various organs.

Chinese physicians have worked out the science of the

arrangement of these points on the skin, which diseases at and what points and how punctures are to be made (in the sense of the method and depth of insertion of the needle, the duration of its stay in the tissues, etc.). The points are connected with one another by 14 lines or meridians.

The majority of points used at the present time for purposes of a therapeutic effect have been described in very ancient times. This is evidence of the striking power of observation of Chinese scientists and the high level of skill of the ancient physicians, who were able to come near discovering important rules and regulations of the activity of the human body on the basis of numerous experiments and observations.

Respiratory Gymnastics or Pneumotherapy

Among the therapeutic-prophylactic measures such as massage and therapeutic gymnastics which are used in the people's medicine of China an important place is occupied by respiratory therapy ("chi-kung"). This method has long beenused by the people for therapeutic and prophylactic purposes for the purpose of strengthening and preserving health and longevity. It has been described in many works of the people's medicine and in books of systematic toacism. (A special philosophical trend, widespread in

ancient China). The study of respiratory gymnastics continued to be developed in the centuries which followed.

In this method of treatment the patient under the supervision of a physician masters the methods of respiratory gymnastics. Pneumotherapy does not require any special equipment, provides an independent control, develops the patient's initiative, is an economical and simple method of treatment.

Respiratory gymnastics is accomplished through the observance of special rules of respiration in an appropriate position: lying on the side or on the back, sitting on a chair and crossing the feet.

Before setting about the respiratory exercises it is essential to loosen one's belt and loosen the clothing so as to feel entirely free and comfortable. The first several minutes one should breath uniformly, with the usual rhythm, and then should begin respiratory gymnastics.

As is indicated in all textbooks on laboratory gymnastics, before beginning the exercises it is necessary to relax and concentrate one's attention on the distinct accomplishment of the respiratory exercises, to relax the muscles completely, close the eyes and exclude oneself from the environment.

If the exercises are carried out lying on the side it

is necessary to prepare a hard wooden bed to make the sheet even, and to put a pillow in a comfortable position. If it is cold in the room the feet should be covered with the sheet. One lies on the right or left side, and the head is inclined slightly forward; the eyes are screwed up so that light is hardly seen. The patient should keep himself from perceiving sounds. The mouth is closed without pressure, and the respiration is accomplished through the nose. The higher arm lying above the sheet is straightened out without any tension, the palm is directed downward and is at the hip joint. The other arm is on the pillow several centimeters from the head with the palm upward. The upper part of the trunk is inclined backward.

The upper foot is bent at an angle of 120°, is on the lower foot, and is extended freely or slightly bent

If the exercises are carried out in a sitting positic a broad and even stool or chair should be prepared. The patient sits up straight, evenly and in a stable position, his knees should be bent at an angle of 90°; he should not let his feet hand free in the air. The head is inclined slightly forward. The trunk should form an angl of 90° with the thighs. The feet should be spread apart to the same span as the shoulders; both arms are placed freely on the thighs with the palms downward, and the arms

should hand downward. The upper part of the trunk should not be bent back. The eyes should be half closed so that the light does not penetrate into them. The mouth is closed; breathing is done with the nose, that is, just as when performing the respiratory exercises in the position of lying on the side. After taking this position the respiratory exercisow are begun.

Inspiration and expiration are accomplished frequently with the pronunciationof individual syllables or words. Usually, the sentence "Tz'u-chi-ching-tso" ("one should sit peacefully") is used. For a particularly deep and slow respiration sentences are used with a larger number of words: "Tz'u-chi-ching-tso-shen-t'i-chiang-k'ang" ("sit peacefully and you will be healthy") or "Tz'u-chi-ching-tso-shen-t'i-meng-chiang-k'ang" ("sit quietly and then you can be healthy"). For example, let us take the sentence "Tz'u-chi-ching"; in pronouncing this sentence the method of respiration will be the following: on the word "Tz'u" the breath is held; on the work "ching" the tongue is allowed to drop out,and exhalation is made.

In order that the patient concentrate on the accomplishment of respiratory exercises it is recommended that he concentrate his attention on the tang-t'eng point. Then, he shifts his attention to ideas of his great toes;

after a certain time the sensation of heating of the soles of the feet occurs. In those cases where the patient's attention is concentrated and his mood is already calm this method can be dispensed with.

The science of pneumotherapy provides three methods of respiration, which are distinguished by the intensity of the respiratory exercises.

1. The method of quiet respiration: free respiratio through the nose; slow and even. During inhalation the tongue may be raised to the palate.

2. The method of deep respiration: the patient breathes as usual, and then progressively deeper and deeper until the respiration is accompanied by sounds. The times of inspiration and expiration are the same; there are no pauses between them. In setting about the accomplishment of these exercises one should breathe freely and slowly.

3. The method of respiration with opposite movements: on inspiration, the chest cage is raised, and the abdomen is sucked in; on expiration, the abdomen is protruded, and the chest cage shrinks. In this case, the respiration should be even, slow, quiet, deep and prolonged.

The three methods of respiration mentioned above are used selectively with consideration of the specific con-

dition of the patient. On the basis of preliminary clinical data it may be concluded that the method of quiet respiration is indicated for elderly persons and those who are seriously ill, including those suffering from pulmonary tuberculosis, as the starting exercises. The method of deep respiration is recommended for persons with neurasthenia as well as those suffering from constipation. The method of respiration with opposite movements is used less often than the others, because at first such respiratory exercises are accompanied by unpleasant sensations; however, this method gives good results in the treatment of hypertension.

In beginning the performance of respiratory exercises with therapeutic or prophylactic aims it is necessary to keep in mind that pneumotherapy gives an effect only when all the rules mentioned above and the methodological requirements are observed. Relaxation of the patient during the period of performing the exercises and his ability to distract himself from the surrounding stimuli are of particular importance.

The exercises should be performed under circumstances of complete quiet, rest and comfort. Nothing excessive should be allowed in the room so as not to distract the patient.

The patient will need seven or eight meals while he is occupied in respiratory gymnastics. If he is a seriously ill patient he needs special care.

The patient should be assured of the efficacy of pneumotherapy. He should patiently and persistently carry out the respiratory exercises and inevitably finish the course of treatment.

In pneumotherapy one should be particularly cautious about colds.

In the position of lying on the side the exercises first last 30 minutes and are repeated six times a day. After five days the duration of every exercise is increased to one hour. After 10 days from the start of the exercises exercises in the sitting position are added to those in the position of lying on the side. The exercises in the sitting position are begun in 30-minute periods six times a day. When exercises in the sitting position are added to those in the lying position the latter should be shortened from one hour to 30 minutes (six times a day). The sitting and lying exercises are carried out for 10 day Twenty days after the beginning of the exercises the duration of the exercises in the sitting position is increased to one hour (six times a day).

As far as exercises on the side are concerned during

this period the performance of them depends on the time available, but they should not be introduced at the expense of shortening the sitting exercises.

This combination of exercises is carried out until the 60th day, after which the number of exercises in the sitting position, lasting one hour, is reduced from six to four times a day. From the 75th to the 90th day the sitting exercises are performed three times a day and last one hour; exercises performed lying on the side last 30 minutes each and are performed twice a day (before breakfast and before supper).

Exercises for toughening up the body are begun with 20-30-minute periods and are repeated six times a day. After five days the duration of the exercises is increased to 40 minutes. After 10 days, the duration of the exercises is gradually lengthened to one hour and repeated five times a day; after a month the exercises are performed one hour six times a day. After 70 days, a shift is made to four hours of daily exercises; and after 90 days, to two hours.

Clinical observations made in recent years in the sanatoria, have shown that pneumotherapy gives a good effect in the following diseases: gastric or duodenal ulcer, persistent constipation, chronic gastritis, marked

exhaustion as the result of overfatigue, malnutrition or serious disease (in the stage of recovery), inactive pulmonary tuberculosis, hypotension, neurodermatitis, and cardiac valve insufficiency.

Pneumotherapy is also indicated for insomnia, headaches, impotence, chronic gastritis, general weakness, habitual constipation, hypertension, and anemia. In these cases, the respiratory exercises exert a tonic effect.

Popular Remedies

The arsenal of drugs used in Chinese medicine numbers more than 2,000 items. No less than three quarters of this number is constituted by drugs of plant origin -- various roots, flowers, herbs, fruits or the bark of trees; the others are drugs of animal and mineral origin. From this it is seen what an important place is occupied by medicinal plants in the Chinese people's medicine. This, to a certain degree, is explained by the fact that in China the most varied health-giving plants grow.

The experience of using medicinal agents has been accumulated in China for several thousands of years. In the T'ang era (618-909), in connection with the fact that the collection of wild medicinal herbs could not satisfy the growing demand the need arose for cultivating these

plants. Specifically, during that period, plantations of medicinal plants began in China. However, despite the great therapeutic value of many medicinal agents, the efficacy and properties of some of them remained unstudied by the methods of modern science until recently.

At the present time, medicinal plants used from time immemorial in the Chinese people's medicine have begun to be used quite extensively clinically and for outpatient treatment. In connection with this, the need has matured for a detailed study of the efficacy and pharmacologic effect of these remedies by means of clinical observations and experimental research. At the present time, it has been possible to define more accurately the therapeutic effect of approximately 200 species of medicinal plants.

In recent years, as the result of clinical and scientific verification it has been determined that Ch'ang-shan (Dichroa febrifuga Lour), ya-tan-tz'u (Brucea javanica Merr.) and other agents cure malaria, while huang-lian (Coptis teeta Wall.) and pei-t'ou-weng (Pulsatilla cornua Spreng.) cure bacterial dysentery.

For example, in 1956, physicians of the Shanghai City Infectious-Disease Hospital successfully used pei-t'ou-weng and huang-lian in the form of an [illegible] infusion. Treatment of 40 patients with bacterial

dysentery with this remedy gave good results. As a rule, after taking the infusion of pei-t'ou-weng, on the second or third day the general condition of the patient improves, the temperature drops to normal; on the fourth or fifth day the stool becomes normal.

A group of sick children who were treated with sulfonamide preparations and a group of children who received the antibiotic chloromycetin served as controls. The additional treatment of the patients of all three groups was absolutely the same: physiological solution, glucose, vitemins, analgesics and other measures. As a result, it was found that the infusion of pei-t'ou-weng was more effective than the sulfonamides but was inferior to chloromycetin.

Tu-chung (Eucommia ulmoides Oliv.), huang-ching (Scutellaria baicalensis Georgi) and rof-mu (a remedy obtained from the roots of rauwolfia can be used successfully for the treatment of hypertensive disease. (In 1931, Indian chemists isolated the first crystalline alkaloids from various species of rauwolfia; in 1952, other scientists isolated the principal alkaloid, reserpine or serpasil, from this plant which is now extensively utilized for the treatment of hypertensive disease). Yin-ch'en (Artemisia capillaris Thunb.) is a very effecti

choleretic. A good result is also given by popular diuretics, such as pen-pieng-len (Lobelia sp.), fu-ling (Pachyma cocos Fr.) and others. Tan-shen (Ipecia polymorpha) and i-mu-ts'ao (Leonurus sibiricus L.) normalize the menstrual cycle and stop uterine bleeding.

Such Chinese popular remedies as ginseng and Chinese lemon [Schizandra chinensis] which possess tonic, stimulating and strengthening effects, have deservedly acquired world-wide fame.

Ginseng has been known in China for about 4,000 years and has long been considered one of the most valuable medicinal agents. The first mention of it is encountered in the very old Chinese works where the medicinal agents are described ("Shen-nung-peng-ts'ao", of the first century B.C.). The well known Chinese pharmacologist Li Shi-chen (Sixteenth Century) gave ginseng a considerable place in his work on medicinal agents.

According to the statements of the old Chinese physicians, ginseng possess a property of giving a man strength, endurance and freshness. They assert that ginseng can even save one dying from death. Ginseng roots, which in their external appearance resemble the figure of a man and possess, as it were, a special health-giving power, were particularly worshiped in the past.

In China this medicinal plant, called "the wonder of the world", "God's grass", "the root of life", is designated by a combination of symbols: jen-man and shen-life.

Ginseng is a perennial grassy plant with numerous roots, long leaves and whitish-green blossoms. It grows in China, Korea, and the Primorskiy Kray of the USSR. At the present time, the effect of ginseng on the human body has been quite well studied. It has been shown that ginseng influences the cerebral cortex, and increases the work capacity.

Ginseng is used in neurasthenia, hypotension, general weakness, physical and mental overfatigue, increased drowsiness and many other diseases. There are data according to which ginseng ointment accelerates wound healing. In China it is recommended that ginseng not be used as a tonic measure during the hot summer month It is believed that the most pronounced and best tonic effect of ginseng is shown in the winter time.

Another medicinal agent, which exerts an excitatory, stimulatory effect on the central nervous system is Schizandra chinensis. This is a climbing bush, which grows in China, primorskiy and Khabarovskiy krays of the USSR. It is used in the form of a powder or

tincture of the dried fruits and seeds. This remedy is used for physical and mental fatigue and states of increased drowsiness.

In order to avoid ~~een~~ nervous system overexcitation ginseng and Schizandra chinensis should be used only on a physician's prescription.

The Chinese people's medicine is also rich in drugs which possess a general sedative and analgesic effect. Of these drugs yan-hu-so (Corydalis remota Fisch.), fang-chi (Stephania tetrandra Moore), hsi-hsin (Asarum sieboldi Miq.) and others are used for headaches on the background of cerebral vascular spasm and for pains of various origins (in peptic ulcer, cholecystitis, intestinal and renal colic and others). Quite a few remedies obtained from plants possess an antihelminthic therapeutic effect. Among them are shih-chun-tse (Quisqualis indica L.), pin-lang (Areca catechu L.) and others. In the past year, in one of the hospitals of Pekin the efficacy of prescriptions of ti-huang, ginseng, t'ien-tung, kou-ti was checked. Of 89 patients suffering from diabetes a pronounced effect was noted in 53; an improvement in the condition, in 34; treatment did not produce any effect in two patients.

A slower, more gradual effect on the patient's body compared with modern chemotherapeutic preparations is

characteristic of the remedies used in the Chinese people's medicine. Nevertheless, the efficacy of many of the popular remedies is quite great in a number of cases. The experienced physician prescribes a strictly defined quantity of various remedies for every patient, thereby making an individual approach to the treatment of the patients.

We believe that a reasonable combination of the methods and agents used for several thousands of years in the Chinese people's medicine with modern methods of treatment, particularly with the use of the latest chemotherapeutic preparations, antibiotics, vitamins, hormones, etc. should give a good effect in a number of cases. Below, brief descriptions of some of the most popular medicinal plants used in the Chinese people's medicine ~~is~~ are given.

1. Hsi-hsin (Asarum sieboldi Miq.) Siebold's hazelwort. Physicians ascribe an analgesic-diaphoretic, diuretic and expectorant effect to the dried root of this plant.

2. Fang-feng-Siler divaricatum Benth. et Hook. f. The dried root of this plant is included in many medicinal prescriptions. It is considered to have a general tonic and antipyretic effect. It is recommended for febrile states.

3. Ma-huang-Ephedra sinica Stapf (the Chinese ephedra plant). The stems of this plant have long been used in China as an antipyretic and diaphoretic remedy.

4. Ch'ai-hu-Bupleurum falcatum L. (the crescent hare's ear). The roots of this plant, which exert an antipyrent and astringent effect are used in rheumatic fever and fever.

5. Ju-hsiang--Pistacia khinjuk Stocks. (pistachio). The rosin of this tree is used as an analgesic and sedative agent; a general tonic and diuretic effect is ascribed to it.

6. Huang-ch'i--Astragalus hoantchy Fr. (astragalus). The root of this plant is considered to be an excellent tonic, diaphoretic and diuretic agent in the people's medicine; it is recommended in diabetes and ascites.

7. Niu-hsi--Achyranthes bidentata Blume. The root, stem and leaves of this plant are used medically in China. An analgesic and diuretic effect is ascribed to them. This remedy is prescribed in pains of various origins, hypertensive disease and diseases of the genito-urinary tract.

8. Pei-mu--Fritillaria verticillata Willd. (the speckled Guinea-hen flower). The root of this plant is very widely used in the people's medicine. A general

sedative and antispasmodic effect is ascribed to it; this remedy is used successfully for relieving cough.

9. Yüan-chih---Polygala tenuifolia Willd. The root of this plant is widely used in China as an expectorant, antispasmodic and choleretic remedy.

10. Pan-hsia---Pinellia ternata. The root and stem of this plant are widely used as a remedy against cough, vomiting, dizziness as well as an antipyretic and diaphoretic. In combination with dilute hydrochloric acid this agent is particularly effective for the treatment of vomiting and nausea in pregnant women.

11. Huang-ch'in---Scutellaria baicalensis Georgi (Baikal skullcap). The root of this plant is prescribed in various febrile conditions, hypertensive disease, jaundice, disturbances in the menstrual cycle. This remedy is frequently combined with huang-liang and is prescribed in the form of pills. Such pills are extensively used as general tonic remedies with a prophylactic aim.

12. Huang-chin---Polygonatum falcatum A. Gray (the crescent sealwort). The root of this plant, which possess a general tonic and emollient effect, is used medically. This remedy is used also for the treatment of leprosy.

13. Ta-feng-tse---Gynocardia odorata R. Br. The seeds

of this plant and the oil exuded from them has been used in China since ancient times as an agent for the treatment of leprosy.

14. Sha-shen--Adenophora polymorpha Ledeb. The people's physicians have ascribed a general tonic and expectorant effect to the roots of this plant; it is recommended particularly for diseases of the respiratory tract.

15. Mu-t'ung--Akebia quinata Decne. The stem and fruit of this plant are considered to possess diaphoretic and digestive-tract-juice stimulating, diuretic and laxative effect.

16. Sha-jen--Amomum xanthoides Wall. The seeds of this plant are used for vomiting as well as remedy which possess an astringent and sedative effect.

17. Ma-tou-ling--Aristolochia debilis Sieb. et Zucc. (Birthwort). The fruit of this plant is particularly widely used for the treatment of tuberculosis.

13. Pin-lang--Areca catechu L. (Palm). The nuts of this palm tree are extensively used in China as a remedy which stimulates the production of digestive juices, and for its astringent and antihelminthic effects.

19. Hung-hua--Carthamus tinctorius L. (safflower). The red blossoms of this plant are prescribed for consti-

pation and loss of appetite.

20. Huang-lian-Coptis Teeta Wall. The root of this plant is highly prized in Chinese medicine and is recommer. for dysentery, diarrhea and inflammatory diseases of the intestine (colitis and enterocolitis).

21. Chang-hung-huang--Crocus sativus L. (saffron crocus). It is ascribed antispasmodic and stimulatory effect; it is used also for the treatment of various blood diseases.

22. Ch'ang-shan--Dichroa febrifuga Lour. It grows in the South of China; the roots, stem and leaves of this plant are used in infusions as a special treatment for malaria.

23. Ping-p'ien--Dryobalanops aromatica Gaertn. A type of camphor is obtained from this tree which is used in Chinese medicine not so much as a cardiac agent as as an agent which possess a sedative, antispasmodic diaphoretic and expectorant effect.

24. Kan-ts'ao--Glycyrrhiza glabra L. This plant is one of the most popular in Chinese medicine. It has been included in the composition of many drug prescriptions which are given for febrile states, pains, cough, shortness of breath, etc. It is frequently used in prescriptions for children.

25. Jenshen--Panax ginseng S.A. M. In Chinese medicine it has been widely used chiefly for chronic, debilitating diseases, particularly for general weakness, poor appetite, exhaustion, reduced working capacity, headaches, insomnia, neurasthenia, anemia, diabetes, gastritis, in functional disturbances of cardiac activity, sexual weakness and impotence. Usually, ginseng is used in combination with other drugs or is administered in the food.

26. Fu-ling--Pachyma cocos Fr. This fungus, which grows on the roots of coniferous trees, is widely used in the Chinese medicine as a sedative, diuretic agent which contributes to digestion.

27. Ho-hsiang--Lophanthus rugosus Fisch. et Mey. The leaves of this plant are used as an agent which relieves vomiting.

28. I-mu-ts'ao--Leonurus sibiricus L. (Siberian lion's ear). In medicine, the stem and seeds of this plant are usually used. They stimulate hematopoiesis, regulate the menstrual cycle, detoxify poisons, stop pain in the uterus and possess a hemostatic effect.

29. Lang-tang--Scopolia japonica Maxim. This remedy is ascribed a general tonic, analgesic and diuretic effect. It is prescribed also for malaria, dysentery and

epilepsy.

30. Ti-huang--Rehmannia glutinosa Libosch. The root of this plant is used for diabetes, hectic fever, over fatigue as well as after considerable blood losses.

31. Ho-shou-wu--Polygonum multiflorum Thumb. (Bistort). The root of this plant is prescribed for general weakness. This remedy has been used successfully for returning the original color to graying hair.

32. Kou-ch'i--Lycium chinense Mill. (Chinese club moss). The young leaves, buds and berries of this plant are used in medicine as a general tonic agent.

33. Wu-wei-tse--Schizandra chinensis Baill. (Chinese lemon). The dried fruits and seeds of this climbing bush are used as a stimulant for weakness of the cardiac muscle and in other diseases of the cardiovascular system and respiratory organs. This agent increases the work capacity, reduces sleepiness, possess a general tonic effect.

34. Yin-ch'en--Artemisia capillaris Thunb. (Wormwood). The leaves and stem of this plant possess a striking choleretic and antipyretic effect. This plant is being successfully used in the treatment of jaundice.

35. Pien-hsü--Polygonum aviculare L. (Knot weed). The juice obtained from this herb is used as a hemostatic agent.

36. Mei-men-tung--Liriope spicata Lour. The stem of this plant is widely used in Chinese medicine; it is ascribed a general tonic, diuretic and antipyretic effect. This agent is recommended in the treatment of tuberculosis, bronchitis and bronchial asthma.

37. Ch'uan-ch'un--Conioselinum lucidum(marsh parsely). The root of this plant is widely used in Chinese people's medicine: it is ascribed a general tonic, analgesic and hemostatic effect. This agent is prescribed also for stopping uterine bleeding, in the treatment of cardiac diseases, neuralgias, etc.

A number of effective drugs long used in the peoples medicine has become known to science quite recently, in some cases as the result of chance findings.

There is no doubt of the fact that systematic study of the ~~the~~ medicinal plants of the Chinese people's medicine will enrich medical science with new therapeutic preparations.

The Chinese people's medicinal agents have played and are continuing to play an important part in safeguarding the health of the population of China. They are used extensively by the people, particularly in the country, and occupy an important place in controlling various diseases.

Diagnostic Methods

In Chinese medicine there are four methods of diagnosis: 1) "wang" -- examination of the color of the face, skin, eyes, tongue, degree of obesity, height and state of nutrition, as well as the moods detected; 2) "weng" [an exact transliteration here would indicate more nearly wieng] -- auscultation for cough, shortness of breath, a determination of the changes in the voice, movement of gases in the intestine, etc.; 3) "weng" [an exact transliteration here would indicate more nearly weng] -- interrogation of the patient: the circumstances under which he became sick, what his complaints are and how his feeling of well being is (appetite, stool, body temperature, perspiration, pains, etc.); 4) "ch'ieh" -- examination of the pulse, which is the most important method of diagnosis.

In Chinese medicine 28 types of pulse are distinguish. of which 10 are the principal ones: superficial, deep, slow, fast, fine, excessive, free, tenacious, tense, gradual.

Among the diagnostic methods are palpation of the patient's body (tender feelings are demonstrated and the presence of edema); the determination of the temperature and the degree of moisture of the skin, etc. All these are necessary elements in the history and clinical exam-

ination of the patient.

The people's physicians have determined the fact that the one who is able to detect disease should observe the color of the face and skin, take the pulse, listen to the respiration and the voice: "put your hand on the patient's pulse, feel his chest, abdomen; in addition, interrogate the patient in the greatest detail, and this will make it possible to define the disease". The physicians of the people's medicine have recognized the need for comprehensive use of all four of the principal methods of diagnosis mentioned above. The interrogation of the patient concerning the course of the sickness should be accomplished with particular care. The family from which the patient comes, what his general living conditions are, how he is fed, where he lives, what his mood is should be made clear, that is, what accompanied the onset of the disease and how it developed.

Basic Principles of the Chinese People's Medicine

The theoretical basis of Chinese medicine is constituted by four main principles.

1. The objective world is material, and matter is constantly changing and moving. A person is part of the universe.

The teaching of "t'ien-jen-he-i" (heaven and man are

a single entity) maintains the unity of man with his environment. According to this teaching, man develops independence on nature and passes down the road of life with the same rules and regulations as the four seasons of the year change.

2. There are two sides of matter itself which counteract each other and are interdependent. These two sides are called the "yin" (negative principle) and "yan" (positive principle). It is entirely possible that the word "yin" in its original significance indicated a gloomy day, and "yan", a sunny day. Afterwards, these two words acquired a broader meaning and began to be used for designating everything opposite, like, for example: heaven--yan; earth--yin; sun-yan; moon--yin; male principle--yan; female principle, yin.

They also designate abstract concepts, for example: movement--yan, rest--yin; activity--yan; passivity, yin; heat--yan; cold--yin; fullness--yan; emptiness--yin; ~~outside~~ external, yan; internal, yin.

"Yin" and "yan" not only counteract each other but they also mutually support and limit each other and are also interdependent. They exist in a state of constant change and movement.

Scientists of the people's medicine believe that

everything existing can be divided into five substances according to its properties: wood, fire, earth, metal and water (the "wu-hsing" teaching). These substances not only give rise to one another but also mutually limit one another (mutual restraint); metal gives rise to water; water, to wood; wood, to fire; fire, to earth; earth, to metal (mutual production).

The "wu-hsing" teaching also assumes the presence of five organs in the human body, the interaction and the interrelationship of them: liver, heart, stomach, lungs and kidneys. If any organ becomes sick, the physicians explain this from the standpoint of the "wu-hsing" teaching. If the patient lacks something or has too much of something the corresponding method of treatment is used: adding or subtracting.

According to the "wu-hsing" teaching (about the five substances), all phenomena in nature are interdependent. The "yin-yan" teaching and the "wu-hsing" teaching were united under the name of "yin-yan-wu-hsing" (concerning the negative and the positive principles and the five substances). Astronomy, chronology and medicine in ancient China were based on this teaching.

3. The weather changes observed in nature are divided into six types: wind, cold, dryness, dampness,

fire (heat) and opressive heat. All these changes, which are directly connected with the seasons of the year, have been called "ssu-shi" (the four seasons in China). If in nature there is some deviation from the normal this has a harmful effect on the human body and produces disease. In the fourth century B.C. Hsün Tse, a scientists of the confucianist philosophical school, said: "the heaven (he has in mind nature) can not cause man to become sick if he expediently regulates his manner of life, adapting himself to the change in the climate".

4. Man's feelings are divided into seven types in the people's medicine: happiness, wrath, sadness, reflection, grief, fearfulness and anxiety. Being in any mood to an excessive degree or for too long does harm to the human body and an affliction is produced.

Usually, it is difficult for foreign scientists to understand these four conceptions of the people's medicine but the Chinese physicians flexibly and skillfully use them for purposes on diagnosing and treating diseases.

Chapter III

Clinical Experience of the Chinese People's Medicine in Recent Years

In China the accomplishment of an experimental study of the agents of the Chinese people's medicine well known at the present time has been recognized as necessary. The future selection of these agents, which have been published in the ancient medical books, will make it possible to supplement the arsenal of modern medicine with many effective therapeutic agents. In the past years scientific research in this direction has been widely developed; much has been done on the organization of clinical observations. Thanks to the collaboration of physicians in the modern and people's medicine some achievements have been made in a number of medical institutions in the field of both clinical observation and scientific research work.

After the formation of the Chinese People's Republic the Communist Party and People's Government took various measures for the study of the Chinese medicine, which is making it possible for the Chinese people's medicine to serve the people with even greater benefit.

Scientific research work on the study of Chinese medicine and drugs by the methods of experimental and clinical investigations has been developed on a particularly large scale after 1954. In therapeutic-prophylactic and scientific research institutes preliminary results have been obtained on the effectiveness of treatment of a number of diseases by remedies of the people's medicine.

Schistosomiasis. A whole series of methods and agent of Chinese people's medicine has been checked. These agents are particularly effective for the treatment of schistosomiasis in the late stages, where the use of antimony preparations are strictly contraindicated. The use of the people's drugs is contributing to the elimination or reduction of ascites, reduction of the size of the liver and spleen, improvement of the liver function. After the successful treatment with such remedies the patients are shifted to antimony preparations. In recent years (1954-1958) various agents of the Chinese medicine have been used in 12 provinces for the treatment of schistosomiasis in the late stage in 80,000 patients; of these, 75,200 patients v then subjected to treatment with antimony preparations. Such patients, according to the data of modern medicine, are consid

hopeless. Chen-tsu therapy has also been used successfully for the treatment of patients with schistosomiasis. It is used also for the elimination of toxic side effects produced by antimony preparations. In the Institute of Chen-tsu Therapy patients with an enlarged liver and spleen are given treatment by cauterization with cicatrization; good results have been obtained in 66.7 percent of the cases.

Japanese B encephalitis. Previously, the mortality rate from Japanese B encephalitis reached 30-50 percent. In recent years, combined treatment with modern and people's remedies has given a very good result.

According to the data of therapeutic institutions of Peking, Shenyang (Mukden) and others, the percentage of patients who recovered after being treated with popular remedies reaches 90 percent. The department of health of the province of Hopei, on the basis of an analysis of treatment results of Japanese B encephalitis with these remedies, found that two prescriptions are most effective -- ying-ch'ao-san and pei-hu-t'ang.

Influenza. In 1957, there was a large epidemic of influenza in the Chinese People's Republic. In T'ienching

positive results were given by the prophylactic use of pills containing ying ch'a'e-chetuwan. Of several thousands of persons who took this preparation only 2.51 percent became sic in them the disease had a mild course; in the control group the morbidity rate reached 16.1 percent. In the Second People's Hospital of Huangchow a good therapeutic effect has also been obtained: after a single use of the popular remedies the patients' temperature dropped from 39° to normal, and there were no complications at all.

At the present time, in the country, particularly in the villages, these remedies are used extensively for the treatment and prophylaxis of influenza.

Infectious Hepatitis. The treatment of infectious hepatitis by popular remedies has also proved to be effective: the jaundice disappears rapidly and the temperature drops.

According to the data of Hospital of the Red Cross Society in the city of Kunming in Yunnan province, after the use of popular remedies (ying-ch'eng -- Artemisia capillaris) the patients recovered after an average of four to five days: the jaundice disappeared, the urine became transparent, the reacti for bile pigments was negative, the feeling of well being and the

appetite of the patients improved. In 1958, in Shanghai, Chungching and others thousands of patients were successfully treated by popular remedies.

Bacterial Dysentery. Along with the modern methods the people's remedies are used for the treatment of bacterial dysentery in China (Huang-lian -- Coptis teeta Wall; pei-t'ou-weng -- Pulsatilla ceruna Speng, and others). Good results have been obtained in the First City Hospital in the city of Ch'ungching in Ssuch'uan province, in the Infectious-Disease Hospital in the city of Taiyüan in Shangsi province in the People's Hospital of the city of Hofi and others.

Pei-t'ou-weng is used in the form of the infusion (0.5 gram of the drug is contained in one cubic centimeter of the infusion), which is prescribed three times a day in a dose of five to 10 cubic centimeters (for adults).

Poliomyelitis. In 1958, in the Children's Hospital of Peking 200 patients were treated. An exact clinical diagnosis of poliomyelitis was made in 129 patients. Cure was observed in 60; improvement, in 69 patients.

Beginning with June 1953 and through September 1955 treatment with acupuncture of 100 children who were sick with

poliomyelitis was accomplished in this hospital. In Table 13 the preliminary results of treatment of the children suffering from paralyses after having poliomyelitis are shown.

Table 13

Results of Acupuncture Treatment of Children Suffering from Paralysis following Poliomyelitis

Time of start of treatment after onset of paralysis Срок начала лечения после наступления паралича	No of patients Число больных	Cure Излечение	Definite improvement Явное улучшение	Improvement Улучшение	No effect Отсутствие эффекта
less than a year . .	83	26	34	23	0
More than a year . .	15	1	7	5	2
Total	98	27	41	26	2

Those children were considered cured in whom the symptoms of paralysis disappeared. Those patients in whom a definite effect was observed after acupuncture treatment (the patients could walk but not very well) were categorized in the group with definite improvement. Forty-four patients have not yet completed the course of treatment; they are still under a physician's observation.

The data presented are evidence to the effect that treatment of the consequences of poliomyelitis by acupuncture

contributes to the recovery of function of affected organs. The acupuncture is particularly effective if it is begun during the first few days after the drop in the temperature and normalization of the cell elements in the spinal fluid.

Treatment of paralysis which has lasted for a year or more, at a time when muscular atrophy has already occurred, gives poorer results. In various cases, the result is good.

As a rule, acupuncture sessions are held every other day or every third day. In seriously ill patients a cure or definite improvement occurs in a half year or after a year from the time of onset of treatment. In the particularly seriously ill acupuncture treatment is continued up to two years. However, some of the seriously ill patients recover much sooner: recovery occurs 3-5 months after the onset of treatment. For the purpose of eliminating the residual signs effective points have been established on the upper and lower extremities, the punctures at which points produced the best therapeutic effect.

The method of Chen-tsu therapy for the residual signs of poliomyelitis is the following: the needle is inserted into the tissues with a rotary movement and is left for a short time in

order to produce a moderate stimulation of nerve endings, and then it is rapidly extracted also with a rotary movement. It is expedient to combine acupuncture with cauterization. Each cauterization lasts two or three minutes and is accomplished with a slow rotation of the burning end of the wormwood cigarette at a distance of 1.5 centimeters from the skin.

Cauterization and acupuncture produce the stimulation of sensory nerve endings and nerve trunks, which apparently accounts for the recovery of the metabolic processes and neural regulation of the paralyzed organs. Acupuncture, by producing a temporary and slight stimulation of nerve endings in the skin apparently in a number of cases contributed to the restoration of functions in the motor nerve cells of the spinal cord, which prior to this were more or less severely affected by the poliomyelitis virus or were even on the verge of death. Hence, it is understandable why Chen-tsu therapy, when begun on time, produces a definite improvement even in serious cases.

Clinical experience has shown that acupuncture and cauterization have justified themselves as treatment remedies for the residual signs of poliomyelitis, contributing to the

recovery of function of the affected extremities. The success in treatment depends on the period of onset of treatment, severity of the disease and activity of the patient.

The mechanism of the beneficial effect of Chen-tsu therapy has not been conclusively studied.

Diabetes Mellitus. The description of diabetes mellitus is encountered in ancient medical books. Thus, in the work "Huang-ti-Nei-ching" and others the signs and methods of treatment of diabetes mellitus are presented.

The well known physician Sung Ssu-miao (581-682) was the first to begin diet therapy for diabetes mellitus, approximately 1,000 years before Johnrollo (1796). In the book "Ching-kuei-yao-liue" (Chang Chung-ching, 150-219) a remedy was described -- pills of shing-ch'i-wan.

Even at the present time popular remedies are used successfully for the treatment of patients with diabetes. Thus, beginning with January 1955 and through January 1957 in the Hospital of Laborers and Employees of the Administration of Local Industry of Peking 50 patients were treated with a mixture of ginseng and ti-huang (Rehmannia glutinosa). The reduction or disappearance of the general symptoms was noted in 49

persons; approximately 20 days after the use of the popular remedy the quantity of sugar in the blood decreased, and the sugar disappeared from the urine. In 40 patients of those treated there were no recurrences for a year after treatment. At the present time, there are many clinical observations which constitute evidence of the beneficial therapeutic effect of these remedies.

Chronic Nephritis. It is well known that chronic nephritis is considered one of the difficultly curable diseases, particularly in the late stage.

According to the data of the Peking Medical Institute, certain achievements have been made in the treatment of patients with chronic nephritis by popular remedies. In three of 24 patients a cure occurred. Disappearance of the protein from the urine was noted in 14; a considerable reduction, in two patients; in various patients a reduction in the blood pressure was observed with improvement in the kidney function, normalization of the chemical elements of the blood (increase in the protein and reduction of the cholesterol).

In September 1958 the workers of the Kueiyang Medical Institute found, during a mass movement for the collection of

valuable prescriptions, that the old woman, Lu, preserved an inherited prescription, which included drugs which exerted a good effect in chronic nephritis. The remedy was tried out in the Institute clinic for the treatment of four patients (degenerative stage of chronic nephritis), who for years had been unsuccessfully treated with modern methods. A month after the use of this prescription the edema and ascites disappeared from all four patients.

At the Institute of the People's Medicine in the province of Shansi 17 patients were treated by this prescription; the edema disappeared in 14 patients, and was considerably reduced in two.

Hypertension. Popular remedies and methods of acupuncture have been widely used for the treatment of hypertension. At the Eleventh People's Hospital the people's medicine physician Chang Po-an suggested the use of the prescription erh-hsiang-t'an (the following is included in its composition: Curculigo endifolia R. Br; Lypimedium macranthum Morr et Dene var. violaceum Franch, Bacopa, Monnietta, Hyata, Anemarrhena saphodeloides, Bge. Evodia Glouca, angelica polymorpha, Maxim, var. sinensis, Oliv.) and Che'wu-wu-t'up (Clerogengion Cuchogomon Thumb.).

These drugs were tried out in the treatment of 800 patients with hypertension. A therapeutic effect was obtained in 72.5 percent of them (Table 14).

The data of clinical observations on tens of thousands of patients attest to the fact that in the treatment of hypertensive disease the remedies of the people's medicine do not lag behind modern hypotensive preparations in their effectiveness.

Table 14

Efficacy of Treatment of Hypertension with Popular Remedies (in Percentages)

	erh-hsiang-tan (366 patients)	ch'eun-wu-tung (430 patients)	Paeonia Harrin montansins (27 patients)	ton (50 patien
	Эр-сян-тань (366 больных)	Чеу-у-тун (430 больных)	Paeonia Montansins (27 больных)	Haringlon (55 больных)
Pronounced effect	28,69	32,10	59,3	24
Slight effect	45,90	40,46	22,2	46
No effect	25,41	27,44	18,5	30

There are also data in existence concerning the efficacy of treatment with popular remedies in such diseases as cirrhosis of the liver, aplastic anemia, et cetera. However, these data need further careful verification.

The surgical method of treating bone fractures is very

interesting. In ancient Chinese medicine a method of osteosynthesis was described by means of a willow branch similar to the method of treatment by means of a metal nail.

In the Hospital of the People's Medicine in Wuhan the physician Liu Ta-fu was the first to revive the use of this method in experiments on dogs and obtained good results. At the present time, they are being used in many hospitals in China by surgeons and osteologists. Thus, in Wuhan 49 patients have been treated by this method with good results (fractures of the extremities, mandible, vertebrae, et cetera).

In the medical institutes of Peking and other cities experimental research has been done on animals.(dogs). In experimental dogs two to three centimeters of a leg bone have been resected, and at the site of the defect a willow branch was inserted. After two months, the dogs were able to walk well. On the X-ray film the ingrowth of the willow branch was noted, which was confirmed at autopsy. According to investigation data, the period of treatment and recovery of function of the patient's extremity were considerably shortened.

In China, considerable experience has been accumulated in the use of Chen-tsu therapy in certain diseases. At the

present time, recourse is had to this method not only in China but also in the Soviet Union as well as in a number of other countries.

The Scientific Research Institute of Chen-tsu Therapy has studied clinical material concerning the results of treatment of 15,000 patients with 231 nosological forms of disease. The total effectiveness is equal to 40 percent. Sur Chen-tsu therapy is not a universal method of treatment and cannot be used in all diseases.

The Effectiveness of Chen-tsu Therapy in Headaches

At the Institute of Chen-tsu Therapy 115 patients were observed with various forms of headaches; a comparatively rapid analgesic effect of Chen-tsu therapy was established (Table 15).

Sciatica. According to observation data on 123 patients with sciatica in the research hospital in the province of Kwangtung the effectiveness of Chen-tsu therapy reaches 91.8 percent (Table 16).

Observations of the department of Chen-tsu therapy in the clinic of the Chun-te Secondary Medical School (45 patients) showed that the results of treatment in the acute sta

are better than in the chronic stage. In the majority of patients acupuncture was performed twice; in a minority, only once.

Table 15

Effectiveness of Chen-tsu Therapy for Headaches

Name of disease	No of patients	Good effect	Improvement	Temporary effect	No effect
Headache of neurogenic origin	55	9	26	10	10
Traumatic headache	13	4	2	4	3
Headache from hypertension	14	1	2	9	2
Migraine	21	9	8	2	2
Headache from high temperature	5	5	—	—	1[1]
Other types of headache	7	6	—	—	—

[1] The patient had a subarachnoid hemorrhage.

Table 16

Effectiveness of Chen-tsu Therapy in Sciatica

Region	No of patients	Recovery	Improvement	No effect
Kuangtung province	132	96	31	5
Hopei province	41	28	9	4

According to the data of Chen-tsu therapy department of the Hospital of the Liuita Secondary Medical School in the province of Liaoning, Chen-tsu therapy has proved to be effective in the treatment of neurasthenia (118 patients), headaches, insomnia, nocturnal emissions and poor appetite.

There are observations in existence, according to which Chen-tsu therapy stops attacks of bronchial esthma, eliminates pains in gastric spasms and acute gastritis, exerts a therapeutic effect in chronic inflammations of the intestine, certain types of diarrhea and constipation of various etiologies, in the initial stage of hypertension, tachycardia, cardiac neuroses, angina pectoris, diabetes, gout, rheumatic arthritis, particularly in its acute stage, et cetera.

At the Institute of Chen-tsu therapy in Peking 128 patients with hypertensive disease were treated. A considerable effect was obtained in 40; improvement, in 51 patients; in 37 patients the treatment proved ineffective.

In the Workers' Hospital of Ch'ung Ch'ing Chen-tsu therapy was used in 252 patients with acute gastroenteritis. Its effectiveness amounted to 94,8 percent.

In the People's Hospital in the province of Fuchiang

Chen-tsu therapy was given to 865 patients with rheumatic arthritis: 194 patients (22.96 percent) recovered; in 146 patients (16.88 percent) a considerable improvement was noted; in 456 patients (52.7 percent), improvement; in 69 patients (7.92 percent) the treatment proved to be ineffective. As the result of Chen-tsu therapy such acute symptoms as redness, edema, pain and temperature of the skin disappeared quickly.

Chen-tsu therapy exerts a favorable effect also in acute tonsillitis, sinusitis, allergic rhinitis, nosebleeds, ringing in the ears. A good result has been obtained in the elimination of postoperative pain; toothache is stopped comparatively quickly (punctures at the he-ku point). Of 103 patients treated the toothache disappeared in 38; it was considerably reduced in 36 patients; treatment was ineffective in six patients.

The data presented above by far do not completely characterize the effectiveness of Chen-tsu therapy.

Chapter IV

Recent Scientific Investigations in the Chinese People's Medicine

In the present chapter only preliminary data are bein presented on the use of the method of Chen-tsu therapy in the deaf and dumb and patients with acute appendicitis. The method has been presented in brief, because a special book by Chu Lian "Modern Chen-tsu Therapy", published in Russian in 1959 has been devoted to it.

Treatment of the Deaf and Dumb

Investigations were carried out on this problem at Eleventh People's Hospital of Shanghai in 1956-1958. Th results of this research deserve greater attention. It well known that the cause of acquired deaf-mutism, in th great majority of cases, is a disturbance in the functio of perception and analysis of the sound coming into the from the environment as a result of involvement of the auditory nerve or the organ of Corti following acute infe ion sustained at an early age. Here, in the organs of speech, both central and peripheral, no organic changes a observed. Therefore, deaf-mutism and simple deafness essentially represent only an affliction of the auditory organs.

The method of treating deafness by acupuncture was

described in ancient Chinese medical works. In the book, "Neiching", which was published two thousand years ago, it is mentioned that "...In the case there is no effect following the punctures at points along the line from the large intestine to the arm--yang-ming (four points are located along this line which are effective for deafness: sheng-yang, yang-hsi, p'ien-li and he-ku) it is necessary to make a puncture at a point located in front of the ear (the t'ing-hoy point)". Afterwards, through long years of practice experience in the treatment of deafness has been enriched continuously; however, until the liberation of China material on this subject had not been subjected to statistical generalizations. On the other hand, the method of Chen-tsu therapy, like the other methods of the people's medicine, was denied as unscientific and the use of it was limited or prohibited. Following the liberation of China the attitude toward Chen-tsu therapy changed markedly.

In October, 1956, at one of the hospitals a special department was created for the treatment of the deaf and dumb by this method.

On the basis of the rich previous experience the method was improved, and specifically methods for deep puncture were worked out, which considerably increased the effectiveness of treatment of the deaf mutes. Preliminary data in the treatment of 301 patients have proved to be encouraging.

Methods of Treatment. Below, the acupuncture points are indicated in a diagramatic form.

Name of point		Location	Direction of puncture	Depth of puncture in
Frequently used points	I-feng	In the recess behind the ear lobe	Forward and slightly upward	3.2-3.9
	Ting-kung	Anterior to the tragus of the ear	Backward and downward	3.2-3.9
	Erh-men	Anterior to and slightly above the notch above the tragus	Backward and downward toward the lower wall of the external auditory meatus. The tip of the needle is slightly backward	3-3.7
	Ting-hoy	Anterior to the notch below the tragus	Slightly backward.	3.2-3.9
	Ch'i-mai	At the margin of the mastoid process, 3 tsuns above the I-feng point, on the same level as the opening of the external auditory meatus	Forward and downward	3-3.7
Associated points	Pai-hoy	In the center of a line between the upper edges of the aural conchae	Slightly backward	0.3-0.5
	He-ku	Between the first and second metacarpal bones; slightly nearer to the second.	Toward the index finger	2-2.5
	Chung-chu	On the dorsal surface of the hand	Perpendicularly	1.5-1.8

		(cont'd) in the interosseous space between the fourth and fifth metacarpal bones, posterior to the metacarpo-phalangeal joints of the ring and little fingers		
Reserve points	Ya-men	5 fengs above the posterior margin of the hairy portion of the head in the midline	Perpendicularly	3-3.8
	Lian-chüan	Above the thyroid cartilage in the midline	Backward and upward	3-3.7

Notes: 1. The main (frequently used) points are used in all cases of treatment. 2. The associated points are used in turn. 3. The reserve points are used depending on the patient's condition; for example, if the patient's voice is hoarse (to the point of being absent) a puncture must be made at the ya-men point; in case of difficult movement of the tongue, at the lian-chüan point. 4. The depth of the puncture is determined by the patient's age. 5. Frequently, patients having the procedure performed for the first time are anxious; therefore, to avoid fainting during the puncture it is recommended that only the i-feng, ting-kung and pai-hoy points be used at the first session. Afterwards, the others are added to these points.

Acupuncture methods are the following:

1. The needle is inserted by fast rotary movements; after the puncture of the skin the needle is advanced without rotation to the prescribed depth. Here, it is necessary to produce an irradiation of sensations of rheumatic pains,

numbness or bursting.

2. The needle is left in the tissues a minimum of 30 minutes.

3. During extraction the needle should not be rotat.

Chen-tsu therapy is accomplished every other day. A course of treatment consists of 30 sessions. A repeat course is prescribed after a 15-day or month's interval. If the first course does not produce any effect treatmen can be stopped.

Thick needles are most suitable. However, to avoid pains, which, as a rule, occur with the use of thick needle it is recommended that stainless steel No. 30 needles 4 or 3.4 centimetres in length be used.

Analysis of the Results. Of 301 patients 181 were men and 120 were women. Patients who had had the disease less than five years constituted 88.7 percent.

Usually, deaf-mutism is divided into congenital and acquired. According to the foreign data in the literatur cases of congenital deaf-mutism comprise about 25 percent According to the data of Chinese investigators, congenita deaf-mutism is encountered in 20.3 percent of the cases; cases of undetermined etiology are included in this numb In practice the determination of deaf-mutism of congenita origin offers considerable difficulties. For example, s times deaf-mutism, which occurs as the result of an infectio

disease or injury to the newborn is considered to be congenital. Sometimes, cases of congenital deaf-mutism are categorized in the group of undetermined etiology.

According to data in the literature and the data of Chinese investigators, the most frequent causes of acquired deaf-mutism are high temperature with convulsions, meningitis, measles, and other acute infectious diseases (Table 17).

Table 17

Etiology of the Disease

Etiology	No of patients
High temperature with convulsions	103
Meningitis	52
Measles	31
Typhus	19
Complications after taking streptomycin	14
Otitis	13
Trauma	6
After taking quinine	2
Undetermined	61
Total	301

In evaluating the treatment results the method of examination of hearing is very important. However, the exact determination of residual hearing offers great difficulties. Frequently, this cannot be done by means of an audiometer. Therefore, in examining hearing Chinese authors resort chiefly to a determination of the distance at which the patient can perceive sound.

Data on the treatment results of 301 patients are presented in Tables 18 and 19. The figures for the treatment results are the following:

a) Considerable improvement: The hearing basically was recovered; the patient can hear ordinary speech pronounced behind his back and can repeat simple sentences;

b) Improvement: The patient hears loud sounds uttered behind his back and is capable of learning to speak simple sentences;

c) Treatment does not give any effect.

Table 18

Results of Chen-tsu therapy

Result	No of patients
Considerable improvement	92
Improvement	163
No effect	46
Total	301

Age exerts a definite influence on the results of treatment (Table 20). The treatment results in younger persons are considerably better than in older persons.

Between the results of treatment and the duration of the disease there is a definite relationship. The sooner treatment is begun the better the effect (Table 21).

Chen-tsu therapy exerts a therapeutic effect in all cases, regardless of the etiologic factors; therefore, the

is no definite relationship between the treatment results and the etiology of the disease. However, with respect to certain groups statistical data are possibly inaccurate because of the limited number of patients. According to composite data, the effectiveness of treatment in diseases of undetermined etiology, including congenital deaf-mutism and injury, is the same as in diseases of other etiologies. These data are different from the polyclinic material at the school for the advancement of physicians of the Chinese people's medicine in the province of Shensi (Table 22).

Table 19

Evaluation of Chen-Tsu Therapy on the Basis of Audiometry

Result	No of patients
Considerable improvement	6
Improvement	12
No effect	20
Total	38

The number of sessions of Chen-tsu therapy until the occurrence of an effect is presented in Table 23.

Treatment of Acute Appendicitis

At the first Shanghai Medical Institute and other institutions a study was made of the effectiveness of treatment of acute appendicitis by acupuncture. Below, the preliminary data obtained are given.

In ancient Chinese medicine acute appendicitis was

called "changyung"--an abscess of the intestine of yan nature, which is one of the types of "yung-chü" of the internal organs. (In the Chinese people's medicine abscess is divided into two forms: yung--an abscess of yan origin and chü--an abscess of yin origin. Yung is manifested by redness, edema, swelling, pain and elevation of temperatur This process is encountered both in the body's integument and in the internal organs, for example in the lungs (pulmonary abscess), intestine (appendicitis), et cetera. Chü is expressed as swelling, pain and rarely by the excretion of fluid). Two thousand years ago, in canon of Chinese people's medicine, "Huang-ti Nei-ching" the etiol of acute appendicitis was given. Methods of diagnosis an treatment of this disease were described in detail in the book by the well known scientist of the Han era Chang Ch ching (142-210), "Chin-kuei Yao-liue". During subsequen dynasties data about this disease were expanded and supple mented.

Recently, physicians of the people's medicine in clos collaboration with physicians of modern medicine are making complete investigations on the problem of using Chen-tsu therapy and other popular remedies in cases of acute appendicitis. The aim of the present communication is a familiarization with some of the experience in the field o Chen-tsu therapy for acute appendicitis. In five therape

institutions of Shanghai at the beginning of September 1958 a study was begun of the treatment of acute appendicitis by this method. During five months 557 patients were treated. Of these, 466 were given simply Chen-tsu therapy; the others, Chen-tsu therapy in combination with other popular remedies and antibiotics. In some patients, according to the appropriate indications, Chen-tsu therapy was stopped. With the aim of evaluating the effectiveness of Chen-tsu therapy data are presented below concerning treatment by this method in the case of 466 patients.

Table 20

Relationship of Treatment Results to Patients' Ages

Age in years	Considerable improvement	Improvement	No effect
0—9	31	47	15
10—14	34	51	10
15—19	17	29	6
20—24	7	17	7
25—29	2	9	5
30—34	1	5	1
35—39	—	1	1
Over 40	—	4	1
Total	92	163	46

All the patients were divided into two groups depending on the clinical form of the disease (Table 24): 1) Patients in whom appendicitis simplex was noted (including relapsing chronic appendicitis), 2) Patients suffering from appendicitis destructiva (acute appendicitis with local peritonitis).

Patients who had perforating appendicitis with diffuse peritonitis were excluded for understandable reasons.

Table 21

Relationship between Treatment Results and Duration of Disease

Duration of disease in years	Considerable improvement	Improvement	No effect
0—4	6	23	4
5—9	39	40	5
10—14	25	45	10
15—19	12	26	5
20—24	5	6	10
25—29	3	6	4
30—34	—	3	3
35—40	—	3	1
Unknown	2	11	4
Total	92	163	46

Among those treated young persons predominated. The youngest patient was four years of age; the oldest, 67. There were more men than women.

All the patients were admitted to the therapeutic institution with overt clinical symptoms of acute appendic[illegible] the majority of the patients were admitted 24 hours after the onset of the attack (Table 25).

At the time of admission pains were noted in the right iliac area in all patients, and in the majority, leucocytos[illegible] (Table 26). In three patients a feeling of resistance wa[illegible] noted (infiltrate) in the right iliac region.

In 28 of 51 children vomiting was observed on admission.

Table 22

Relationship of Treatment Results to the Etiology of the Disease

	Considerable improvement	Improvement	No effect
High temperature with convulsions	35	48	20
Meningitis	10	35	7
Measles	8	19	4
Typhus	5	12	2
After taking streptomycin	1	13	—
Otitis	6	4	3
Trauma	3	3	—
After taking quinine	—	2	—
Undetermined etiology	24	27	10
Total	92	163	46

Treatment Methods. Chen-tsu therapy is carried out with the patient lying on his back with his lower extremities extended. The location of the shang-chü-hsü and the tsu-san-li points were found on the anterolateral surface of the upper third of both legs. The distance from the lower level of the kneecap to the upper level of the lateral condyle is divided into 14 individual proportional tsuns. (A tsun is equal to 3.333 centimetres). The tsu-san-li point is below the lower level of the kneecap at a distance of three individual proportional tsuns, lateral to the proximal portion of the tibia and anterior and below the head of the fibula. The shang-chü-hsü is below the

tsu-san-li point at a distance of three individual proportional tsuns, external to the tibialis anticus muscle. Hence, it is seen that the distance between the tsu-san-li and the shang-chü-hsü points is equal to three individual proportional tsuns. The main point for acupuncture is one individual proportional tsun above the shang-chü-hsü point. Pain frequently occurs after pressure at this point (Fig.).

Table 23

Number of Sessions of Chen-tsu Therapy before an Effect was Produce

No of sessions	No of patients
2	17
3	36
4	27
5	28
6	32
7	25
8	16
9	16
10	15
11	10
12	5
13	8
14	7
15	3
16—30	16
Total	255

Stainless steel No. 26-28 needles, one to two tsuns long, are used for acupuncture. No. 28 needles one tsun in length are more suitable for children. Usually, the needle is inserted perpendicularly, rotating its ends with the thumb, index finger and middle finger. On puncture of the skin the patient may feel slight pain. After puncture of the skin

Table 24

Clinical Forms of the Disease

	No of adults	No of children	Total
Appendicitis simplex	403 (of these 76 suffered from relapsing chronic appendicitis	51	454
Appendicitis destructiva	12		12
Total	415	51	466

Table 25

Duration of Pains in the Abdomen

Duration in hours	No of adults	No of children
Less than 12	172	28
12-24	120	12
24-48	66	6
Over 48	57	5
Total	415	51

the method of strong stimulation should be used, that is the needle should be inserted gradually by rotary movemer until the patient has sensations of rheumatic pain, burs ing, numbness and sensations of the passage of an electric current, radiating to the foot. In the science of Chen-ta therapy the occurrence of a sensation is called "te-ch'ih" The depth of the puncture is determined by the occurrence of the reaction indicated. Usually, the depth of the puncture varies within limits of one to 1.5 tsuns depending on the state of the nutrition and the age of the patient. There is no standard depth. Usually, the puncture is mad first in the right leg and then in the left. After the appearance of the reaction it is necessary to leave the needle in the body for a certain time in accordance with specific state of the patient; in the mild form of the disease the needle is left in for an hour; in a serious form, for two hours; in a very severe form, the needle r be left in for three to four hours; in this process the needle is rotated every 15-30 minutes so as to intensify t reaction. At the end of the period indicated the needle taken out by rotary movements with three short stops.

If the patient has a high temperature and the clinic symptoms are severe additional punctures, aside from the punctures made at the two points indicated, should be made at the chü-ch'ih and nei-t'ing points. The puncture meth

is the same as for the previous points.

Table 26

Leukocyte Count in Blood of Patients on Admission to Hospital

Leukocyte count	No of patients	No of children
Less than 8000	103	1
8000-10,000	60	4
10,000-15,000	162	26
15,000-20,000	63	13
More than 20,000	16	7
No complete record	11	
	415	51

The procedure presented above should be repeated depending on the condition of the patient. In serious cases the procedure is repeated every four hours; in mild cases, after six hours, and in case of a considerable mitigation of the patient's condition--every 8-12-24 hours until he recovers. If meteorism appears during the course of regression of an inflamatory process, it is recommended that

punctures be made once a day at the ta-ch'ang-shu and the tz'u-liao points (on both sides). In these cases, the needle is usually left in for a short time, approximately 30 minutes.

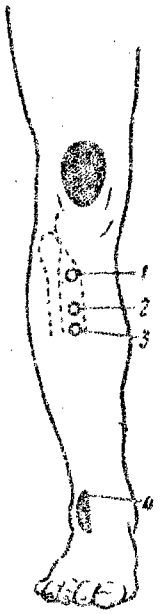


Fig. 13

The Location of the Shang-Chü-Hsü and Tsu-San-Li Points

1--tsu-san-li; 2--pain point; 3--shang-chü-hsü; 4--lateral condyle

Following the complete disappearance of the acute inflammatory process chiu therapy can be given once a da the main points. The method of chiu therapy is as follo

10 wormwood pellets each the size of a rice grain are prepared; then these wormwood grains are applied to the main points, each in turn, and they are burned. Usually, such a procedure is repeated one or two times. If, after the disappearance of the acute inflammatory process in the right iliac area, aching pains remain or tenderness on deep palpation, it is recommended that punctures be made at the pain points. The pain points frequently coincide with the location of the t'ien-shu, wei-ling and ta-chü on the right. The needle is left in for 30 minutes.

During the treatment the patients receive a semiliquid or soft diet.

What has been presented above represents only the general treatment principles for simple and destructive appendicitis.

In the practice of giving this treatment it should be kept in mind at the same time that the choice of points, the depth of the puncture, the strength of the stimulation and the interval between treatment sessions should correspond to the constitution and the specific condition of the patient. Thus, for example, if the most painful point coincides with the location of the ts'u-san-li point it should be considered the fundamental one in the choice of points. If the patient is weak, the strength of stimulation should be moderate; otherwise, the puncture may cause harm

to the body.

Analysis of the Results. Clinical observations have shown good immediate results of Chen-tsu therapy of appendicitis both in adults and in children.

In the majority of patients the abdominal pains disappeared in 24 hours; in some, after the first treatmer session. In the majority of cases the rigidity of the abdominal muscles also disappeared in 24 hours. The pain points palpated disappeared more slowly, usually on the second-third day of treatment. In chronic appendicitis pain points disappeared even more slowly, usually on the third-fifth day. In patients with destructive appendici the symptoms disappeared quite slowly, while the feeling resistance in the right iliac area disappeared usually o the 10th day of treatment. In five patients at the begi ning of the disease signs of local peritonitis were found in the right iliac area; the feeling of resistance appeare on the second-third day after Chen-tsu therapy. The signs of the inflammatory process disappeared on the 10th day after prolonged Chen-tsu therapy.

On the basis of the clinical observations presented it may be noted that Chen-tsu therapy for appendicitis does exert a passive analgesic effect but rather contributes t the regression of the inflammatory process by means of a definite mechanism of action the nature of which is still

unknown.

Of 403 patients with simple appendicitis the first attack of appendicitis was observed in 327; in 76 there was a relapsing chronic appendicitis. Of these, an operation was performed in five patients. Therefore, a beneficial result of Chen-tsu therapy was noted in 93.4 percent of the patients. In five patients operated fecoliths were found in the appendix; there was no acute inflammatory process. Of 51 sick children an operation was performed on one with chronic appendicitis.

Of 12 patients with destructive appendicitis an operation was performed on five. At operation, gangrenous changes were found in the appendix with a slight local peritoneal reaction. There were no fatal outcomes.

The hospitalization period of the patients with simple appendicitis was equal, on the average, to 4.8 days in adults and 3.7 days in children. The majority of the patients began to work or to go to school on the first-second day after discharge from the hospital.

In view of the fact that the use of Chen-tsu therapy for acute appendicitis was begun recently (maximum observation period three to four months) and no systematic observation has been conducted on the treated patients the data on the late results have been very limited.

Of 403 patients with simple appendicitis there were

277 patients under observation. Of these, the pains did not return in the right iliac area in 217 patients; 43 patients complained of occasional slight unpleasant sensations in the right iliac area which, however, did not affect work or study.

In 17 patients relapses were noted, and the earliest period of occurrence of the relapse was the third day after a temporary alleviation; the latest period, four and a half months. Of these patients two were given a repeated Chen-tsu therapy; four patients were given Chinese popular remedies, and 12 patients (7 patients with recurrent chronic appendicitis) were operated.

Of 20 children who were under observation a recurrence appeared in one patient on the eleventh day after discharge from the hospital. At the time of a second admission to the hospital an operation was performed on the second day of disease. At operation a perforation of the appendix was found.

The Effect of Chen-tsu Therapy on the Protective Reactions of the Body

In the past two years a whole series of important scientific investigations concerning the effect of Chen-tsu therapy on the reactivity of the body has been carried out under the methodological supervision of the State Scientific Planning Committee of the Shenyang Medical Institute in

cooperation with the Scientific Research Institute of Chen-tau therapy of the Academy of the Chinese People's Medicine. It should be recognized that scientific research work in the field of the people's medicine is very laborious and complicated. However, these difficulties have not stopped the scientists, and undoubted progress has been made. Below, we are presenting certain data of experimental work.

More than 30 years have now passed since the time that Hopkins discovered reduced glutathione (GSH). During this period, in experimental medicine considerable valuable material has been accumulated. At the present time, it has been determined that the sulfhydryl group (SH) is the active radical of GSH. This radical is contained in all the cells of the body and is of important biological significance in metabolism, cell division, the maintenance of a normal protein structure, regulation of the nervous system function, et cetera.

Determination of the concentration of the sulfhydryl group in the blood, of the sulfhydryl group content in the tissues and of the activity of succinic dehydrogenese is important for the evaluation of the protective reaction of the body. However, to date there has not been any study as yet of the effect of acupuncture on the metabolism on the sulfhydryl group. A study of the sulfhydryl group metabolism

following puncture is necessary not only for the elucidation of the mechanism of action of acupuncture but also for therapeutic practice. The aim of experimental research has consisted specifically of this. The determination of the concentration of the sulfhydryl group in the blood and of the content of the sulfhydryl group in the tissues was accomplished by generally accepted methods.

The Concentration of the Sulfhydryl Group. Study of the concentration of the sulfhydryl group in the blood was made on nine dogs (100 experiments). The data obtained showed a definite difference in the concentration of the sulfhydryl group in the blood before and three hours after acupuncture (Table 27).

Table 27

Change in Concentration of Sulfhydryl Groups in the Blood Three Hours after Acupuncture

No of dog	Decrease in %/	Value of t/	Probability (p)
1	5,7	3,6	$0,001 < p < 0,01$ (13)
2	17,2	2,4	$0,02 < p < 0,05$ (8)
3	5,7	5,7	$p < 0,001$ (13)
4	4,3	4,5	$0,001 < p < 0,01$ (11)
5	7,7	2,8	$0,01 < p < 0,02$ (11)
6	7,5	2,3	$0,05 < p < 0,1$ (8)
7	4,5	2,1	$0,05 < p < 0,1$ (12)
8	5,0	1,8	$0,05 < p < 0,1$ (12)
9	6,2	1,8	$0,05 < p < 0,1$ (12)

Note. The figures within parentheses designate the number of experiments

From Table 27 it is seen that the concentration of the sulfhydryl group in the blood three hours after acupuncture decreased within the limits of 4.3-17.2 percent. From the statistical viewpoint, the value "t" in the majority of cases is greater than two and the probability (p) is less than 0.05.

The Content of the Sulfhydryl Group in the Tissues. Experimental animals were divided into two groups: control and experimental. The data concerning the content of the sulfhydryl group in the organs of normal rabbits are presented in Table 28.

Table 28

The Mean Sulfhydryl Group Content in Various Organs of Normal Rabbits

	Average content in %	No of observations
Cerebral cortex	110.0	5
Liver	215.0	5
Kidneys	122.5	5
Gastrocnemius muscle	41.8	5

From Table 28 it is seen that the sulfhydryl group content in the liver is greater than in the kidneys; in the kidneys it is greater than in the brain; in the brain, greater than in the gastrocnemius muscle. All this is in agreement with data in the literature. The experimental group, in its turn, was divided into three subgroups depending on the number of punctures (3,5 and 7 punctures). The

data concerning the change in the sulfhydryl group content as the result of acupuncture are presented in Tables 29-31

Table 29

Content of Sulfhydryl Groups after Three Acupunctures

	Average content in %	Increase in %	No of observations
Cerebral cortex	123.0	10.6	7
Liver	325.0	33.5	7
Kidneys	191.6	36.5	7
Gastrocnemius muscle	50.5	17.2	7

Table 30

Content of Sulfhydryl Groups after Five Acupunctures

	Average content in %	Increase in %	No of observations
Cerebral cortex	133.3	17.5	6
Liver	287.7	25.0	6
Kidneys	154.8	20.8	6
Gastrocnemius muscle	53.2	21.4	6

Table 31

Content of Sulfhydryl Groups after Seven Acupunctures

	Average content in %	Increase in %	No of observations
Cerebral cortex	133.0	17.3	6
Liver	287.7	25.0	6
Kidneys	154.8	20.8	6
Gastrocnemius muscle	53.2	21.4	6

From the data presented it is seen that the content of the sulfhydryl group in various organs increased after three, five and seven punctures.

The Change in the Activity of the Succinic Dehydrogenase of the Tissues. Experimental animals were divided into control and experimental groups. The total number of experiments was 45. Data concerning the average value of the succinic dehydrogenase activity are presented in Table 32.

Table 32

Average Succinic Dehydrogenase Activity in Various Organs of Normal Rabbits

	No of cases	Average value (minimum)	Standard difference
Cerebral cortex	13	10.45	2.23
Subcortical area	13	9.65	1.73
Liver	14	8.11	2.99
Kidneys	13	6.69	1.63
Gastrocnemius muscle	9	23.89	6.54

The greatest activity of succinic dehydrogenase is in the kidneys; then comes the liver, subcortical area of the brain, and then the cerebral cortex. The lowest activity is in the gastrocnemius muscle.

The experimental animals were divided into three subgroups depending on the number of punctures (3, 5 and 7).

The change in the succinic dehydrogenase activity after acupuncture is given in Tables 33-35.

Table 33

Succinic Dehydrogenase Activity in Organs after Three Acupuncture

	No of cases	Average (minimum)	Increase and decrease in %	Standard difference	Probability (p)
Cerebral cortex	11	9,14	+13,3	1,02	>0,0
Subcortical area	10	8,85	+ 8,5	0,24	>0,(
Liver	11	6,59	+18,7	1,82	>0,(
Kidneys	11	7,09	— 5,9	1,41	>0,5
Gastrocnemius muscle	8	21,25	+11,0	8,75	=0,

As is seen from Table 33, the enzyme activity after three acupunctures underwent a change--it increased, particularly in the liver (+18.7 percent), then in the cerebral cortex and in the subcortical area. However, this increase is slight because of the fact that the probability is greater than 0.05. The probability for the gastrocnemius muscle is 0.5. Although there was an inhibition of this activity in the kidneys, this is not significant because the probability was greater than 0.5.

The results of the experiments presented in Table 34 show that with additional stimulation following three acupunctures (a total of five acupunctures) the enzyme activity in different organs is increased considerably. In the liver, cerebral cortex and gastrocnemius muscle a considerable increase in activity is noted. Although the activity in the subcortical area also increases it is slight. The enzyme activity in the kidneys is inhibited

Table 34

Succinic Dehydrogenase Activity in Organs after Five Acupunctures

	No of cases	Average (minimum)	Increase and decrease in %	Standard difference	Probability (p)
	N	↓		σ	√
Cerebral cortex	9	7,91	+24,7	1,35	<0,01
Subcortical area	9	8,11	+15,9	2,17	<0,05
Liver	9	5,33	+34,2	1,39	<0,05
Kidneys	9	7,11	− 6,2	3,45	>0,5
Gastrocnemius muscle	7	17,43	+27,0	3,6	<0,05

The results of the experiments show that the enzyme activity in the cerebral cortex, liver and gastrocnemius muscle after seven acupunctures was less than after five acupunctures. This speaks for the fact that five acupunctures possibly represent the most expedient stimulation for the three organs mentioned above. Extra punctures are apparently less effective.

Table 35

Succinic Dehydrogenase Activity in Organs after Seven Acupunctures

	No of cases	Average (minimum)	Increase and decrease in %	Standard difference	Probability (p)
	N			σ	
Cerebral cortex	10	8,85	+16,0	1,60	>0,05
Subcortex	10	8,10	+16,1	1,32	<0,05
Liver	9	6,33	+21,9	1,17	<0,05
Kidneys	10	4,90	+26,8	1,04	<0,01
Gastrocnemius muscle	8	19,87	+16,8	5,19	>0,05

The data presented attest to the fact that the enzyme activity in the liver, cerebral cortex and gastrocnemius muscle is increased after three acupunctures, while in th subcortical area and in the kidneys, after seven acupunct s.

After an acupuncture the concentration of the sulfhydryl group in the blood temporarily decreases (it returns to its previous level eight hours after the punctures); the content of the sulfhydryl group in the tissues increases; the activity of one of the sulfhydryl enzymes--succinic dehydrogenase--is increased. All these changes show that acupuncture can increase the protective reaction of the body.

A temporary reduction of the concentration of the sulfhydryl group in the blood after punctures speaks for a increase in the activity of the central nervous system function, the hypophyseal and the suprarenal system. As the result of an increase in the content of the sulfhydryl gr in the tissues the activity of the system of sulfhydryl enzymes (including succinic dehydrogenase) is assured.

On the basis of everything presented the following conclusions may be drawn.

1. Acupuncture is one of the methods of etiologic treatment which increases the adaptability and protecti reactions of the body and produces an effect by means o destroying the vicious cycle of pathological processes.

5937

2. The protective reaction after acupuncture is expressed in many ways, one of which is an increase in the concentration of the sulfhydryl group and an increase in the activity of succinic dehydrogenase in the tissues.

3. The investigation data constitute evidence of the importance and correctness of the decision made to develop the rich heritage of Chinese medicine proposed by the Central Committee of the Communist Party of China.

The Chinese people's medicine is not only of historic significance but is of great practical interest even at the present time. The Communist Party of China and the People's Government are giving tremendous attention to problems of development of the Chinese people's medicine.

In accordance with the instructions of the Central Committee of the Communist Party of China and the People's Government a number of specific measures have been taken: The unification of physicians of modern medicine with physicians of the people's medicine, study of the Chinese people's medicine by modern physicians, the creation of scientific research and therapeutic institutions by the Chinese people's medicine, the publication of literature on problems of the Chinese people's medicine and drugs. Broad masses of physicians of the people's and modern medicine, working in close collaboration under the supervision of the Communist Party, have made considerable progress in their

scientific research on the study of the Chinese people's medicine and popular remedies and have made a definite contribution to the work of public health. We hope to develop the people's medicine even more rapidly for the benefit of the Chinese people.

1288

END