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KD 3577FAREWELL TO THE GOD OF PLAGUE—THE
CONTROL OF SCHISTOSOMIASIS IN CHINA

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Abstract—The anti-schistosomiasis campaign in China is traced through the various stages of economic and political development from pre 1949 Revolution up to the Cultural Revolution. The campaign was transformed from being essentially independent in organisation and staffed by mainly western trained experts to one that was to be closely integrated with rural commune development. With this change, there was less emphasis upon the use of chemical molluscicides and western drugs favoured by the majority of other affected countries. Instead, much greater reliance was placed upon decentralization of the medical service so that administration by health auxiliaries of labour intensive snail eradication techniques, public health control over sanitation and traditional treatment of patients suffering from the disease predominated. The campaigns were undertaken to fit in with the slack periods of the agricultural year so as to minimize the disturbance to productive work. The side-product of fertilizers, resulting from measures aimed at both snail eradication and environmental sanitation, was also an important input for agriculture. The decentralization of health services facilitated the mobilization and education of the mass population that is so important in dealing with diseases such as schistosomiasis which are largely consequent upon poverty and ignorance. The achievements in schistosomiasis control, especially in Yükiang, have also been used as a political lever to illustrate the importance of socialism, mass cooperation and self reliance in tackling the problems of disease.

On 1 July, 1958, Chairman Mao wrote a poem, "Farewell to the God of Plague", eulogizing the remarkable achievements of the mass movement in eliminating schistosomiasis from Yükiang Country, Kiangsi Province. Inspired by the poem, the people of Yükiang maintained the vigilance necessary to prevent the reinfection of the county [1]. Furthermore, the success in Yükiang has been held up as an example to be followed by other counties in the same way as the Tachai approach towards agriculture has become a model of self-sufficiency for the rest of the country to emulate.

The success in Yükiang was quickly followed in other areas so that one year later the Chinese press claimed that the disease which threatened the health of about 100 million people in 12 Provinces had in 65.4% of the previously affected areas been practically eradicated. By 1970 the disease had been eliminated in 38 countries which included Yükiang and Tehhsing in Kiangsi, Hsienyu in Fukien, Tsengcheng in Kwantung, Ksiangyang in Hupeh and Paosham in the Shanghai municipality [2].

There is some controversy over the extent of Chinese success in controlling schistosomiasis. Some authors tend to regard Chinese sources as entirely unreliable and take a pessimistic view, whereas others, basing their judgement upon reports from visitors to China, and practising doctors in China, as well as Chinese official sources, are more optimistic about the achievements that have taken place. British doctors who visited China in 1974 were told that in the early 1950s, before the programmes began, the infection rate was 30–40% in the endemic areas. This figure fell to 25% in the late 1950s, to 6% in 1960 and only 4% in 1965 [3]. It is clear, however, that schistosomiasis has not been completely eliminated and that severe measures are still being taken to prevent the disease from spreading. Another group of professional health visitors from the United States

noted with amazement that all the dogs in one commune had been eliminated in case they were to act as a reservoir host for the parasite and to continue its transmission [4]. These and other recent visits to China as well as literature from both within and outside China indicate that schistosomiasis is still a problem, although the degree of success in combating it is differently interpreted [5–9]. The degree of Chinese success is in any case extremely significant when one considers that throughout the world the disease remains largely uncontrolled and its prevalence is increasing [10].

In China schistosomiasis is caused by the parasite *S. japonicum*. The other main species of schistosomiasis, *S. haematobium* and *S. mansoni*, present different control problems, and are not found in China. Nevertheless, it is likely that all countries affected by schistosomiasis and having low per capita incomes have much to learn from the measures developed within China. On the whole, countries with high per capita incomes, such as Puerto Rico and Venezuela with a *S. mansoni* problem, Rhodesia with both *S. mansoni* and *S. haematobium*, and Japan with *S. japonicum*, have had a great deal of success in dealing with schistosomiasis. On the other hand, countries with much lower per capita incomes such as Brazil with *S. mansoni*, Egypt with *S. mansoni* and *S. haematobium*, and the Philippines with *S. japonicum*, have had much less success [11]. As a consequence, it is of great interest to look at the Chinese approach, based principally upon labour intensive rather than capital intensive strategies, which have met with a significant degree of success.

An analysis of the Chinese approach can be regarded as even more important if one takes the view that the success in reducing schistosomiasis in richer countries has been due more to improvements in standards of living than to planned schistosomiasis control projects. Thus although *S. japonicum* has been

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practically eliminated in Japan, the reason for the decline can be attributed in part to socio-economic changes. Progress in general development can account for improvement in health education and in sanitation as well as a reduction in contact with contaminated water where the free living stage of the parasite makes contact with its human host [12]. A similar case can be made for Puerto Rico's success in controlling *S. mansoni* [13]. Hence, a study of the Chinese achievements in controlling schistosomiasis throws light not only upon the politics of Chinese health, which has been written about at great length with reference to the general administration of health services [14], but also upon the factors necessary for the control of a disease affecting many of the less developed countries. Finally, a study of schistosomiasis control policy illustrates how the strategies chosen both reflect and reinforce the political structure within China.

To understand the interaction of political-economic development, health service organization and the policies aimed at a particular disease such as schistosomiasis it is necessary to look at their historical development. Following this, one can attempt to isolate those factors which have contributed to the success of the Chinese in their antischistosomiasis policy. It is possible to trace the development of schistosomiasis policy, health policy and development policy in China through approximately four periods: 1949-1955, 1955-1960, 1960-1966, and 1966-1968. The first period is characterized by attempts to break away from China's imperial past. The second involved the development of communes and the Great Leap Forward. The third was a period of revisionism and bureaucracy and the final period was that of the Cultural Revolution.

In 1949, at the time of the Chinese Revolution, 85% of the 540 million population lived in the countryside. At this time China had a Western-styled health system with some 40,000 doctors and some 13,000 hospital beds, concentrated mainly in the cities [15]. The state of parasitology and the prevention of parasitic diseases, such as schistosomiasis, was fragmentary and totally inadequate to meet the daunting task of disease eradication [16]. The Peking Union Medical College had been established in 1920 and during its early years the Division of Parasitology was practically the only centre in China where training in parasitology could be obtained. Since 1930, other departments of parasitology were formed in Shanghai, Canton and Nanking and in a few years before the 1949 revolution many of the medical schools in China established departments of parasitology. Most of the work undertaken by these departments were of an experimental nature with the principal aim of determining the distribution and clinical significance of parasitic diseases in China [17].

The emphasis upon medical "centres of excellence" in urban areas, and the relative neglect of rural health services, continued in the first few years after the Communists had come to power [15]. In the 1950s China turned to Russia for both aid and development of heavy and regionally concentrated industry, and also for its model of health service planning. The first five year plan (1952-1957) was orientated towards industry and the urban population, and the health ser-

vices focused on the problems of the urban workers [14,18].

Despite the continuing emphasis upon urban areas, the influences upon medical work changed dramatically when at the first National Health Conference in 1950 Mao Tse Tung formulated the four guiding principles for solving China's tremendous health problems. These were (i) serve workers, peasants and soldiers, (ii) regard prevention as the principle activity, (iii) unite Western and Chinese traditional doctors, (iv) combine public health with mass movements [19]. These principles, while not all adopted immediately, have remained the principle Maoist guidelines for health services development within China.

The first stage in schistosomiasis work in China before 1955 continued to emphasize survey and epidemiological work and was at first carried out principally by a few experts from Shanghai and other major urban centres [8]. Impetus to the work came from the National Health Conference in 1950 which helped to establish the Institute of Parasitic Diseases at the Chinese Academy of Medical Sciences. It was this Institute which was the main co-ordinating body for research. A national schistosomiasis research committee was set up under the dual direction of the Antischistosomiasis Committee of the Central Committee of the Chinese Communist Party and the Antischistosomiasis Bureau of the Ministry of Health [16]. In 1951 antischistosomiasis stations were set up in all the known affected areas, technical personnel were trained and surveys of the extensiveness of the disease were undertaken. Plans for controlling the disease were undertaken by national, provincial and municipal committees [16,20]. During the ensuing period prevention and treatment stations were established. By 1958, 197 of these stations existed with more than 1200 medical field teams, and manned by 17,000 specialized personnel. In addition there were by this time 42 institutes for schistosomiasis research in medical colleges, universities and various government organizations. Research work was further influenced by the objectives of the National Programme for Agricultural Development (1956-1957) which designated schistosomiasis control as one of its principal objectives [9].

The extent of the research programme on schistosomiasis in China was demonstrated at the second session of the National Research Council on Schistosomiasis when 200 papers were brought together at a conference between 4 and 12 December, 1956 [21]. By this time, the epidemiology and distribution of the disease was becoming fairly clear. The disease occurred in three different types of area: first, the plain regions, where rivers were the source of infection and human contact was made with the infected water through domestic use such as washing, laundering and bathing; secondly, the hill regions, where infection occurred chiefly through the use of terraced paddy fields irrigated by valley water, and where contact was made as a result of agricultural work; and thirdly the low lying marsh and lakeland areas where contact with infected waters was made through gathering rushes and weeds and by fishing [20].

The surveys also showed that the rates of infection varied according to the chances of contact with water. The prevalence was low for children under five and

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increased markedly for those over 10, with a peak for the age group 15-30, which coincided with the most active group amongst the farmers in rice growing districts. The incidence was generally much higher amongst males than females because of their different occupations and opportunities for contacting infected water, and while the distribution of the disease was related to the distribution of the *Oncomelania* snail which harboured the parasite, it was most prevalent amongst the poor and lower middle class peasants. It was the poorer groups which, like the fisherman and boatmen in the marsh and lakeland areas, had the most contact with infected water and hence suffered the greatest infection [22-24].

The total extent of schistosomiasis in China also became known following a national survey in 1958 which indicated that 10,470 million people in China were suffering from the disease and that a further 100 million were constantly exposed to infection. The area affected covered 324 hsiens (counties) and municipalities in 13 provinces, a population and area much greater than the pre-revolutionary estimates of 5.3 million infected in 138 hsiens [25]. Over thirty species of animal were also found to be infected, including oxen, horses, donkeys, mules, pigs, goats, sheep, dogs, cats, mice, wild cats and badgers. It was estimated that some 1,500,000 cattle were infected. The infection rate varied according to different modes of farming, and occurred more often in the swampy areas than in the plain regions, and more often in the plain regions than in the hill regions [20].

While much work was done on schistosomiasis research, emphasis upon Mao's principle of regarding prevention of ill health as the prime aim became feasible only as development policy shifted from the urban and industrial sector to the rural sector. Problems of a worsening food supply caused by a shift of labour from agriculture to industry, wastage of local resources, a dependence upon Russia for foreign exchange and a concern for military defence based upon rural areas were some of the factors contributing to policies aimed at the decentralization of industry and the development of rural areas [18]. By 1955-1956 there was a major movement towards the development of agricultural co-operatives, and during the winter of 1955 the national programme for agricultural development was drafted, which included the task of eradicating schistosomiasis and other parasitic diseases [24].

One of the advantages of co-operatives was their ability to mobilize surplus labour during the slack seasons in order to undertake various social and economic campaigns; some of these campaigns were directed towards solving specific health problems such as those first introduced in 1952 to improve village water and sanitation and those aimed at eradicating the four pests—rats, flies, mosquitoes and sparrows (sparrows were later replaced in the list by bed-bugs) [26].

Decentralization took a further step during the period of the Great Leap Forward (1958-1959) when communes were created and small-scale industry was encouraged. The communes, which varied in size from 5000 to 100,000 people, had the significant advantage of being able to organize not only production units, but also educational, health and defence services [18].

The rural development policy led to a change in the health service system. The capacity of the rural health services was increased by the use of doctors trained in traditional medicine, the development of auxiliary medical staff, and the emphasis upon mass campaigns to prevent health problems [27]. A party directive in 1955 emphasized the need to study traditional medicine as traditional methods were often preferred because of their simplicity and acceptability to the Chinese people, and to make use of the traditional doctors whose services had largely been neglected by institutions dominated by Western medical science [28]. In its drive to train more traditional doctors the Ministry of Health established an Academy of Traditional Medicine [14]. Auxiliary workers studied medicine on a part-time basis and carried out simple treatment, preventive and sanitary work.

Health campaigns in rural areas were, wherever possible, combined with work on developing agricultural production. These campaigns had the advantage of low resource cost as they were implemented during slack periods of the farming year. In addition they were important in reducing the elite status of the professional doctors and so helped not only in making medical science more accountable to the public but also in achieving the goals set for an egalitarian society [29]. During the Great Leap Forward, rural health services were also improved by the transfer of urban medical personnel to the countryside to lead or serve on health teams. Doctors were encouraged to build up and support local health services. Medical personnel rapidly expanded the rural health services through a rotation system, which allowed for one year's leave of absence from the cities [27]. The doctors brought new ideas into the rural areas, which helped to foster social change and built up the morale of the people by providing concrete health programmes. They helped to explain the role of human faeces in spreading schistosomiasis and the importance of snails in transmitting the disease. The medical and epidemiological information was crucial to the development of mass campaigns which were to be a cornerstone of the preventive work against schistosomiasis [8].

It was in the winter of 1955 that Chairman Mao, in the spirit of rural development, issued a call for schistosomiasis to be wiped out [30]. In the same year the first session of the Anti-schistosomiasis Conference laid down the principles of schistosomiasis eradication—"spend one year to prepare, four years to fight, two years to clean up what has not been completed and to eliminate schistosomiasis in those areas where the condition is already ripe" [31]. This battle plan was accepted in the National Programme for Agricultural Development which also proposed plans for the elimination of the five major parasitic diseases (schistosomiasis, malaria, kala-azar, filiaris, and ankylostomiasis). Following the draft programme huge campaigns for mass prevention and treatment were launched [25].

The campaigns against schistosomiasis were fought on three fronts, namely (1) against the snail which was the intermediate host of the parasite, (2) against the parasite itself by treatment of the human patient, and lastly (3) a range of preventive measures were adopted which involved improving sanitation and

avoiding contact with cercariae (the free living stage of the parasite which infected man). Early research work had indicated that snails were able to live only in the top few centimeters of soil and were found less often in cultivated fields, especially those which had been double-cropped and deeply ploughed. They were also absent from land flooded by water for more than 8 months of the year [20]. Knowledge of these facts, however, was already possessed by the Japanese and had been the basis of land reclamation projects in both Japan and the Philippines [32-34].

I With this basic knowledge, control programmes were developed which involved first, in the plain regions, digging new irrigation ditches and at the same time filling in old snail-infested waterways, so helping to reduce the snail population. Before the old canals were filled they had their sides scraped and cut away, the sediment being used as a local fertilizer. For example, in one 20-day campaign in Shanghai 5670 km of canals were redug by over 100,000 people, providing some 7.5 million tons of humus which was used as fertilizer for 250,000 mu. of farmland. The snail population was also reduced by some 95% during this operation [20, 31, 35, 36]. Secondly, in the hill regions, irrigated paddy fields were converted temporarily into dry fields and on occasion were treated by applying molluscicides such as those obtained from the local fruit Theo Oleosa and also by burning [20, 24, 30, 37]. Thirdly, in the marshland areas of the lakeland regions in Kiangsi, Hunen and Hupeh drainage of swamps and reclamation of marshland were undertaken and the areas of snail transmission were reduced with the help of deep ploughing [20]. During the winter of 1958 some 30,000 peasants helped to reclaim 20,000 acres during slack periods of agriculture [38]. By 1964 China had reclaimed about 300,000 acres as a result of snail extermination programmes [9].

II The second attack on schistosomiasis, involving treatment, depended upon both traditional and western health strategies. Traditional Chinese drugs, such as those obtained from pumpkin seeds, were given to improve the patient's physiological condition before antimony treatment (the western approach) was applied. Acupuncture, moxibustion and traditional herbal drugs were also important in reducing the undesirable reactions from antimony treatment. Some of the traditional prescriptions were by themselves responsible for a cure rate of up to 50% [25].

Domestic animals, especially draught animals, a major cause of parasitic infection as well as of a loss in agricultural production when infected, were also treated. By 1959 over two and a half million oxen had been treated [39].

Before 1957 schistosomiasis had been treated by tartar emetic courses lasting 20 days, and only 1.14 million people had been treated during the whole period 1949-1957. During 1958 the course of treatment was reduced to three days and in that year about five times the number of people were treated as in the previous eight years [20, 25, 40]. Students and teachers from medical colleges were often involved in these campaigns. For example, in 1958 2000 students and teachers from Shanghai First Medical College, with the aid of 20,000 volunteers, organized a number of campaigns involving the examination of

some 100,000 people and treatment of the cases found. These campaigns were also integrated with snail destruction campaigns and measures taken against other parasitic diseases [41].

III The third method of attack on schistosomiasis, of particular importance in view of its neglect by most other countries suffering from the disease, involved an all-out movement to improve local environmental sanitation [42]. By improving sanitation the parasite could be prevented from reaching the water and hence from being transmitted by the snail. In rural China sanitary measures received particular attention in view of the presence of vast quantities of human and animal excreta, the cheapest and most valuable fertilizer available. Before rural community development was emphasised, Chinese villages often had dilapidated animal shelters and manure pits scattered all over the land. Containers were often flooded by heavy rains, disseminating schistosome eggs far and wide. When the rural campaigns began, public latrines and collective animal shelters were built, and the disposal of human and animal excreta was strictly managed [28, 43, 44]. Statistics compiled during the first nine months of 1958 showed that over 65 million new or rebuilt latrines had come into use during this period. Furthermore, each individual had his own privy, a gaily coloured pot, which could be taken on a boat if he was a fisherman. Every morning the contents would be collected into large communal earthenware containers and stored for the required period [45, 46].

Further preventive measures were taken by peasants working in contact with infected water, especially by those collecting reeds in the lakeland areas. When contact was unavoidable, clothes were impregnated with repellents which helped to protect the worker from infection. Once again local residues of plants were favoured [21, 47]. As the free living parasite usually remained in the upper layers of the water, floating dams were used in an attempt to keep them away from workers cutting reeds, and water for drinking was taken from below one meter from the surface.

All these campaigns depended for their success upon good co-ordination and on educating the masses to appreciate both the reasons for the campaigns and the value of them. The campaigns were also carried out during the slack seasons when manpower could be spared from routine agricultural tasks, generally speaking in February and March, before spring ploughing and during late summer before the harvest. Moreover, with regard to treatment which involved some discomfort and loss of work, the measures taken were calculated to cause the least disruption to family and commune life. Thus if more than one member of the family became infected, treatment was scheduled so as to minimize losses in family income. Patients who worked during the day were treated at night so as to avoid loss of productive labour [9].

Success in controlling schistosomiasis in Yükiang was followed rapidly in other countries. However, during the ensuing years the schistosomiasis campaigns became less prominent due to a number of factors relating to economic development within China. Poor agricultural returns during the Great Leap Forward were made worse by poor weather

during the years 1959–1961. Soviet withdrawal of aid from China in 1960 added to the already desperate developmental situation and as a result there was a swing to the right which emphasised the authority of managers, technocrats, experts and planners [18]. This change in emphasis was also reflected in the health services, which experienced a reversion to emphasis on technical skills and medical experts rather than reliance on mass movements. Health programmes became more capital intensive and laid greater emphasis upon curative treatment, which increased the prestige of doctors and research workers. The health services also became relatively more available in the urban areas [27]. So during the following five or six years preventive work suffered and became of diminished importance. Work on eradicating the snails lapsed, and the emphasis during this period on private agricultural plots to be fertilized by each family's own sewage, sabotaged earlier sanitary attempts at preventing parasitic eggs from reaching the water [8, 48].

In the summer of 1965 the struggle between Mao and the bureaucrats began to come to the surface and on 26 June Mao gave his directive "in health place stress on the countryside" which preceded the onset of the cultural revolution. Experts and scientists once again came under attack. Urban medical personnel joined mobile medical teams; self-reliant medical services at commune level were encouraged, and the further training of medical auxiliaries was undertaken. The training was mainly undertaken by the mobile medical teams from the commune's medical clinical centre which served some 80,000 people. The aim was to train one "barefoot doctor" per production brigade (approx 1500 people), one voluntary sanitary worker per production team (approx 200 people), and one midwife per village. Once again the training was done principally during the agricultural slack seasons and the auxiliaries were trained in both Western and traditional medicine [49].

Amongst other things these medical auxiliaries, attached to the production teams and working from health stations, were responsible for basic preventive measures such as supervising the storage of human excreta for agricultural use, case finding and treating those suffering from schistosomiasis and organizing campaigns against snails and other pests [15]. The degree of decentralization in the prevention of diseases such as schistosomiasis was important as it not only facilitated health education but allowed the control programmes to be adopted more rigorously. There was, for instance, less chance of polluting and contacting infected water if the peasants were aware of the danger. Moreover, there was a much greater chance that case finding and treatment of infected persons would be successful. The system of health care can be compared with, say, Egypt where a great deal of money has been spent on trying to prevent schistosomiasis and yet the gulf between the health workers and the local population has for the large part been so wide that experts believed it to be virtually impossible to discover the extent of schistosomiasis resulting from *S. mansoni* and *S. haematobium* infection and for those who did undergo treatment, as many as 40–50% did not complete the course of treatment [50].

During the Cultural Revolution, mass mobilization again became important. For instance, in Liansheng People's commune during two months in the early part of 1968, more than 1000 members from 46 production teams filled in 2000 mu. of snail infested swamps and so produced some high yielding agricultural land [30].

The campaign against schistosomiasis was undertaken in close conjunction with the development of water resources. Despite the fact that increased irrigation provided potentially more habitats for the snail, which carried the parasite. For example in the mountainous Ningkuo County schistosomiasis, once a major health problem, has practically been wiped out and not a single case of acute infection was reported in the four years following 1971. This success was achieved in conjunction with building six small hydropower stations and converting 1300 ha of land into irrigated fields [51].

CONCLUSIONS

The achievements in controlling schistosomiasis in China have, it appears, been closely dependent upon changes in policy. Of particular importance throughout has been the role of health education and mass campaigns. Conventional measures of showing educative films at large public meetings have been of some importance. For instance, in Anhwei Province in 1964, a film illustrating how schistosomiasis is transmitted was shown to 440,000 peasants in 1100 showings [9]. Educative measures were also reinforced by slogans. Thus improvements in sanitation were made under the slogan of killing five birds with one stone. In other words, the proper management of manure was alone to produce five achievements, i.e. collection of more manure for agricultural use, the elimination of the schistosome parasite, the extermination of flies, the reduction of contagious intestinal diseases, and finally the improvement of rural health conditions [31]. In this way health policy has been closely associated with broader aspects of development policy, especially that relating to agriculture. Simple handbooks illustrating how schistosomiasis is transmitted and techniques for eradicating the disease have also been important in facilitating the organizational work of auxiliary medical workers. One such book, compiled by the Revolutionary Committee of the Shanghai Schistosomiasis Research Institute in 1971, typically used Maoist quotations, such as "Be brave and not afraid of hard work", "united with co-operation", to motivate workers in rural areas to continue their struggle against the disease [52]. Joshua Horn in *Away With All Pests...* refers to the importance of military analogies and slogans in the campaigns against schistosomiasis. Thus the mass line, the concentration of forces against the snail and the Paper Tiger theory play prominent parts in the battle as they had done in guerilla warfare against a seemingly intransigent oppressor [8, 53].

The military nature of the campaigns against schistosomiasis was important, for organization and rigour are features which have been essential to the prevention of the disease and often missing in those countries which have failed to control it. In Jiashan County, for example five antischistosomiasis base areas were established in the first two years of the

battle against the disease. Apart from these base areas specific organizations were also developed at county level under the guidance of the state, at commune level organized by the collective, and at production brigade level organized by the masses themselves. The production brigade was staffed by a political instructor, a group leader who was in charge of the work of treatment, sanitation and snail control, and various auxiliary technical workers who were able to help with the practical work of giving injections, making examinations and organizing faecal control. Furthermore each production team within the production brigade had from one to three antischistosomiasis workers of its own. As a consequence, all peasants within the communes of the county were enlisted to participate in a "war of annihilation". Four massive campaigns, with a labour force equivalent to 98,000 workdays, were organized to eliminate snails. This war of annihilation was followed by "sparrow warfare" which was launched to eliminate sporadic snails. The result of these and other campaigns was to eliminate schistosomiasis in a county which on the eve of liberation in 1949 had an average of 65% incidence of the disease [36].

Motivation for undertaking campaigns against schistosomiasis was often induced by comparing conditions in pre-revolutionary days with those achievements under communist organization. The dramatic was used to emphasize the differences. Thus "Ghost Lake" was used to describe the morbidity and ill health around Kungchou Lake in the Hupei province during the period of the Kuomintang regime, an area later to be drained, cultivated and freed from schistosomiasis [31]. Likewise Shagyanpan village in Yüsan county was referred to as the "village of widows" due to the high morbidity rates of farmers before schistosomiasis control [38]. The success in controlling schistosomiasis in Yükiang played a similar role and in this case was dramatized by Mao's poem and tribute.

The remarkable success in controlling schistosomiasis has been important not only in improving the health of the rural population but also in reinforcing the desirability of the communist organization. Memory of the past reinforced by slogans and poems such as "Farewell to the God of Plague" have therefore played an important part in maintaining the mass participation and rigorous determination which have been characteristics of China's remarkable achievements in fighting disease.

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- achievements in the control of bilharziasis in New China. In *Bilharziasis* (Edited by Wolstenholme G. E. W. and O'Connor M.). Ciba Foundation Symposium, Boston, 1962.
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 26. These clean-up campaigns were also to include turning dumps and stagnant pools into parks and beauty spots, tidying up villages and eradicating various other pests such as cockroaches, snails and fleas. Teh-Chuan L. Ten years of public health work in New China. *Chin. med. J.* 79, 483 1959.
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 29. See Hsin-Chung C. China attempts to eradicate five parasitic diseases. *JPRS* 38, 910, 1959.
 30. Struggle against schistosomiasis—Liansheng People's Commune Quingpu County, Shanghai. *Chin. Med.* 11, 670, 1968.
 31. Wen-Po W. The people's boundless energy during the current leap forward. I. New victories on the antischistosomiasis front. *Chin. med. J.* 77, 110, 1958.
 32. Yokogawa M. Control of schistosomiasis in Japan. In *Proc. Symp. on the Future of Schistosomiasis Control* (Edited by Miller M. J.). Tulane University, New Orleans, Tulane University, New Orleans, U.S.A. 1972.
 33. Okabe K. Schistosomiasis in Japan. *J. Parasit.* 43, (Suppl. 30), 1957.
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 35. Between 1957 and 1959, in Yükiang 130 km of canals were filled up, 676 km of new canals dug, 363 ponds filled up and the cultivated areas expanded by 532 mu. (90 acres). See The first county to wipe out schistosomiasis. *Chin. Recon.* 17, 12, 1968.
 36. Similar campaigns were undertaken in Jiashan County, see Revolutionary leading group of Jiashan County anti-epidemic station, Jaishan Chekiang, As Chairman Mao directs, we follow—how schistosomiasis in Jiashan County was wiped out by "people's war". *Chin. Med.* 10, 607, 1968.
 37. China has not relied upon synthetic pesticides as have most less developed countries but have made use of local residues of *Thea oleosa* and *Rhododendron molle* that have molluscicidal properties. They have also tried using industrial wastes such as discarded calcium carbonate which again has some molluscicidal properties when mixed with quick lime. Nevertheless, sodium pentachlorophenate, a commonly used molluscicide in other countries was used on occasion in the 1960s.
 38. Wen-Po W. Battle against schistosomiasis. *Chin. med. J.* 80, 299, 1960.
 39. Sung-Ts'e L. and Hsien L. A survey of short-course antimony tartrate therapy for schistosomiasis japonica in China. *Chin. med. J.* 82, 46, 1963.
 40. Between January and October 1958, over 2,800,000 patients were treated with antimony therapy with about 85% success. During the period 1956-1958, over 134,000 schistosomiasis patients were cured by traditional Chinese medicine. Studies on Schistosomiasis japonica in New China. *Chin. med. J.* 78, 368, 1959.
 41. Fu-Ching Y. Medical training today. *Chin. Recon.* 8, 30, 1959.
 42. Neglect of sanitary methods by other countries was reflected in an International Symposium at Tulane University in 1972 when a review of current projects aimed at controlling schistosomiasis in 15 countries revealed that in 22 projects molluscicides were used; in 15 chemotherapy was used; in 10 engineering methods were used to control snails; but in only 10 projects were sanitary and health education policies applied. See *Proc. Symp. on the Future of Schistosomiasis Control* (Edited by Miller J. M.). Tulane University, New Orleans, U.S.A., 1972.
 43. It was found that schistosome eggs could be killed by the production of ammonia which resulted from storing faeces mixed with urine. This storage was also important in controlling other parasitic and gastrointestinal infectious diseases.
 44. The link between environmental sanitation and agriculture has been particularly strong in China as both sewage and industrial waste from cities such as Chachow, Peking and Tientsin, have been treated and then pumped out into the rural areas to irrigate the land. See Hsien-Chen W. Sewage as a source of production increases. *Chin. Recon.* 14, 24, 1965.
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 47. Dibutyl phthalate and benzylbenzoate were used but *Camellia oleosa* (*Thea oleosa*) and pure oil were favourite agents for impregnating clothes.
 48. It is interesting to note that during this period the *Chinese Medical Journal* stopped printing articles with a political and policy slant and adopted the more conventional approach of leading international medical journals of discussing principally scientific and technical research work.
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 50. Ayad N. The role of molluscicides in combating bilharziasis. In *Bilharziasis* (Edited by Wolstenholme G. E. W. and O'Connor M.). Ciba Foundation Symposium, Boston, 1962.
 51. Double victory in battle to wipe out schistosomiasis. *Chin. Recon.* 24, 38, 1975.
 52. Fun-zhi schistosomiasis shou chai (prevention and control of schistosomiasis handbook) reviewed in *Science*, 179, 1118, 1973.
 53. Propaganda of a military nature was often used to inspire the peasants to fight the disease unremittingly. In both treatment and snail eradication the strategy was likened to military concentration of forces against an enemy. The principle of this approach dictated that "in every battle, concentrate an absolutely superior force, encircle the enemy forces completely, strive to wipe them out thoroughly and do not let any escape from the net". Quoted from "The present situation and our tasks", 25 December 1947; *Selected Military Writings* (2nd ed.), 349-350. In a similar way the masses were urged to wipe out every snail in the locality and treat every single person suffering from the disease without exception. By doing this, the problem of combating what had seen to be a seemingly invincible enemy (as schistosomiasis has been regarded in most affected less developed countries) was reduced to a simple matter of massing the people against it.