

Disease and a Way of Life

By J. TEAGUE SELF

Just preceding the turn of this century, Sir Ronald Ross, a British scientist, sailing along the Italian coast looked out over the swamp lands with their pitiable inhabitants scourged by poverty and disease, and commented that in a few years these people should be free of the malaria which had plagued them for centuries. A short time before making this comment, Ross, in August, 1897, had recognized the malaria parasite in mosquitoes, thus confirming his belief that they played a part in its transmission. The night after this momentous observation, Ronald Ross penned these words in his poem titled, "In Exile."

*This day relenting God
Hath placed within my hand
A wondrous thing; And God
Be praised. At his command,
Seeking his secret deeds
With tears and toiling breath,
I find thy cunning seeds,
Oh million-murdering death."*

The scientist-poet not only was elated over finding the secret of transmission of this, the world's number one killer, but he foresaw man's freedom from suffering from this and other diseases which might be transmitted in a similar manner. Ironically enough at the time Sir Ronald Ross made his statement concerning malaria among the Italian people, he was having difficulty as a medical officer in India where the discovery was made, because his superiors felt embarrassed by such wild speculations of a colleague. He seemed rather unperturbed by this action and undoubtedly felt that truth in his discovery would be verified, and that man would take sufficient action to destroy the mosquitoes which transmitted malaria and hence eradicate the disease. What he perhaps did not fully appreciate was that malaria is a disease which goes hand in hand with certain living conditions of human populations, and to control it these conditions must also be changed. These conditions include poverty and all of its consequences, such as malnutrition, poor medical care, poor housing, and above all, subjugation to a mental state of hopelessness.

The name malaria was invented by the

Italians to designate a disease which they believed to be caused by the damp night air or "bad air" characteristic of swamp lands. Little did they realize that the air which gave the disease its name had nothing to do with the ailment and that those damp squalid places which they believed to produce the "bad air" had an entirely different relation to malaria. Neither was it understood that living in the swamp lands had any relation to the low socio-economic order of the people and that they were unable because of economy, education, disease, and other causes to better their own conditions under their own power.

During the early colonization of America, malaria was a disease of distressing importance among the colonists throughout the eastern seaboard and the Mississippi Valley as far north as southern Canada. The colonists also believed that the disease was caused by "bad air." We have good evidence of this in the old antebellum homes of the South which were built on the highest points possible away from the lowlands. As agriculture developed in the Mississippi Valley, lands were drained of mosquito-producing waters, and better screened housing units were built on higher grounds away from mosquito breeding places. Because of these practices the disease itself receded southward, until in the middle 1930's it appeared primarily in the lower Mississippi Valley and Gulf Coast states. The gradual disappearance of this disease was not so much due to any effective effort of the people themselves directed towards its control, but was rather a consequence of a change in their own living status.

Since endemic malaria has practically disappeared as a disease in America during the past ten years, it has been assumed by some that it was eliminated from this country as a result of the application of new and powerful insecticides, such as D.D.T. Let us, however, consider the conditions under which native malaria made its exit from the United States of America. The recession in the incidence of the disease antedated by many years the intro-

duction of D.D.T. and other modern control measures. It receded at a time when the social and economic conditions of the people of the Southern states were improving steadily and materially, and made its exit at a time when these people were more prosperous than at any time since the Civil War.

The work of such agencies as the Tennessee Valley Authority in its vast and important malaria control program and the D.D.T. residual spray programs during and immediately after World War II, sponsored by the United States Public Health Service in co-operation with State and County Health Departments, perhaps constituted the final blow to this dreaded parasite in America. We must keep in mind, however, that this was accompanied by generally improved living conditions throughout the endemic areas of America and did not involve total destruction of malaria mosquitoes.

In contrast to the American situation it is pointed out that during the past several years a concerted attempt has been made to eradicate malaria mosquitoes from the island of Sardinia as a means of controlling the disease. A whole army of workers was employed in this intensive project, and yet the mosquitoes still occur on the island in spite of all these efforts. One wonders if such a program can be permanently successful without something being done to raise the living standards of the people involved.

The purpose of this paper, therefore, is to point out that, with many diseases, treatment, artificial control measures, and the like are of little or no avail in the absence of understanding by those responsible, and in the absence of improvement in the living conditions of the people.

Soon after the implication of mosquitoes in the transmission of malaria was made by Sir Ronald Ross, Walter Reed and his co-workers demonstrated that mosquitoes transmit yellow fever, and the work of eradicating this disease in the Western Hemisphere got under way. The eradication of the mosquito vector of yellow fever was simple as compared to that for malaria-

bearing mosquitoes in America because the yellow fever mosquito is a domesticated insect which breeds in flower pots, tin cans, rain barrels, and other containers, around human habitations. Hence the problem of controlling it is simple as compared to that of controlling most malaria mosquitoes which breed primarily in the wild. One of the major results was its effective control in the Panama Canal Zone, thus making the construction of the canal possible.

The job of clearing the Panama Canal Zone of yellow fever was in the hands of two of the world's greatest sanitarians, General W. C. Gorgas and his co-worker, Mr. Joseph A. LePrince. Mr. LePrince has written of his fear of a return of the disease after it was cleared out because "he knew that women's hair looked better and kept looking better when washed in rainwater." I heard him say recently that he had to slip in and pour oil in General Gorgas' rain barrel to prevent the development of yellow fever bearing mosquitoes. Even at the present time the yellow fever mosquito finds the holy water fountains in Latin American countries an excellent place to multiply, and, in such places as the highly cultured city of New Orleans, it manages to survive the winters by breeding in flower pots inside houses.

General Gorgas had his troubles also. In 1905 the Panama Canal Commission, supported by the Secretary of War, recommended to President Theodore Roosevelt that "Gorgas should be dismissed and replaced by a man with more practical ideas." One cannot always obtain understanding and proper action even among the higher echelons of society.

So it is, and has been, that ignorance, combined with superstition and low socioeconomic living standards, along with unwieldy social customs, have played a major role in the perpetuation of some of man's most important diseases.

About 150 years B. C., Agatharchides of Cnidus penned the following statement: "That the people taken ill on the Red Sea

suffered from many strange and unheard of attacks, amongst others, worms upon them, which gnawed away the legs and arms, and when touched retracted themselves up in the muscles and there gave rise to the most unsupportable pains." The worm referred to by Agatharchides is the guinea worm which only recently was estimated to infect some 27 million people in western and southern Asia and in Africa. It is thought by many that the Biblical passages in the Book of Numbers 21: 6-9, referring to the fiery serpent which Moses held up in the wilderness, actually is concerned with the parasite referred to by Agatharchides rather than real serpents. Be that as it may, the disease caused by this organism has plagued the people of Asia and North Africa for centuries, and today is as common as it was in the beginning of our recorded history. Yet, a slight change in the habits of these people could effectively control the parasite. The worm, about the size of a lead pencil and up to two feet in length, lives under the skin in the arms and legs of man and makes contact with the outside through a lesion or opening. Eggs are released into the water when it comes in contact with the infected skin. If the eggs are consumed by certain small aquatic organisms which inhabit the water, they hatch and live in the organisms as parasites. Man gains his infection when the aquatic organism in which the parasite lives is swallowed in drinking water. In the Near East, where the disease is so common, it is associated almost entirely with the "step-wells" in these highly arid areas from which drinking water is obtained. It is customary to wade into the well to dip up drinking water to be carried away in crocks for human use. The substitution of a windlass or pump for this method of obtaining water, or simply sterilizing the water, would free man of this parasite so common to the population of that area of the world.

A more striking story perhaps is the one concerned with the so-called Chinese liver fluke. This is a small worm about one-

quarter of an inch in length which causes a disease of the liver, fatal to man. The worm is estimated to infect some 190 millions of people in far eastern Asia and the Pacific Islands. The survival of the disease is dependent primarily upon a single food habit of man, namely, that of the consumption of steamed fish on rice, a delicacy among all classes. The particular manner by which the dish is prepared involves insufficient cooking to kill the parasites. The fish for this ritual are grown in ponds, and since the ponds will not themselves support the fish population, the fish must be fed. Because of the low economic status of the people, the only fish food available is human waste. As a result of this feeding of human excrement to the fish, man passes the infection on to them, and then when the fish are consumed, the disease is passed back to man. The low living standard of the people, along with a set and inflexible method of eating the fish, is responsible for the parasites maintaining themselves in this large segment of the population of far Eastern peoples.

Over one hundred million people of the world are afflicted with the often fatal blood disease known as schistosomiasis. This disease is caused by a worm parasite which invades the human body through the skin and lives in the blood stream around the lower bowel. As the parasites mature, their eggs escape through the tissues and leave the body with the excrement. To survive, the eggs must be deposited in water. When they hatch, the young, immature individuals invade snails and spend a part of their life in these animals. The parasites eventually escape from the snails into the water and invade the human skin when they come in contact with it. It is obvious, therefore, that the one hundred million people who suffer from this disease do so purely because of poor sanitation. Avoiding the water contaminated by human waste would in large part control the affliction.

It seems as if this would be a simple problem to solve. Let us again, however, relate this problem to conditions of human life. Take for example, the Nile Valley where some 80 per cent of the agricultural population suffers from the disease. In the first place, the land of the Nile Valley must be irrigated and the farmers must work in the water thus making it possible for the disease-causing organism to come in contact with and enter the human body through the skin. The low economic status of the people renders the wearing of protective clothing impossible. The low social and educational status of the people causes them to be ignorant and almost completely uninformed on the method by which the

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disease gains admission to the human body. The necessity for the fertilization of crops and the absence of any type of fertilizer except human waste makes the use of human night soil a necessity. Therefore, the people who are afflicted with the disease are totally subjugated to the simple conditions which are necessary for its existence.

The disease, common from Japan south through the Asiatic countries, the Pacific Islands, and Africa was introduced into the Western Hemisphere during slave trading days and now is common in the Caribbean Islands and certain areas of South America. In all areas where the disease occurs, its survival is associated with ignorance and subjugation of people to specific types of social and economic factors. While these factors are simple, they cause at the same time insurmountable complications so far as the infected people are concerned since these people are unable by their own power to overcome the conditions of their lives.

Recently an eminent authority on world health estimated that some 450 millions of the world's human population are afflicted with the commonly known hookworm. Here again is a disease which would have no chance of survival except for ignorance of its cause and social and economic conditions which favor it. Hookworms enter the body through the skin. When the eggs hatch into young, these enter the skin when it is exposed directly to contaminated soil. Control would be a simple matter of avoiding the pollution of soil with human wastes. No one would knowingly and wilfully subject his skin to such exposure if the results were understood. A number of years ago a graduate of the University of Oklahoma was assigned to a civilian conservation camp in a neighboring state. The principal project of the camp was to construct sanitary toilets in an area of high hookworm incidence. To those who operated this program the problem seemed simple. They merely had to construct these toilets for people who were unable financially to do so themselves and help stop the contamination of soil. The project was completed, and after some weeks the former University student was sent back to the area to determine the effectiveness of the program. Much to his amazement, he found that the toilets were being used only by the women, and he aroused no small amount of consternation by suggesting that they be used by both men and women. It was explained to him that under no conditions did women and men use the same toilets. This is an example of how a deep-rooted custom may cause and even increase some of our most widespread diseases.

In many areas of the world, hookworm disease is inseparable from occupational practices. Such is the case among the miners in continental Europe where no sanitary facilities are provided in the mines. This is also true in the coffee groves of Latin America where the coffee bean pickers and their families live by day in the groves which are ideal for the development of hookworm in the soil, and where no sanitary facilities exist. In a large segment of the afflicted populations, however, ignorance is solely responsible for the perpetuation of the disease. It has been shown that hookworm can be effectively controlled largely by educational measures. This has been demonstrated in our Southern states during the past twenty years. The state departments of health, aided by the Rockefeller Foundation, have reduced the incidence of the disease to a relatively low occurrence, merely by educating the common people on how the disease is acquired. In hookworm and in the other diseases which have been discussed so far, there is little question but that a proper educational program would be one of the most effective measures of control.

It might be generally assumed from what I have said, that the types of diseases of which I speak must occur only among the ignorant and the poor. This is not true. Everyone is familiar with the word tapeworm. One, known as the fish tapeworm, afflicts an estimated ten million people in the Scandinavian countries of Europe and the northern Great Lakes region of the United States and Canada. These people are recognized as being among the most highly cultured and educated in the world. They get the tapeworm by eating improperly cooked fish which harbor it. The fish get the infection from water contaminated with sewage. Two simple precautions would effectively control the disease in man. One would be the proper disposal of sewage, and the other would be simply not to eat certain types of fish until they are properly cooked. Most of the people, it so happens, who are afflicted by this tapeworm relish improperly cooked fish, and they insist on having their fish incompletely cooked regardless of the possibility of tapeworm infection. This is comparable to the insistence of the author on having his steak rare in spite of the fact that he might get a beef tapeworm by the same method. In view of the above, we can understand why the poor, illiterate Chinese consumes contaminated fish in his festivals. He has little control over the method by which the fish becomes infected, and he is not sufficiently educated to know how to change his own eating practices. From the elite of the world's population, how-

ever, one would expect that a slight change to improve the conditions of health of the people would be easy, but man is not so prone to change his own eating habits when it involves his own desires.

Let us take another disease which is no respecter of persons. This is amoebic dysentery which occurs throughout the world's populations. Infection by this disease again is due solely to pollution of food and drink by human excrement. That it should therefore be common in tropical countries where there is little cooking of food, where sanitary facilities are nonexistent, or poor at the best, and where climatic conditions are ideal for the survival of the causative organism, is not surprising. But it may surprise the reader to know that in Oklahoma and other states of these United States of America the incidence of this organism runs more than 5 per cent. In this State the transmission is in certain cases a result of the contamination of food by sewage, but often it also involves the defiling of food and drink by food handlers who practice poor personal hygiene. This is particularly true of the carrier who prepares such dishes as green salads. In a large metropolitan area in Oklahoma it has recently been demonstrated that 19 per cent of the food handlers in school cafeterias are carriers for this organism. We have no public health facility for enforcing the treatment of these people or of prohibiting their handling the food consumed by our children. We should be appalled but not astonished, therefore, that from 5 to 10 per cent of the general population is infected by the organism. This is not entirely a case of ignorance or social and economic necessity, but rather one of unconcern and disregard on the part of the general population. Such is not an exception even among the educated.

One disease which should make us Americans blush is that known as trichinosis caused by the trichina worm. The trichina worm is a parasite which invades the muscles, and in heavy infections is highly fatal. It lives in man, hogs, rats, and many other animals; and the disease is acquired by eating meat containing the microscopic living parasites. Our present information indicates that within a lifetime, one in six Americans is parasitized by the organism. Hogs get the disease by feeding on pork scraps containing the parasites. Unfortunately, human beings are as susceptible to the organism as hogs. We get the disease almost entirely from pork which has not been sufficiently cooked to kill the parasites. In a typical American way, the husband and wife, both of whom are employed or engaged in some other activity, stop on the way home in the after-

noon, buy some pork chops, rush home, treat them lightly to a hot skillet, and then eat them with some canned French fries and frozen peas—all of this being prepared and downed in a matter of minutes, so each can meet an early evening appointment. As we all know, it tastes fine, but unfortunately the pork is not cooked well enough in this manner to kill the parasites. Since the pork becomes infected in the first place by feeding hogs raw garbage containing poorly cooked pork scraps, the disease is perpetuated in both human beings and hogs by this method of cooking.

The practice of feeding raw garbage to hogs is not only a universal practice in the United States, but in many large cities is looked upon as the most satisfactory method of garbage disposal. Hence, the incidence of trichinosis is higher among Americans, with the highest standard of living in the world, than in most other nations. The incidence and severity of the disease among Americans differs from that in other nations by virtue of the method by which pork is dispensed. The American custom is to buy pork at the butcher shop rather than for one family to kill and consume an entire animal. As a result of this, any infected animal is parceled out over the counter in small bits to many families; hence the intensity of infection seldom becomes great in any one individual, but the rate in the population is increased. If it were our custom to butcher animals and consume them within a family, we would have many more acute cases of the disease, such as occur, for example, in certain European countries. Again, therefore, the perpetuation of the disease is dependent upon a particular custom, and the fact that we as Americans are usually not acutely infected is also the result of a peculiar custom.

Much has been said and is being said about the relationship of man's comfort to his education and the general socio-economic standards. In this brief article I have attempted to give examples of diseases which affect continuously large segments of the world's population and which are responsible for a tremendous amount of morbidity as well as mortality. They are also directly related to the social customs and economic status of peoples. Even highly civilized countries, such as the United States of America, and in highly prosperous areas, such as Oklahoma, we have examples of debilitating diseases which owe their existence almost entirely to carelessness, ignorance, and deep seated customs. Only recently I was engaged in a campaign to have all of the Boy Scouts in my area immunized against tetanus before they went to their summer camps. In one instance, two boys, the sons of highly

educated people who were community leaders, were not allowed by their parents to take these immunizations. The explanation was that they saw no reason for these immunizations since the boys did not have tetanus. This illustrates the fact that among the highly educated there may be considerable ignorance.

As one who is interested in the well-being of the human race, particularly from the standpoint of infectious diseases, I am strongly convinced that the solution to the control and eventual eradication of many diseases, including those which I have mentioned in this article, as well as many others, can be accomplished only on the basis of better knowledge of health through education, and improved socio-economic conditions under which people live. It is unfortunate, therefore, that more attention is not given to the relationships between the general well-being of the population and the knowledge which is extant concerning its debilitating infirmities.

The world is now experiencing a complete new era in transportation. Within a few hours we can move from any one point on the earth's surface to almost any other point. This brings up an entirely new health problem wherever you happen to be on the earth's surface. Now, we as Americans can not think only in terms of controlling the diseases to which we have been accustomed in the past, but must think in terms of controlling diseases wherever they occur because distance is no longer an effective barrier. This is illustrated vividly by an occurrence in the early 1930's in the region of Natal, Brazil. A French mail plane flying from Africa to Brazil transported one of the world's most important malaria transmitting mosquitoes from Africa to Brazil. This new and more efficient vector was responsible for one of the most devastating malaria epidemics that the Americas have ever known. Luckily, through the efforts of the Rockefeller Foundation and the Brazilian government, this mosquito was eradicated before it reached limits beyond control. This illustrates, however, the fact that a new and more efficient tool, which is now at our hands, can very well result in catastrophic consequences. Man must never forget the relationships between his infirmities and his way of life.

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eration is glaringly vitiated by political expediency. Far be it from me to underrate the importance of military and economic factors. Yet their overemphasis tends to falsify the real issues. The impact of tradition—the impatient and exasperated may

call it fossilized history—is such that no hastily improvised, exclusively organizational pattern can prevail if it be not integrated into the predominant organic structures.

The exasperating fellow, the European intellectual, is a key figure in our relationship with foreign countries. I think I was only frank in more than merely hinting that the intelligentsia in many of the countries I visited are either out of touch or often out of sympathy with this country. While such an attitude is fully to be expected from Communist writers, it also is found in a host of non-Communist and even definitely anti-Communist authors. We of *Books Abroad* are modestly convinced that we are going in the right direction in keeping Americans informed on the mentality and aspirations of foreign countries by disseminating pertinent literary information. But another and equally important step would be to provide European intellectuals and especially European writers with a chance of knowing us better. This could best be done in this country, by an arrangement which would allow these foreigners, as our guests, truly to share our living conditions, both our work and our play, our certitudes and our doubts. Such an arrangement, I am sure, would signally contribute toward dispelling many of the vicious and harmful prejudices and misunderstandings prevalent in Europe about our true intentions and our true nature. I am sure that quite recently by the impact of certain visa refusals under the provisions of the McCarran Act, there has been the growing suspicion in Europe of anti-intellectual bias in this country and of discrimination against writers. This reporter on more than one occasion heard the international goodwill character of his trip and its planned literary survey challenged with the statement that "we did not even let European writers enter the States." As there are instances in which a literal application of the Act has alienated, disturbed, and upset genuine friends and political allies; and as, moreover, the better-known European writers greatly influence political opinion and attitude, this situation must be viewed with serious concern. Many of the current prejudices and misunderstandings regarding this country stem from unfamiliarity with the American scene and spiritual climate, rather than from the insinuations of a hostile and often diabolically clever propaganda. Moreover, because a certain provincial, traditionalistic, and nationalistic outlook of some European writers, especially in the economically underprivileged countries, could easily be corrected by giving them the opportunity of acquiring a broadened universal outlook, I feel very strongly that