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/The followings are translations of selected articles from Jen-min Pao-chien (People's Health), Vol 1, No 10, 1 October 1959./

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CHINA'S MAJOR ACHIEVEMENTS IN INDUSTRIAL HYGIENE AND IN THE PREVENTION AND TREATMENT OF OCCUPATIONAL DISEASES DURING THE PAST DECADE

/The following is a translation of an article written by Liu Shih-chieh, Department of Hygiene of Peking Medical College; and Wu Chih-chung, and Wang Wen-yen, Institute of Labor Hygiene, Labor Protection, and Occupaticnal Diseases of the Chinese Academy of Medical Sciences in the Jen-min Pao-chien (People's Health), Vol. 1, No 10, 1 Oct 59, pages 896-903./

In old China, the working conditions of the laborers were very poor. There was no health protection of any kind nor were any measures ever taken by the reactionary government to improve conditions. After liberation, the Party and the People's government showed great concern over the health of the laboring people. Work on industrial hygiene was started promptly and developed rapidly.

Since the establishment of New China, a bill for an eight-hour workday system has been passed. Definite regulations have been made to protect laborers. This basic achievement is another step in the development of the Chinese constitution. During the Eighth People's Congress, the followings among suggestions advanced in relation to the Second Five-Year Plan on development of China's economics: strengthen labor protection; institute industrial hygiene and technical safety, guarantee safety protection in production; undertake constructive measures to reduce and abolish the more dangerous occupational diseases. Special attention should be given to improving working conditions of laborers who work in wells, under high temperatures, in the fields, and at high altitudes as well as to improving the working conditions of women laborers.

In 1951 "Regulations on the Chinese People's Republic Labor Insurance" was announced. In 1956, the Ministry of Labor and the Ministry of Health declared "Factory Safety and Hygiene Regulations," "Regulations on Safe Techniques in Construction and Installation," and "Regulations on Report of Workers and Employees Casualty Incidents."

In addition "Temporary Health Standards of Industrial and Mining Enterprise Planning," and individual

laws and procedures such as prevention of occupational poisoning and heat exhaustion, prevention and treatment of sillicosis, were also anounced. With these laws and procedures as a basis, work in industrial hygiene can very well be carried out in a constructive manner.

China's industrial hygiene activity has been patterned after the method used in the Soviet Union ever since it was started. A great deal of help has been given by the Soviet government and people in the work of cadre training. They have not only trained a large number of our students abroad, but also sent specialists with great experience (such as Yu. A. Osipov, G. A. Makisimov, and others) to China to lecture and supervise. They trained a number of cadres for basic teaching and scientific research. These cadres with the basic training have achieved much in the expansion of China's labor health and scientific research fields.

In 1950, the Ministry of Health established in Tientsin the Industrial Health Department. Later, industrial health centers were established in Shanghai, Anshan and elsewhere. The Peiping Labor Health Institute (not the Industrial Health, Labor Protection, and Occupational Disease Research Institute of the Academy of Medical Sciences) was founded in 1954. At present, a total of ten organizations exist for industrial hygiene and occupational disease research. Also, industrial health divisions have been established in the public health departments of many medical colleges and schools to train special personnel for scientific research work in this field.

In the past decade, China has achieved definite results in the field of industrial hygiene and occupational diseases. The following is a brief and collective report on the major achievements.

I. Prevention and Treatment of Silicosis

In 1950, the Ministry of Health anounced that silicosis should be included in industrial and mining safety and health inspections. During 1949-1954 there have been continuous reports of clinical observations of silicosis cases. There have also been successive reports and investigations on working areas in factories and mines including density of silica dust, silic dioxide content of dust, etc.

In 1955, the State Council urged various related departments to emphasize particularly the investigation

of factories and mines with silica dust hazards. Since that time, well-planned work has been developed throughout China on health investigation of factories and mines and on research studies of silicosis.

From 1953 to 1956 there was a steady development in the general investigation of silicosis, and its prevention and treatment in P'ing Hsiang Colliery. The development of silicosis has been completely controlled.

In 1956 general surveys were carried out in many factories and mines in Liaoning, Kiangsi, and other provinces. In 1957, an investigation by the metallurgy industry was carried out in fifty-one factories and mines. Thorough examinations were done on over 34,000 workers. The coal and charcoal industry surveyed systematically twenty-eight mines, and examined over 31,000 workers. Peiping Medical College, in 1958, examined over 13,700 workers of the Western Peiping Coal Mine and had a clear understanding of the mode of development of the disease.

During the past two years (58-59?), large scale surveys have been carried out in many provinces and municipalities. Liaoning province has surveyed sixty-eight factories and mines. The municipality of Shanghai completed, within a brief period of 1958, a survey on silicosis among 15,925 workers. Anshan, Tientsin and T'aiyuan also proceeded with large-scale surveys. Hence, the mode of disease development in various industries and different types of work has been clearly and thoroughly recognized.

There is no doubt that during the past decade the greatest accomplishment in the field of silicosis prevention and treatment has been adoption of dust prevention measures in the mines. Victory has been won in dust reduction work in the mountain mines. From incomplete statistics to the end of 1958, 223 large Chinese mines have brought dust concentration down to government standards. In early 1959, the Ministry of Metallurgical Industry announced that silica dust hazard in all Chinese metal mines had been completely eliminated.

Comparatively good results have also been obtained in factory dust reduction. Government standard rates were reached in many factories. As early as 1949, the factory dust prevention problem was pointed out by the Northeast Ministry of Health. An important bill was passed at that time on dust shielding as a preventive measure. In Shanghai district, good results were obtained in chalk factories after a more advanced research on dust prevention

was carried out. Preventive work was first started in chalk factories in the Suchow and Wuhsi areas. Shields and ventilators were used as dust prevention measures. The highest amount, 99 percent, of dust-fall found in the breaking, grinding, sifting and packaging areas was reduced to 0.33 - 1.9 milligrams per cubic meter of air.

Later, in Shanghai and Hu-chou, wet-grinding methods were practiced in all the chalk factories. Chalk dust was reduced to 0.21-1 milligrams per cubic meter of air. In 1958, Shanghai Municipality reported that the dust content was reduced to health standards in 63 quartz powder factories, arc welding carbons and enamalware factories, and also in 14 sand shops in steel factories. Several similar reports have appeared in other industrial cities.

This accomplishment in dust prevention in factories and mines is the result of a series of extensive and improved techniques, scientific research, and practical experiments. From experiemces gained during the past few years, it can be concluded that dust-preventions work must be controlled by the government, and must be extended to all factories and mines. The combined measures of "water, air, shield, protection, control and investigation," must be practiced.

As a result of practical research of the past decade on prevention, treatment, and investigation, health workers of our vast medical field have obtained much more experience than ever before in the diagnosis and treatment of silicosis, in labor power, and in the management of working schedules. A universal standard has been established for X-ray diagnosis of different stages of silicosis. Much research and observation has been done on respiratory functions. Traditional medical treatment was practiced extensively throughout China with some immediate results.

In therapeutic management, conclusions were drawn from results of a five-joined method used. The five-joined methods are: join western and traditional medicines, join medical and psychological treatment, join therapeutic treatment and light labor, join therapeutic treatment and regulated ways of living, and join therapeutic treatment and tuberculosis prevention.

At present, research work on the mechanism of development, experimental silicosis, and dust extinction procedures are being studied in nine different organizations. More than three hundred articles relating to silicosis have been published during the past decade in China. This is certainly a significant achievement.

However, the results we have obtained so far are still inadequate. Dust prevention work in the factories and mines has to be reinforced and expanded. In order to be ready for this expansion, we have to increase production and improve the quality of the equipments and facilities required. Moreover, labor health programs, labor protection, and scientific research in relation to the fundamentals of silicosis and its clinical aspects have to be reinforced. Production requirements have to be further improved and the health of the workers promoted.

II. Prevention of Summer Heat and Cooling

In the southern districts of China, outside temperature rises as high as over 35° C during the summer. In certain places, it sometimes reaches 40°C. Prevention of high temperature and heat exhaustion in factory and mining industries is a difficult problem.

Since the beginning of 1950, health investigations has been carried on in high temperature factories and changes made. In textile plants, where high temperature and high humidity were the rule, mill temperature has been controlled since 1953. It has been reduced to under 30° - 35° C., with humidity not exceeding 65-80 percent.

The greatly improved working conditions in the factories have resulted in a continuous growth in the rate of production and improvement of the quality of the products. There is also a reduction in the number of sickleaves. Heat exhaustion sufferers are fewer each year. This is exemplified by the following data: In the steel and iron industries, incidents of heat exhaustion in 1956 were 90 percent lower than in 1953; in Peiping, the frequency of heat exhaustion in 1958 was 98 percent less than in 1955. These accomplishments are the results of emphasis made by supervisors together with enforcement of efficient heat reduction measures.

The government has spent large sums yearly on heat prevention and cooling measures. Every year, for the past three years, a national conference is assembled to exchange experiences and conduct special seminars. Scientific research on heat prevention and cooling and published articles increase and multiply continuously. Up to the present, over 500 articles have been published.

China's theory in heat exhaustion prevention is to enforce the practice of combined measures. While new constructions are being planned, especially the bigger

factories and mining enterprises, measures are enforced to meet required health standards. Existing factories and mines are required to start with improving work procedures and management of the heat sources. Mechanization and automation are utilized as much as conditions permit. A veteran worker, Chang Ming-shan, in Anshan invented an automatic repeater. This completely solved the problem of working under high temperature and strong radiation in smaller rolling mills.

The next requirement is to reinforce insulation measures (including heat produced from indoor sources and sun radiation). In the past few years, China has gathered abundant experience in this aspect and has actually solved many of its problems.

Thirdly, natural ventilation must be utilized as much as possible. The number of air changes must be increased. At first, raised ceiling ventilators and additional screens were used to improve conditions. Recently, an open-styled factory building was planned. It has the advantage of cross ventiliation with an increased number of air-changes (over 100 per hour). This type of factory building is most suitable for the southern districts of China.

The fourth requirement is to utilize air-showers and spray-fans. The latter is now being used all over China. Beside these measures, high-temperature industry workers are all furnished, as required, individual protection equipment. Suitable places for relaxation are provided in the bigger factories. For workers in the open, mat-sheds are erected and other shading means are used to protect them from the rays of the sun.

In labor organization and health protection, a series of procedures are also practiced. A rotation and intermission system has been organized with scheduled work and rest timetables in all high temperature shops. Salt-containing (0.2-0.3%) drink is provided for workers; their food is improved, and they are ensured sufficient sleep in the summer, etc. Physical examinations are given to all high-temperature workers in the early summer. When examinations reveal that high temperature should be avoided, a worker is immediately transferred to other duties. All of these measures have made heat-exhaustion prevention more effective.

The measures mentioned above are carried out with the best available facilities according to China's theory of diligence and frugality.

Because of the difference in geographical localities and types of work, property management will also be different. Native methods are used in combination with western methods. Measures used have to comply with the principle of more results with less cost. Workers are urged to do as much as they can themselves. Presently available facilities are to be utilized to the full extent. Waste products and substitutes are to be utilized. Protection and management of ventilation and insulation facilities are stressed.

Research studies on physiology under high temperature were started in 1951. A major part of the work was to determine the effects of high temperature working conditions and heavy labor on workers' physiology. Later, the search for adequate drinking-liquid supply under high temperature conditions led to research on water-salt balance.

While working on the water-salt balance problem, Wuhan Medical College and some other units determined the nitrogen, potassium and 17-ketosteroids content of the sweat and urine of high-temperature workers. The problem of proper supply of healthy food to the workers was carefully studied in every district in China.

Research on the energy metabolism of workers operating on major duties in steel industry has been carried out in various districts. Results unanimously indicate that the estimated energy metabolism is lower in Chinese workers than the values generally reported in foreign literatures.

In 1958, ten thousand people were surveyed in municipalities throughout China's eighteen provinces. At the same time, corresponding laboratory research was carried out in several major research centers. Based on these studies, health standards for conditions in indoor industries were determined. The results have brought out a great deal of dependable scientific informations.

III. Prevention and Treatment of Occupational Poisoning

During the past decade, many studies have been done, by different medical colleges and schools, research organizations, and epidemiological centers, on scientific investigations and prevention of occupationsl poisoning. Over one hundred papers have been published. While

this extensive survey was in progress, industrial health chemistry was promoted, clinical observations on occupational poisoning, and preliminary studies on industrial toxicology were also developed. Information in the field of industrial technology and on poison prevention measures was gathered.

Most of the prevention and treatment work, also the most extensively studied, deals with occupational poisonings. Lead poisoning has always been the most important problem in every area. In the past ten years, physical examinations have been done on more than ten thousand workers. A clear understanding of health conditions and the extent of poisonings in different industries have been obtained.

Of all the industries and different types of works, the rate of poisonings are the highest among the lead smelting, battery manufacturing, and ceruse manufacturing workers. Although the number of wind-cutting (feng ko) and electric welding workers in the ship building industry is small, the lead content in the air around the working areas and the rate of poisoning among these workers are both high. People in the printing industry more than any other come in contact with lead. However, the lead content of the air and the rate of poisoning are both comparatively low. Investigations show that the more serious poisonings are caused by lead fumes rather than by lead dust, and that the incidents are directly proportional to the age of the workers.

There have been many studies on lead poisoning. The significance of stippling of the erythrocytes and the presence of brown pigment in urine as diagnostic aids have been carefully evaluated. At the same time, the lead content in the urine of normal subjects have been determined. Lead content in the urine can serve as an indicator of the amount of lead absorbed. Much work has been done on the analysis of clinical symptoms and physical signs.

In the therapeutic aspects, reports have been made on sodium citrate and vitamin C treatments. Recently, many researchers agreed upon the use of practical therapy. They all claimed that calcium ethylenediamine-tetraacetate (calcium salt of EDTA) is, at present, the best lead chasing drug suitable for treatment of large number of patients.

In the prophylactic aspect, the joining of public and private operations has improved the technical processes of production. In places where large quantities of lead are present in the air, mechanization and enclosures are

used to reduce lead fumes. The rate of poisoning is noticeably lowered with these measures.

An obvious example is the Po-shan Battery Factory. Lead poisonings in 1958 were only one eighth of 1955.

The China Academy of Medical Sciences has designed a natural ventilation covering to remove lead fumes over lead-melting boilers and letter-casting machines. This covering has proved very efficient. Over ninety percent of the Peiping printing industry has installed lead-fume removing covers. This has prevented the development of lead poisoning in places where it is most efficiently managed.

After the bill of "joining of the three forces" -- mass movement; revolutionized techniques; and technicians, workers and factory supervisors -- is passed, it will be possible to eradicate lead poisoning entirely. In 1959, Peiping Printing Factory No 1 achieved results in the eradication of lead poisoning. Results have likewise been reported by other factories. It has been determined, after research study, that the use of acetic acid for hand-washing can clean the hands of workers who come in contact with lead. To reduce the concentration of lead dust in factories to the standards required, cleaning-up in the shops has also been emphasized in research studies.

More chronic benzene poisonings than acute cases are reported. The concentration of benzene in the air and incidents of poisoning among the workers are found to be higher in the lacquer, paint and varnish, 666 manufacturing, paint spraying, and shoe manufacturing industries.

There are many reports on the diagnostic aspects of benzene poisoning. Reduction in the number of white blood cells in Circulation is an important indication of the disease. However, the occupational history, the industrial procedures, and the working conditions must be considered before a final diagnosis is made. Blood picture of the bone marrow is significant in the diagnosis of early cases. No specific therapy has yet been discovered for chronic benzene poisoning. Treatment with "Pentoksil" is still in the experimental stage.

The key to the prevention of benzene poisoning is to reduce the benzene content in the air factory buildings. In Shanghai, 108 paint-spraying shops have, within a very brief period, reduced the benzene content to health standards. The best results are found in small-object paint-spraying factories where the development of benzene poisoning is controlled.

Mercury poisoning incidences have been greatly

reduced in the Harbin and Shanghai areas as the result of the progressive movement for the use of effective measures.

Chromium poisoning is almost under control in Shanghai. Not a single case has been reported since inclosure and ventilation measures have been installed.

Investigations and clinical observations on other poisons such as carbon monoxide, tetra ethyl lead, magnesium, arsenic, phosphorus, zinc oxide, sulphates, florides, benzine, agricultural drugs (organic mercury, organic chlorine and organic phosphorus) have also been reported.

In industrial toxicology, cases of goiter caused by nitrotoluene were reported in 1957 in the Northeast. Since then, reports have been published on research dealing with tin salts, domestic gasoline, silica tetra floride, nitrotoluene and organic tin, etc. All of these studies, carried out according to needs at the time, have contributed material to scientific research. In addition, there are individual reports on the substitution of non-toxic for toxic substances (such as benzene containing liquid, etc.), and on experimental therapeutics.

During the past decade, there has been rapid development in industrial hygiene chemistry. The epidemiological organizations in big cities are capable of carrying out this work. Certain achievements in relation to choice of procedures for estimations and equipment production have been reported. Generally, determinations of commonly used chemicals are carried out side by side with the health investigations. Also, studies on methods on inorganic lead compounds and organic benzene, naphtha and aniline [?], etc. have been done.

Some researchers suggested more sensitive and more accurate methods for studies. Others simplified the procedures of determinations. Studies have also been made on procedures for determination when two substances coexist.

For speed estimates, an experimental gas inspection tube was built. Its use has been extended widely. The carbon monoxide gas inspection tube, for example, is now being produced in large quantities.

For continued observations on the concentration of toxic substances in air, equipments for automatic analysis of hydrogen selenide and instrument for thermo-electric determination of carbon monoxide have recently been devised.

In reviewing the studies of the past decade on the survey, prevention, and treatment of occupational poisonings, it can be stated that no work on this subject was done before liberation. However, our problems have not yet all been solved. The work must be expanded further with full force, with the present accomplishment as the foundation. By this method we can keep in step with the needs of the forever growing socialism.

In health investigation and clinical aspects, more systematized observations should be carried out and more attention should be given to the use and production of new chemicals. Research work on the clinical aspects of occupational diseases, industrial toxicology, and industrial hygiene chemistry in China are still in their early stages. Further developments in these fields are expected.

IV. Other Occupational Diseases and Common Diseases in Factory and Mines.

Occupational dermatitis, such as resin poisoning, used to occur with a very high incidence rate. Ever since the announcement of methods on prevention of resin poisoning by the Ministry of Labor, acute poisonings have been greatly reduced. In Shanghai, not a single case of acute poisoning was reported in 1958 among the road-construction workers who came in contact with resin.

According to present reports, occupational dermatitis among resin workers still exists. There have been debates for long periods on whether petroleum resin is poisonous. In recent experiments with animals, however, it has been proved that petroleum resin does possess toxic properties. Nevertheless the effects it produced are less toxic than coke resin produces.

Much work has been done toward the prevention and treatment of coke gangrene of the skin. Strict and detailed methods resulted virtual elimination of the number of cases in various areas. Other occupational dermatitis in silk, rubber, and pharmaceutical industries, occupational parasitic skin lesions, and rice-field dermatitis have all been investigated, studied and reported.

Some reports are studies on the prevention and treatment of diseases due to predisposing physical causes such as ultraviolet rays, ultrared rays, noise, motion, and high

and low atmospheric pressures.

According to the reports, substantial arc-flash conjunctivitis is seen among electric welding workers. The majority of these are relief workers. Beside the general treatment, acupuncture has been practiced in Shanghai with good results on most cases. Protective goggles are now in production. Some analytical studies have also been carried out.

A limited number of cataracts caused by ultrared rays have been reported. Most of these cases are glass factory workers.

Studies on the effect of noises has also been carried out. The studies show that the loudest noises are from the welding tools of boiler factories, and the metal pounding in spade manufacturing work. Next are noises from the fine yarn shop of cloth weaving factories, and the overtime work shop of metal machineries.

For preventive and protective measures, experiments on certain noiseless machines have been done in chi-chi-hu-echo. Ear mufflers have been studied by different units of the labor health research centers of the China Academy of Medical Sciences.

On therapeutic front, preliminary results have been obtained with acupuncture in cases of deafness caused by loud noise.

Observations on the effect of motion on sand moving workers have been reported. There are few latent cases and most of them are mild. Safe pressure-increasing work regulations and constant supervision have been most effective as preventive measures.

The major non-occupational diseases among factory and mine workers, according to reports from various places, are common colds, bronchitis, acute gastro-intestinal inflammations, chronic gastro-intestinal diseases, tuberculosis, arthritis, neurotic conditions, neuralgia, and diseases of the reproductive systems of women workers. Incidences of these diseases are affected by the following conditions: 1. Epidemics of certain seasonal diseases outside the factories and mines such as common colds in spring and acute gastro-intestinal diseases in summer; 2. Predisposing causes in the mode of living of the workers; 3. Predisposing causes in certain occupations, such as high temperature and chalk dust, etc.; and 4. Teaming of the workers, differences in age, and sex, etc.

In the past decade, combined measures sued in the prevention and treatment of diseases commonly occurring in factories and mines in various parts of China have

proved generally effective. First of all, because of the emphasis given by the Party and executive leaders to the health of workers, many different measures were employed to improve production conditions in factories and mines. The roaring patriotic health movement includes getting rid of the four evils and personal hygiene practice as key points both in and out of the factories and mines. It is a direct action in getting rid of evils and eradicating diseases. This action, without doubt, will reduce incidences of common diseases in factories and mines, and also raise the health standard of the workers.

In addition to these, increasingly good results have been obtained from health information programs in factories and mines. Teams of health workers have been trained on a large scale and work expanded. Contributions have also been made by the tens of thousands of Red-Cross health workers. Lastly, the network of medical and preventive organizations of the factories and mines throughout China has been growing stronger continually.

As a result, common diseases in factories and mines have gradually been controlled during recent years, and show a tendency toward steady reduction. For example, in 1958, among the workers of the 19 national factories in Shanghai, absentees due to the eight most common diseases was, on the average, 36.2 percent lower than in 1957; neurotic conditions, 52.35 percent lower; and arthritis, 43.14 percent lower. Among the workers of the Tientain Eastern Asia Wool Weaving Factory, absenteeism due to the eight most common diseases in 1958 was, on the average, 55.5 percent less than in 1957; acute gastro-intestinal diseases, 60.65 percent less; and neurotic conditions, 47.65 percent less.

V. Conclusion.

During the past decade in China, definite accomplishments have been made both in labor health and in the preventive and therapeutic aspects of occupational diseases. Fundamental knowledge on the development of silicosis in many factories and mines has been gained.

In the working shops of hundreds of the bigger factories and mines, the concentration of chalk dust has been reduced to or close to government standards. For dust prevention, a systematic and effective method has been found through research and development. In heat prevention and cooling work, a yearly decrease in the

number of people suffering from heat exhaustion has been reported. As to the common occupational diseases such as lead and benzene poisonings and others, some investigations are being carried out. Effective preventive and treatment work has been started in many factories and mines.

However, to keep up with growing socialist construction, we must intensify our efforts to raise the standards of science, to expand research teams, in order to be better prepared for the task of raising the health level of the laboring people.

CHINA'S MAJOR SCIENTIFIC AND TECHNICAL ACHIEVEMENTS IN COMMUNITY HYGIENE IN THE PAST DECADE

/This is a translation of an article written by Wang Te-p'u, Hu Han-sheng, Chang Chiu-ch'ien, and Chou Chih-chang in Jen-min Pao-chien (People's Health), Vol. 1, No. 10, 1 Oct 59, pages 899-903./

Before liberation, under the administration of the rebelling government, the government officials all lived in districts where houses were big and roomy with modern conveniences and up-to-date public facilities. The vast number of laboring people were crowded in low, narrow and unsanitary districts. Their houses were low and small, and very crowded with no running water or sewage. The streets were not paved and the living environment was most filthy. In the bigger villages especially, peasants lived in straw-sheds and houses made of grass. The rooms were dingy, dark, damp and very stuffy. Some peasants even lived with their animals. As a result of this unsanitary environment epidemic diseases occurred all year round and the health of the people was seriously threatened.

Since the founding of the China People's Republic, the Party and the government, concerned with people's lives and health, emphasized public health work and guided all the Chinese people to fight first against the most serious diseases. During this period, community hygiene work aimed at repairing and restoring of existing public facilities. The work included dredging of rivers, lakes, ditches and channels; cleaning up refuse that had accumulated for years in the old society; as well as sterilizing drinking water in districts where no running water was supplied.

In 1952, centering on anti-America imperialism bacteria warfare, the patriotic health movement was opened. A complete community hygiene work program was started. Thus, a change in the city and village health throughout the nation has taken place.

In 1953, China entered it's First Five-Year Plan period and began to develop economical construction. In order to have new buildings and the expansion of old city dwellings and public buildings built in compliance with modern health requirements, the State Construction Committee, the Ministry of Health, and the Ministry of Construction Engineering successively announced

"Temporary Health Standards for Industries and Enterprises," and "Joint Directories in Relation to Health Supervision in City Zoning and City Constructions." These standards and instructions have evoked great action in the prevention of water source pollution, in the protection of atmosphere and soil from contamination, drinking water warranties, and in proper zoning of cities and municipalities.

In 1956, China established the far-reaching twelve-year plan of scientific technique development and cited research on problems of community hygiene as one of China's important responsibilities. This provided directions toward which further research on community hygiene would develop.

The Central government proposed a text and commentary, in 1956, on China's agricultural development (draft) evoking "rid the four evils, practice hygiene and eradicate diseases." The patriotic health movement entered a new phase, created a new motion, resulted in a further change in the appearance of health in bigger cities and villages, and reduced incidences and epidemics of diseases.

In the course of ten years, with the Party's guidance and the unselfish aid of Soviet specialists, community hygiene workers, based on the standards and instructions announced during various periods by the Party, have carried out much investigation and research studies. The following is a summary on the most important accomplishments of their work.

I. Zoning of the Populated Districts and Hygiene of the Inhabited and Public Buildings.

During the past decade, along with the rapid development of China's socialist construction and industrialization, many new cities have been built. Several cities have been rapidly industrialized. The number of cities in China has increased from 157 in 1952 to 287 in 1957. The population of these cities has more than doubled. To accommodate large-scale production and the increasing daily demands of the people, health departments have joined with full force in city zoning investigation and research work. They have proposed many health requirements regarding such problems as the selection of sites for new cities and expansion, functional zoning, protection of the atmosphere and water sources,

as well as neighborhood arrangements. Many health hazards and disadvantage elements have been removed from the plans. As a result, the value of planning has been elevated.

In the new cities and expanded old cities such as Paot'ou, Chuchow, Loyang, Lanchow, etc., factories are being built on the opposite side of the city from which the wind usually blows. They are also located down river. Cooperation among different enterprises has also been considered in the site planning of factories to facilitate the development of industries and enterprises. This has also reduced the possibility of atmosphere and water source contamination in the inhabited districts.

Peiping, Shanghai and Wuhan areas, joining in the socialist transformation on industries and commerce, have relocated their factories with toxic productions in the new zones planned for industries and enterprises. Hence, the health conditions of the inhabited districts have been greatly improved.

Since the planned zoning was enforced, streets and projects in the residential neighborhoods and public buildings have been built and restored, some with comparatively well-equipped public facilities. It has given the city an entirely new appearance. Good health conditions are created for the work, life and relaxation of the laboring people.

After the people's farm communes were established in 1958, community hygiene workers were faced with new responsibilities. Rearrangements had to be made in the planning departments in order to serve better the planning of the communes, to provide a good living environment for the people, and to satisfy as much as possible the physical needs and desires of the laboring people. The transformation into a communist society has to be positively prepared.

During the past year (Oct 58-59), epidemiological stations, medical colleges and schools, and scientific research organizations in various provinces and municipalities have all joined in the experimental work of planning people's communes for amny districts. Through investigation, they have accumulated much information and have worked out preliminery drafts for hygiene in zoning.

For example, the Chapter of the China Academy of Medical Sciences, participating in the planning of several of the major communes in Hupeh province, has carried out such research studies as incorporating the eradication of evils and diseases with general health requirements. This has resulted in the drawing of a preliminary draft on "Health Problems in Peasant's Commune Planning."

Peiping Epidemiological Station, after joining with commune planning for several urban and rural districts, has proposed "Health Requirements of Commune Planning in Peiping (draft)."

These drafts were drawn up as a result of the central government's inspiration on "in relation to resolutions on the many problems of the communes." The aim of the proposals was to unify the management of the development in all phases, farming, forestry, herding, assistance /hunting?/, and fishing. Furthermore, the plans carried out would fulfill the urgent need of a higher standard of living for the people. The draft on zoning hygiene produced a certain action on the proper development in commune planning and the ensuring of health requirements.

In regard to residential housing and public building hygiene, much investigation and many research studies have been carried out during the past ten years. The most important are: "Health Investigation on a Model Residential District of the Laboring People" in Shanghai; a survey on farm residences of the Northeast carried out in Shen hsien; and, surveys on health conditions of residences in some communes carried out in the Harbin, Shanghai, and Wuhan areas. Reports on these surveys have affected certain changes in the process of housing planning and in the improvement of housing hygiene.

In 1958, utilizing joint research procedures, Harbin carried out studies on suitable winter indoor temperatures for temperature in construction district No 1. Preliminary results of the studies showed that in district 1, suitable winter indoor temperature was 16-17° Centigrade, that is, for district 1a (Hailar) and district 1b (Harbin) 17°C and for district 1 c (Ch'ang-ch'un) 16° C (all indicating the lower limit).

Many research studies were also carried out in Shanghai on the lower limit temperature adaptation as directed by health regulations. Physical criteria were determined. Atmospheric conditions inside the rooms were recorded. It was revealed from these experiments that "zigzag lines were present in the skin temperature curve of each individual subject tested. Also, while a zigzag was produced, the subject always complained of being cold."

Researchers believed that in health study for warmth, it would be possible to rely on the room temperature level at which the zigzag line was produced as a guide in the determination of lower limit temperatures.

In Wuhan, studies on the height limit for cleanliness in rooms were carried out in the research on health standards. Atmospheric conditions, carbon dioxide,

and total bacteria count of rooms with different heights were determined. Information helpful in health standard regulations on room height for cleanliness have been accumulated. All of these results obtained from research studies have provided references for the planning departments of public health work.

In addition, health investigations and studies on public amusement halls have been carried out in the Peiping, Wuhan, Naking, and Hangchow areas. The small atmosphere in movie theaters was studied.

According to the survey, in many movie and stage theaters ventilation facilities have been installed. Some are also equipped with indoor cooling ventilation facilities. A periodic exchange of unclean air inside the theaters is fundamentally ensured and the health conditions of public gathering places has been improved.

II. Atmospheric Protection in Inhabited Districts.

Health protectionwork of the atmosphere in China was first started in Mukden. The method employed was copied from and based on the Soviet's foremost experiences. Later, atmospheric contamination and its effects on inhabitants' health in the cities have been surveyed and studied as the research work developed in Fushun, Shanghai, Peiping, Anshan, Port Arthur, Tsingtao, and Tientsin successively.

The results of these studies in various places indicate that the atmosphere of inhabited areas is seriously contaminated by industries and enterprises. The contamination affects not only health condition in these areas, but also creates health hazard for the inhabitants.

In Mukden for example, with T"ieh-hsi industrial district as the center, investigations on the atmospheric contamination of the surrounding areas were carried out. The dust and sulphur dioxide content of the air was determined. It was found that the average yearly dustfall in T"ieh-hai industrial area (with the smelting factory as the center point) was about three and a half times higher than that in the control district. The day and night average concentration of sulphur dioxide was nine times that of the control.

In Fushun, determinations of dust and sulphur dioxide were made in the inhabited districts around the power house. Similarly, it showed that dust could travel a distance of 1,500 meters from the source of contamination.

The inhabited districts around Dairen Dye Factory were also seriously contaminated by the harmful gas the factory expelled. The atmosphere of the inhabited areas 300 meters away from the source of contamination contained an amount of chlorine 8.8 times higher than the day and night average concentration according to the Soviet standard.

The results of investigations in Mukden and other cities showed that the sulphur dioxide content of air and the amount of fallen dust were higher during the milder seasons than those during the not so mild seasons.

To further understand the effects of contaminated atmosphere on the health of inhabitants, statistics on the incidence of disease and clinical investigations were carried out among some city dwellers and children in the Peiping, Mukden, Penki, Fushun, Port Arthur and Dairen areas.

Physical examinations were done on students of the graduating class of a certain Fushun junior high school. Results showed that incidences of nasal inflammation among the students living in districts with seriously contaminated atmosphere were ten times more than that among those students from a clean district.

In Peiping, clinical examinations were given to a group of school children between seven and thirteen years of age as part of the research study on the effects of stmospheric contamination on the health of those living near to the Shih-ching-shan Steel and Iron Factory. Results showed that in the contaminated districts, definite liver enlargement was found among school children especially of the lower age group. The percentage of liver enlargement was distinctly higher than that among the children living farther away from the contamination source. This phenomenon probably was related to the toxic effect of the small amount of sulphur dioxide present in the atmosphere over a prolonged period.

In addition to this, research on ultraviolet ray radiation was carried out in Shanghai. It showed that in areas where the atmosphere was seriously contaminated, the intensity of ultraviolet rays at ground level was greatly reduced. Ultraviolet rays within the range of 290-400 millicuries were, on the average, 28.7 percent lower than that in the country, the most being 60.6 percent. The short wave portion (290-350 millicuries) of the ultraviolet rays was 35.06 percent lower, the highest being 68.4 percent.

The most powerful physiological actions such as bacteriocidal, anti-rickets, and erythema effects of ultraviolet rays of the sun come from the short wave portion of the radiations. Loss in the short wave ultraviolet rays of the sun resulting from contamination of the atmosphere will affect the purification of the air in the cities. It will also produce unfavorable results in childrens' growth and development, and in the health conditions of the inhabitants in general.

In Peiping, studies were made on the extent of atmospheric contamination from a sulphuric acid manufacturing shop of a certain chemical factory where the native method was employed. It was suggested that the health protection distance from that factory should not be less than 300 meters.

For improving the atmospheric hygiene of inhabited districts, much work has been carried out during the past few years. For example, Peiping, Shanghai and Mukden cities, joining in the socialist transformation of industry and commerce, have centralized and relocated in the country all enterprises that are seriously contaminating the atmosphere. Dust removal and air purification facilities are installed in these new factories. In the technical progress, waste products are recovered and utilized. Preliminary achievements in the hygiene have been obtained.

Since thebeginning of the First Five-Year Plan period, especially since the 1956 announcement of "temporary health standard of industrial and enterprise plans," the location selection of factories and the technical process planning of new enterprises have all been carefully reviewed by the health department of different places. New enterprises are requested to join production with reinforced recovery and purification facility installations in order to achieve "health is to produce and produce with good health practice."

Liaoning Province, in the past few years, has completed the installation of recovery and purifacation facilities in all big and middle-sized industries and enterprises. Thus, the extent of atmospheric contamination by toxic smoke and production dust is reduced.

During the past few years, community hygiene workers have also reinforced the routine health inspections of old industries and enterprises. They have urged production units to install necessary dust removing and air purification facilities. They have selected low-priced more efficient dust removing and purification equipment

and evaluated its practical usefulness. All these actions based on the State Council's "announcement in relation to the management of harmful waste gas and liquid" have improved the condition of atmospheric contamination in the cities and municipalities.

For example, in Fushun, comparison was made on different atmospheric dust determinations of the area around the electrical factory in the same period of the years 1956 and 1957 before and after new dust removal equipment was installed. Results showed that the amount of fallen dust after reinstallation of the facilities was reduced by half.

Another example is the Dairen Chemical Factory. In the process of manufacturing sulphuric acid, extra gas from the surplus acid was usually expelled directly into the atmosphere. This condition endangered the health of the inhabitants and also corroded the metallic structures of nearby buildings. Later, through investigations and research studies, the local health departments suggested plans for improvement. As a result, this company is now recovering sulphuric acid fumes and ammonia, and is producing fertilizers with these waste products. This procedure not only is beneficial to production, it also avoids contamination of the atmosphere in cities and municipalities.

III. Water Supply Hygiene and Health Protection of Water Sources.

Although there was running water in the bigger cities and municipalities in China before liberation, the availability rate of water was not high. For example, in Shanghai the availability rate was only 25 percent. In the past decade there has been an enormous development in China's water supply work. At present, the number of people among the city and municipal dwellers in China drinking and using running water is more than five times before liberation. In Peiping, as an example, water supplied to the city districts and suburbs in 1958 was 8.92 times higher than in 1948. The availability rate reached 98.55 percent, 2.5 times more than before liberation.

Other examples are seen in Liaoning province. Water supply was 2.1 times higher than the amount available before liberation in Mukden, Port Arthur, Dairen, Anshan, Fushun and five other cities. In individual cities such as Dairen, the total availability

rate in the city and the suburbs has reached 90 percent, and in Anshan, 87.7 percent.

In October 1956, since the State's Construction Committee and the Ministry of Health jointly announced "quality standard of drinking water," the B. Coli indicator rose from "not to be found in 100 cubic liter of water" to "no more than three in 1,000 cubic liter." This is an indication of a rise in China's health standards and of improvement in scientific techniques in water purification.

Information in relation to the changes of quality of the water has been collected to further assure that its quality complies with government standards. In various water supply plants, quality of the water is examined by each company. In addition, the epidemiological stations of different provinces and municipalities have also earnestly carried out constant analyses of water for health purposes. As in Peiping, the number of yearly inspections of water of the whole waterworks has reached 2,000-3,--- times, and spot checks of water sources and water quality numbered about 100-200 times.

Studies on the techniques of water purification and sterilization of the waterworks have also been carried out by research organizations and water plants in various cities and municipalities. For example, water supply plants of various places have all started to use the chlorine ammonia sterilization method. This has been an important factor in solving the problem of excess chlorine at the end pipes of the waterworks, and also in the water quality improvement work.

Peiping Municipality, based on information collected, has studied the process of the order in which chlorine and ammonia are added and mixed. The method employed at the present is "adding chlorine to the water in the incoming pipe to the plant and ammonia in the outgoing pipe."

Tientsin, Shanghai, Wuhan and other municipalities have also employed the midway chlorine addition procedure beside the addition at the plant site. In every case, the chlorine left in the water is more than 0.1 milligram per liter. All of these measures have effectively resulted in raising the amount of chlorine at the end of the pipes close to the standard.

In regard to the problem of water supply to rural districts and the vast village areas, extensive work in drinking water sterilization and water well improvement has been carried out by basic health

departments since the early days after liberation. For example, in Kiangsi province, water well sterilizations in Nanch'ang have been carried out since 1949. In 1951, the work was expanded to twelve key districts. An average of 20,000 people each day in 1949 was supplied with sterilized drinking water. In 1950, the number was increased to 80,000 and in 1951 up to 520,000.

In Tientsin, as another example, over two hundred water sterilization centers were established each year in the rural districts and the country to serve water to over 400,000 peasants. Thus, incidents of contagious intestinal diseases among the peasants in the country were greatly reduced.

In 1958, the large number of peasants in Li-lo-t'sun outside Tientsin, together with the technical personnel of the epidemiological center, after months of repeated experimental studies, built and completed China's first simplified village water supply station. After chlorinized sterilization, physically, chemically, as well as bacteriologically, water from this station reached the drinking-water quality standard established by the government.

Since the construction of the Li-lo-t'sun water station, more than ten additional simplified running water supply stations have been built in the villages outside Tientsin. The problem of drinking water supply to the tens of thousands of peasants in areas outside Tientsin has been solved.

In addition to this, Peiping has built a contact sedimentation pool water supply station in San-chia-tien outside the city. The situation in San-chia-tien's pilot station showed that this new contact sedimentation pool water supply facility can be expanded to the systematized peasant communes.

Other places such as Shanghai have carried out research studies on the use of earthern jars, wooden buckets, cement tile pipes and substances for filtering ponds and using reserved energy for dynamic energy. Several simplified running water stations were built in the rural districts outside Shanghai. Each station supplies water to 300 to 500 people with the water quality approaching health requirements.

Following the development of community welfare work after communes in the farm villages were established, and due to the steady improvement in living conditions, there is a continuous demand for water, both in quality and in quantity, for drinking and for domestic use by the

peasants. For thousands of years majority of peasants have been drinking river water that has never been treated and very unsuitable for health requirements. Building these simplified running water supply stations will result clean drinking water for the vast group of peasants. Various kinds of diseases that spread through water are thus effectively prevented. Simultaneously, the unmatched superiority of the commune is manifested in the raised standard of living for the members both physically and culturally.

In regard to the protection of water sources, tremendous work was carried out in the dredging of rivers and lakes and in the construction of sewers during the early days of liberation. For example, the Ch'iang-tse river in Tientsin, the Ch'iu-huai river in Nanking, and the Hsi-hu in Hangchow have all been dredged. Water sewers for warding off sewage were built along the rivers and lakes to maintain the cleanliness of the water. These are some of the typical examples of water source protection work demonstrating the change in the health picture of cities and municipalities during the economical recovery period after liberation.

In 1953, China entered it's First Five-Year Plan period for economical rehabilitation. Large-scale economic construction with special emphasis on health protection of water sources, developed all through the country. Sewers were built in many newly constructed and expanding cities and municipalities. Some industrial cities and municipalities also constructed modern sewage-managing buildings according to health requirements suggested by health departments. Pollution of water sources by sewage water from everyday living and from industries has fundamentally been prevented.

Since the Scientific Planning Committee of the State Council of February 1958 directed that sewage water for irrigation purpose be studied as a main research problem, epidemiological departments of eighteen major cities and municipalities, Peiping, Shanghai, Tientsin, Chinan, Wuhan, Canton, Harbin, and Ch'engtu, etc., have studied health problems that might arise from using sewer water in farm irrigation. Problems such as the breeding of mosquitoes and flies; parasitic disease from eating uncooked vegetables; contamination of underground water; as well as farm labor protection were studied.

In Ch'engtu, sewage water after sedimentation was used to irrigate the rice fields. In Wuhan, original sewage water was used to raise arrow root. These

experimental research studies showed that under certain responsible conditions, after five days, sewage water's physiological oxygen requirement, oxygen consumption, floating matter and total bacteria count were all greatly reduced.

There is a definite purification action found when the sewage water is used for duckweed planting. Such procedures used in Shanghai as the utilization of sewage water for planting duckweed and the raising of a certain fish not only produced a definite purification effect on sewage water but also effectively controlled the breeding of mosquito larva.

At the present time, research on this work is aimed at "return every drop of dirty water to the field," "year round use" and "joint use of sewage water and mud," etc. These aims have suggested further studies on the contamination of surface water sources by sewage. In addition, scientific information helpful in drawing up "Health Regulations in the Utilization of Sewage Water for Irrigation" have been supplied.

Health surveys and research studies on river and lake contamination and self-purification have great significance in the warranty of water sources and water quality. Before liberation, practically no studies in this field had been carried out. After liberation, much investigation and research work was carried out to study water quality and hygienic conditions of rivers and lakes by the organized forces of epidemiological departments of various provinces and municipalities.

For example, Peiping carried out successive studies during 1954-1956 on the contamination and self-purification of water in the Hu-ch'eng-ho city district and in the suburbs of T'ung-huai-ho, Liang-shuei-ho, and Ch'ing-ho. In addition, a complete health survey and hygienic analysis of the river water in the villages along Kwan-t'ing were carried out. These studies served as a basis on which the State Capital will draw it's plan for the utilization of Yung-ting-ho water as the source for a running water supply plant.

During 1956-1957, the Tientsin municipality completed a health survey and commented on the water quality of the sea and river systems.

Wuhan, in 1957, studied the process of dilution and dispersion of sewage water by the water source of the Yangtze river. The city used sewage in the river from the Hang-yang Paper Factory as the objective for this research. Before this, water of Tung-hu had been quantitatively analysed for the whole year of 1954. The foundaries of the areas

requiring health protection after the expansion of the Tung-hu water supply plant were studied to assure health requirements and the water quality of the swimming pools.

In 1957-1958, Hangchow analysed water samples obtained from the upper and the lower courses of Tung-t'ang-ho. The study served as a reference in the selection of water source for a new running water plant.

The Bureau of Health of Kansu province, in 1956, completed a survey on the geographical, geological and the inhabitant aspects of the epidemiological and health conditions on both banks of Sze-lung-k'uo covering an area of 0.5-20 kilometers 85 miles up the river. Physical, chemical, bactriological and toxicological analyses of the water quality were carried out.

The results of the survey and studies showed that, except for the bacteriological exponent of the water, all the findings were in agreement with the national health standard for water source selection. This water, if passed through a complete system of purification and with proper management has of sewage water from existing and future industries in Lanchow, can become the central source of supply for that city.

The above are only some of the accomplishments in Peiping, Tientsin, Wuhan, Hangchow and Lanchow areas.

Some others, especially the industrial cities and municipalities, have all proceeded with health investigations and analyses of water from nearby rivers and lakes. In the pase few years, the information collected has amounted to dozen of times more than before liberation. This information formed the scientific basis in the development of health protection of water sources and in future water sources selection.

In the decade since the nation was founded, China has restored and constructed tens of thousands of water storage houses of various size. The local epidemiological departments in different areas such as San-men-chia, Miun and Tan-chiang-k'uo, where bigger models were built, have all been capable of carrying the cleaning work of the bases of the storage houses rendering them suitable for the new constructions. These works have created a definite action on the improvement of water storage houses and the quality of water.

IV. Refuse Removal in the Inhabited Districts.

A sweeping-out movement has started everywhere in China since liberation. Refuse accumulated for years has been rapidly cleaned away. Houses have been repaired and remodeled. Many new houses comforming with health requirements have been built. Sweeping-out regulations have thus been stabilized. At present, the work of collecting and the work of transporting refuse and manure daily in various cities and municipalities have reached an equilibrium.

To keep the streets clean, a regulation has been passed to promote section-cleaning by the inhabitants to warrant constant cleanliness of streets and alleys as well as secondary roads. Major streets are kept clean by a thorough sweeping at night and a rotating day cleaning procedure by street cleaners. This procedure will prevent the daytime dust-raising phenomenon when a big cleaning is in operation.

During the past few years, keeping in step with the technological reformation movement, many cities and municipalities have been continuously researched on the collection and transportation of tools. Cleaning-machine repairmen and street cleaners, combining native with foreign devises, have invented many kinds of cleaning equipment. They have built tools such as automatic dust-sweeping wagons, rotary-cans and spiral automatic-loading garbage trucks, vacuum manure-suction trucks, sidewalk sprinkling wagons and dust-sweeping wagons, etc. The invention of this mechanical cleaning equipment not only has improved the labor conditions of the cleaners and reduced the severity of work, but has also greatly increased labor efficiency.

At the same time, many cities and municipalities such as Peiping, Wuhan, and Harbin, through their investigative research, have analysed the quantity of refuse and its physical and chemical composition. The study has affected the collection and management of sorted refuse.

The organic matter in the refuse, when mixed with manure to form a pile-fertilizer, becomes harmless after fermentation has taken place. With this management, large quantities of fertilizer for farm use is produced and agricultural production is being stabilized.

Furnace cinder in the refuse can be used for construction materials such as cinder blocks. Or, it can be used as a fill for swamps. This will prevent the

breeding of mosquitoes and flies as well as the loosening and sinking of the land. Other waste matters in the refuse can be sorted out and used as reproduction materials. At the moment, this practice is being expanded throughout the nation.

Based on the practice of sorted refuse collection, Peiping, in 1956, studied and started the mud-sealed piles of manure mixed with organic matters in the refuse. This method is justifiable in the management of large quantities of the city's organic refuse. It also is a preliminary solution of the problem of organic refuse disposal in the city's and the municipality's planning.

In the hygienic aspect, this procedure will prevent flies from coming in contact with the refuse. The breeding of flies will thus be controlled. Air and soil contamination will be reduced. Disease causing bacteria and ova of parasites will be exterminated. Refuse is fundamentally rendered harmless as necessity demands.

In the agricultural aspect, potency of the fertilizer is being maintained because the nitrogen loss is reduced when the refuse-manure reaches the sealed pile stage. After the pile-fertilizer is ripely decomposed, it is used to fertilize farms. It not only increases the fertilizing effect but also is able to alter the physical characteristics of the soil. This is beneficial to the growth of crops. This method, backed by the principle of well-managed hygiene and more fertilizer, is now being practiced in many places in China.

More research was carried out in Wuhan to increase the potency of the pile-fertilizer. Pile-fertilizer with a generalized fermentation and sufficient heat production is applicable for farm villages especially during winter seasons. Wuhan, based on the principle of the pile-fertilizer and the mud-sealed method, the with adaptations to the conditions of the villages, has devised a pile-fermentation method with automatic moisture regulation and ventilation on a raised platform. This has solved the most difficult problem of moisture control and ventilation in pile-fertilizer production. Fermentation and heat production will easily take place. Furthermore, the decomposition period is shortened.

Usually, in the platform pile-fertilizer, the temperature rises to 60°-70° Centigrade in two to five days. Fermentation is good and is not affected by outside temperature.

In addition, Wuhan researchers have studied the

fermentation temperatures of different materials. They discovered that a rice-hay and weed mixture fermented the fastest and produced the highest temperature. In December 1958, this procedure was widely practiced in Hsiao-kan hsien people's commune of Hupeh province during the winter fertilization movement. It showed that heat was produced readily during the winter season. High temperature fermentation and harmlessness-transformation have been accomplished.

Fertilizer is urgently needed in production. But, the fertilizer has to be first rendered harmless. To solve this controversial problem, Honan, Wei-fang, Shangtung, Peiping and Harbin areas have all successfully experimented on a rapid pile-fertilizer method. In this method, heat is supplied externally to hasten the rise of temperature inside the pile. This provides a suitable environment for the reproduction and activity of the high-temperature bacteria. The fibrous tissue in the pile is rapidly digested. Meanwhile, heat is being produced. It is, therefore, possible to shorten the decomposition process.

In reviewing present results from different places, the following can be seen: Large in quantity, rapid in course, good in result and low in cost. The new method has shortened greatly the time of decomposition of the pile-fertilizer and converted tremendous amounts of organic matter, in six to eight days, into decomposed plant dirt that can be absorbed by agricultural crops. The potency of the fertilizer is well preserved. In addition, manure and refuse are disposed of promptly. Thus, the breeding medium for flies is removed, and disease causing bacteria, ova or parasites, and agricultural infestations are eradicated. Harmless transformation required is fundamentally fulfilled.

To further shorten the decomposition period, increase the potency of the fertilizer, and conserve fuel, each research unit is studying continuously the proportions of ingredients and heat-supplement methods according to the local fertilizer sources and production demands. The final method will then be broadened to provide a better service to production.

Since a high promotion of agricultural production has taken place in China, peasants' communes of many districts have combined manure and refuse managements. Gradually, they are employing more of the methane method. With this method, human and animal manure, and

waste matters of refuse are placed in an enclosed methane pool. Deoxidation action on the organic matter present is utilized in the process of fermentation to attain the harmless state.

According to results of studies carried out by the Chekiang Health Institute, after manure is fermented by methanization, ova of schistosoma are dead within thirteen days, typhoid, paratyphoid and dysentery bacilli are also dead within a two-week period as a result of the changed environment.

From the result of this particular study, useful suggestions have been proposed on the future utilization of methanization in China's agricultural development.

V. Conclusion.

In the past decade since New China was founded, tremendous accomplishments have been made in research studies and in the actual practice of community hygiene. There is a rapid change in the appearance of community hygiene in the vast urban and rural areas. A great deal of investigation and research work has been carried out on the zoning of inhabited areas for health purposes, the protection of water sources, atmosphere and soil. Information has been collected and health problems relating to city zoning, atmospheric contamination, water supply and sewerage, and refuse removal and disposal have been solved. Good labor and living conditions have been created for the people.

The achievement of these results is due mainly to the Party's guide and government in command, that fully enforced the work with the reliance of the people, together with unselfish aid from Soviet specialists. Furthermore, it is inseparable from the superior socialistic system of China.

However, our accomplishments are far behind in satisfying the needs of the rapid development of our internal construction of socialism. From here on, under the Party's guidance, we have to continue working in full force to expand the research teams and research fields. More intensive and detailed studies are necessary to solve the present major problems in community hygiene. The accomplishment of research should be utilized in practical work according to

time and location. The goal is to struggle for further improvement of urban and rural community hygiene, and to protect and promote people's health.

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