WORLD HEALTH

9 November 1959

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Publication No. L60-68

INDUSTRIAL COLLEGE OF THE ARMED FORCES

Washington, D.C.

Dr. John D. Porterfield, Deputy Surgeon General of the U.S. Public Health Service, was born in Chicago, Illinois, on 10 August 1912 and is the fifth generation of physicians in the Porterfield family. He is a graduate of Notre Dame University, Rush Medical College of the University of Chicago, and Johns Hopkins University School of Hygiene and Public Health. He has been an officer of the Commissioned Corps of the Public Health Service since June, 1939. He was assigned to the National Institutes of Health in 1946, and in the following year he was granted leave of absence to become Director of the Ohio Department of Health. He left that post to become Director of the Ohio Department of Mental Hygiene and Correction in 1954. He has served on the faculties of the Ohio State University College of Medicine, the University of Michigan School of Public Health, and the Cincinnati College of Medicine. In October, 1956, he was recalled to active duty in the Health Service as Assistant to the Surgeon General for program planning, development, and evaluation. He was promoted to the rank of Assistant Surgeon General on 5 March 1957. He became Deputy Surgeon General on 30 September 1957. This is Dr. Porterfield's first lecture at the Industrial College.

WORLD HEALTH

9 November 1959

GENERAL HOUSEMAN: We are still on the subject of natural resources, and this morning we are taking up specifically the subject of "World Health." But we are going to talk about a more subtle aspect of the subject as we discuss health as related to national, political, and economic development.

This morning we have a speaker who has been connected with public health in one form or another most of his life. He is a fifth-generation doctor in his own family, and has been connected actively with the Public Health Service for some time.

I would like to introduce this morning Dr. J. D. Porterfield, Deputy Surgeon General of the Public Health Service. Dr. Porterfield.

DR. PORTERFIELD: Thank you, General. I explained before I came in here that I feel a little bit like a disorganized John Kiernan. I have an awful lot of facts at my disposal but the problem of organizing them has created some difficulty. Just as you think you have them in some order, things change on you. We have recently had great changes in some of our international health activities and postures--this in connection with our negotiations with the Russians, particularly upon their visit in this country. We found, in attempting to talk with them, both in formal sessions and during the personal visits of such people as Dr. Markov, Mr. Khrushchev's personal physician, that we sometimes had to think pretty fast on our feet to keep up with them. They are very alert people.

The problem of the effects which health standards have on national strength and economic and political development are extremely vast and, for some strange reason, have never been recognized in their full import by the economists and planners--or at least so it seems to us.

In most of the economic textbooks you will find the health aspects of a country's development relegated to a footnote rather than treated as a direct weapon in the process of developing a country, to make it self-sustaining, and to give it a higher level of living. This is strange, because there are so many effects which can be achieved by an improvement in health in a country. The most obvious one, and the one which people most notice, is a change in the population. As a matter of fact, a

considerable number of scientific bodies in the world today have concerned themselves mightily with the so-called population explosion which is occurring in certain areas of the world.

For example, in Ceylon the death rate was cut almost in half in a matter of a couple of years by the introduction of an islandwide campaign to eradicate malaria. With the birth rate remaining constant, the population of that island has rapidly increased.

However, the effects go far beyond increase of population. Most of the deaths that are preventable in underdeveloped countries occur in the younger age groups. This means that the economy of the country is supporting a considerable number of people in their preproductive years who die young and do not, therefore, return to the economy of the country what it has cost to bear and raise them to the time of their death. The change in the age distribution within a given population is therefore very important, at least as it brings the nonproducers up to and through the producing stage of their life.

In addition to that, those who are in the producing age groups can do a considerably better job if they are healthy than if they are not. To strengthen the hand that holds the plow is probably just as big a technological advance as to change the plow for a tractor.

The problem of mañana could probably be translated in many countries into the word anemia. The interest of people in developing something for their future depends to a considerable, if intangible, extent on how much they expect a future. Many of our efforts in foreign countries to provide technical aid and assistance in self-help in improving the population of the country do not get very far. We get pretty bitter and cynical about it, and say, "Well, these people just can't bring themselves to be serious and to plan for the future," without realizing that from birth they just haven't had much incentive to worry about the future, because they have neither the assurance of life nor the health to make a future appear meaningful.

All of this adds up to the fact that the healthy mind and the strong body are pretty basic to any effective type of community function, however you define a community. There are real costs in ill health, in maintaining a child who dies before reaching a productive, adult life, as I have mentioned, in the cost of feeding parasites instead of people, and in the cost of supporting those people in the productive age groups who are not productive or whose efficiency has been reduced because of ill health.

Economic problems, including population explosions resulting from death rates lowered by health measures, will continue to exist in underdeveloped areas. But these problems can certainly best be met by healthy people rather than those hampered by the heavy burden of illness. Even the problems arising from a population explosion are amenable to solution in a healthy nation--as indicated by what is now happening in Japan. But economic problems are most unlikely to be solved by a disease-ridden people. 1/

We have a number of examples of the immediate economic and developmental strengths of health programs. Most of these examples are best chosen from the communicable disease field, and particularly from the control of malaria, because here control is fast, the effects are fairly immediate, and the disease which is controlled is quite severe.

One of the examples is Ceylon and the change in the death and sickness rates there. Because people have not been able to go into certain severe malaria areas, the development of the malaria control campaign in the island of Ceylon has resulted in adding a most productive area of that island to the total now habitable and workable.

In Indonesia, in one region, the increased annual rice production is worth 25 times the annual cost of the malaria control campaign.

In an area of Afghanistan, factory production doubled in the five-year period as the workers were freed from malaria.

In northern Thailand, the economic gains in one year were three times what it cost for a 10-year malaria eradication program.

One more comment. To the degree that we are concerned about our race with the U.S.S.R., it is clear that they are seriously set on competing with us in providing health in the underdeveloped areas. This reflects their belief in the strength, the economic and political values of health as a commodity. As I said before, one of the propositions--I think it was reported in the public press--which the Russian party made to the U.S. Government when they were here, was that the

1/ A penetrating commentary on the relation between the nation's health and its economy is attached as Appendix A--Public Health and Economic Development, by Dr. E. Ross Jenney.

United States and Russia form bilateral terms, bypassing WHO or any kind of multilateral approach, to move into underdeveloped and sickness-ridden countries and take care of them.

Let's look at the world today with respect to this disease picture. The distribution of disease in the world today has been defined by one author as occurring in four general belts. The first, the north temperate belt, covers the United States and the countries which lie about on the same parallels as the United States. In this zone we have mostly the chronic diseases--cancer, heart disease, arthritis, glaucoma, and things like that. In the tropical zone, which lies on either side of the Equator, we have such things as malaria, amoebiasis, dysentery, hookworm, yaws, and leprosy as the principal disease problems.

There is an interstitial zone that lies between the temperate and the tropical zones, and this zone is blessed with a little bit of the diseases of both of the other zones, and adds to them a few specialties of its own, particularly the contagious skin and eye diesases, specifically trachoma.

In the fourth zone, which affects particularly southern Africa and South America, they have typhoid fever, influenza, syphilis, and certain worm parasitic infections. This is not to say that these diseases are not found elsewhere, but this seems to be the place where they are presently concentrated.

Perhaps the largest disease problem in our world, at least in numbers of cases, is malaria. Malaria is a chronic debilitating disease, transmitted by the Anopheles mosquito. It is estimated that at least 250 million people annually suffer clinical attacks of malaria and that each year perhaps 2.5 million people die from this disease. Though often a direct cause of infant mortality and an indirect cause of deaths of all ages because it lowers resistance to other infections, the greatest impact of malaria on population lies in its debilitating effects. Malaria affects the birth rate, too, as well as holding down the level of life expectancy, by limiting the number of conceptions and by producing abortion and stillbirth. For those patients who do survive a clinical attack, it is a continuing drain on physical energy and may result in mental retardation in many cases.

In those countries where malaria is highly prevalent, it is unquestionably a major factor in retarding economic development and productivity of the nation.

Nearly half the population of the world, well over 1 billion people, live in areas exposed to malaria. Recent campaigns for malaria eradication and control in the world, led by the World Health Organization, have protected some 466 million people, 17 percent of the total world population, but there remain 700 million people, better than a quarter of the world's population, who have no real protection either in being or even presently planned against this disease.

Chart 1, page 7.--In this chart you will see those areas of the world which are particularly affected by this problem.

It is prevalent in certain countries of the Western Hemisphere, about 15 degrees to either side of the Equator, in Asia south of 40 degrees north latitude, in Indonesia, in the southwest Pacific, and in Africa. It is also endemic, if not epidemic, in Mexico, Central America, and the Caribbean area, in Portugal and Spain, in the Balkans, and in a large segment of southeast Russia, below the 60th parallel.

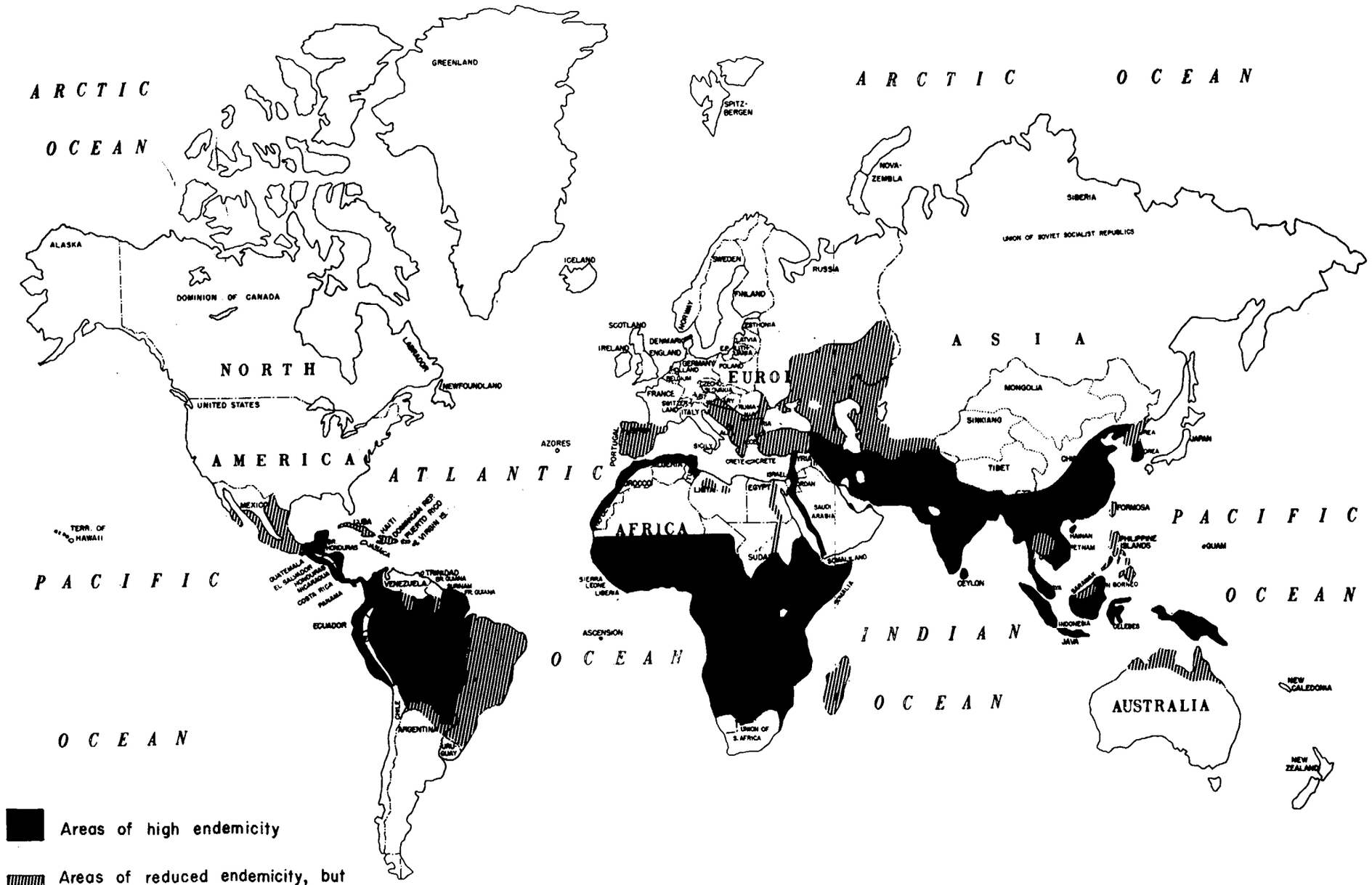
Both malaria morbidity and mortality have declined tremendously. The disease has been completely eradicated, in formerly malarious parts of Brazil, British and French Guiana, Chile, Cyprus, Greece, Italy, Mauritius, Venezuela, Yugoslavia, and, of course, the United States.

In wide areas of Bombay and the Mysore States in India, and throughout Ceylon, transmission has been almost completely interrupted by modern control methods.

Despite these fairly impressive quantitative results which have been realized by control programs, malaria still must be considered as one of the most acute, if not the worst, of the important health problems in the world today.

The method of control is to reduce the rate of disease transmission between man and mosquito sufficiently so that the malaria parasites die off. This is accomplished mainly through spraying the walls and ceilings of habitations with insecticides whose mosquito-killing properties remain active for a considerable time. Mosquitoes are killed before they can transmit disease. Problems in this kind of eradication program are: (1) development of resistance to insecticides by the mosquito, (2) competent spray techniques, and (3) variations in the behavior pattern of the mosquito.

DISTRIBUTION OF MALARIA



Source: Adapted from "Malaria-A World Problem" by Pampana and Russell, WHO 1955
WHO Publications
ICA unpublished data

Chart 2, page 10.--The second disease which I would like to mention is called onchocerciasis or blinding filariasis. This is caused by a small worm whose embryos, whose premature forms, live in the body and tend to migrate around the body. When they migrate to the eye they block the blood vessels of the eye and impair the vision, and usually end up by causing total blindness.

The disease is transmitted by a gnat which breeds in rapidly flowing streams. This has given the disease the name "river blindness," because it affects particularly those populations which live along these rapidly flowing streams. It affects nearly 20 million people in Africa, Central and South America, and in certain areas 80 to 100 percent of the total population of the area will be infected. In Central America the disease occurs on the Pacific slopes of three states in Guatemala and two in Mexico. In South America it is localized in the north central portion of Venezuela. In Africa onchocerciasis extends from Sierra Leone and Liberia southward through Ghana, Nigeria, and the Cameroons to the Belgian Congo, and then it turns east across central Africa to Uganda, Kenya, Nyasaland, and Tanganyika. It also goes up through the Sudan into western Ethiopia.

Through the use of new drugs and mass community campaigns, considerable progress has been made in the control of this disease, and surgery has helped reduce its damaging effects, although surgery, handling one patient at a time in a fairly involved and sensitive operation, is certainly not the mass answer. Insecticide campaigns to exterminate the gnats have been initiated in Kenya and in other parts of Africa, and appear to be hopeful of some success.

Chart 3, page 11.--The third disease is African sleeping sickness, trypanosomiasis. It is prevalent in most of Africa south of the Sahara, except in the very southernmost part of the Union of South Africa. It is a particularly virulent disease. It is transmitted by the tsetse fly. It also affects animals, particularly cattle. This results not only in direct disease injury to the population but in reduction of a most important element of the food supply. This disease is a great barrier to African economic progress.

Large segments of the population have tended to migrate to areas relatively free of the fly. This has served to overcrowd these areas, which already have a low per capita agricultural yield. In fly infested areas, not only have the populations lost animal protein in their diet; they have lost the service of draft animals for work and the fertilizer needed to cultivate the fields. Each of these is an essential item on the economy.

CHART 2

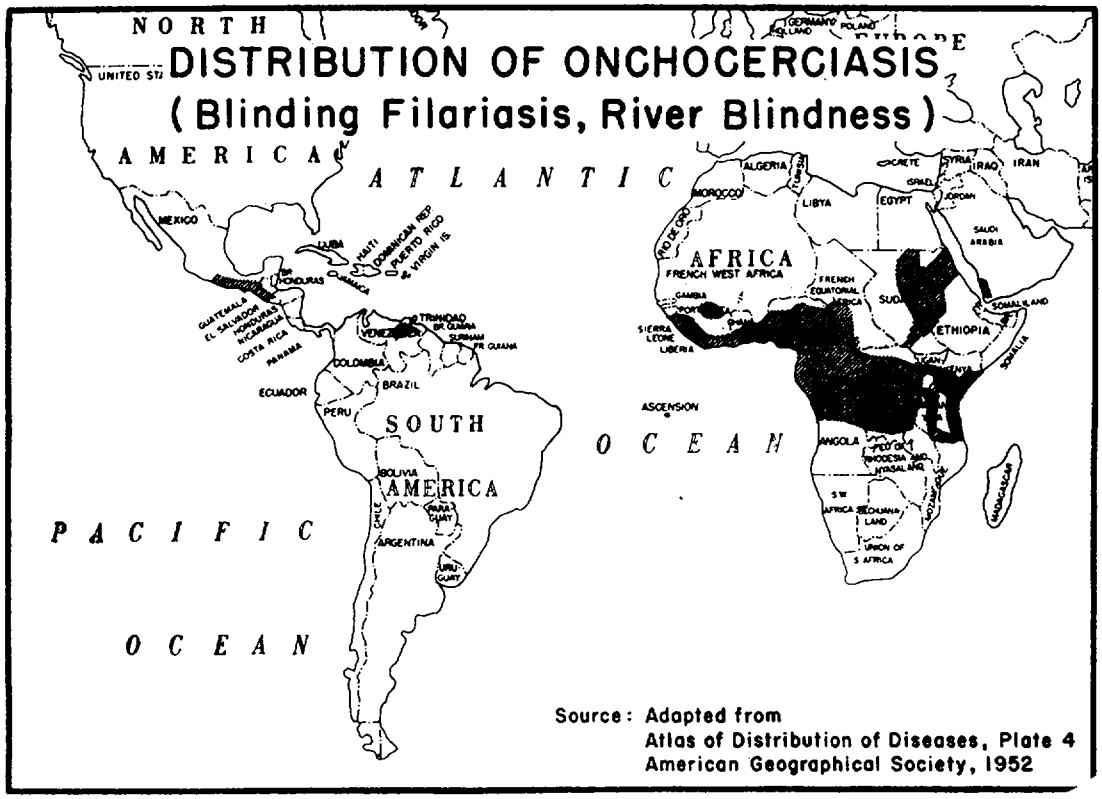

DISTRIBUTION OF ONCHOCERCIASIS
(Blinding Filariasis, River Blindness)
NORTH
AMERICA
ATLANTIC
OCEAN
PACIFIC
OCEAN
SOUTH
AMERICA
AFRICA
FRENCH WEST AFRICA
MEXICO
CUBA
HAITI
DOMINICAN REP.
PUERTO RICO
& VIRGIN IS.
JAMAICA
HONDURAS
GUATEMALA
EL SALVADOR
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
TRINIDAD
BR. GUIANA
SURINAM
FR. GUIANA
COLOMBIA
ECUADOR
PERU
BRAZIL
BOLIVIA
PARA-GUAY
ARGENTINA
URU-GUAY
ASCENSION
ALGERIA
MOROCCO
LIBYA
EGYPT
CRETE
SYRIA
IRAQ
IRAN
ISRAEL
JORDAN
SAUDI ARABIA
RIO DE ORO
GAMBIA
FRENCH EQUATORIAL AFRICA
SUDAN
SIERRA LEONE
LIBERIA
ETHIOPIA
SOMALILAND
SOMALIA
ANGOLA
RHODESIA AND NYASALAND
SW AFRICA
BECHUANA LAND
UNION OF S. AFRICA
MADAGASCAR
GERMANY
POLAND
Source: Adapted from
Atlas of Distribution of Diseases, Plate 4
American Geographical Society, 1952

CHART 3

DISTRIBUTION OF SLEEPING SICKNESS

Source: Adapted from Global Epidemiology

Formerly this disease was almost inevitably fatal. Now we have drugs which make a cure possible if the disease is found in the early stages. With this modern chemoprophylaxis and with the eradication of the fly we have reduced the incidence of the human disease in many endemic areas, but, despite these gains, the toll from sleeping sickness is still very high.

Next is yellow fever. Yellow fever is no longer the scourge that it once was in Africa, Europe, and the Americas, but it continues to be a fairly serious menace to health on both sides of the Atlantic. Classic urban yellow fever, which was responsible for the devastating epidemics which you read about in history, prior to about 1910, has been virtually brought under control in most of the New World countries by intensive eradication campaigns directed at the carrier of yellow fever, the Aëdes aegypti mosquito. It has not been possible to carry out this kind of effort in the endemic areas in Africa.

The current yellow fever problem arises because the disease also exists outside the human habitat. Then it is known as jungle yellow fever, a disease of forest animals. It is caused by the same virus and presents a very complicated epidemiologic picture, because the principal species that carries the disease is monkeys. Living as they do, under a forest canopy, where certain forest mosquitos breed in a way that cannot be controlled, they carry the reservoir of infection. Humans going into or working in these jungle areas very often bring back the disease to urban areas, where the Aëdes aeaypti mosquito still exists and where this species may become infected and reestalish the disease in the community. This is a constant threat in population centers near jungle sources.

Jungle yellow fever is pretty thoroughly entrenched in central Africa, in the Amazon Valley in Brazil, and in other parts of South America. In the nine-year period, up to 1956, 1,350 fatal cases were reported from 13 American countries--that is, the jungle variety, the single, individual cases. Unfortunately, what creates a considerable further threat, even to our country, is the fact that this disease has been very gradually moving northward from South America through Central America. Each year we find cases in monkeys and we find infected mosquitos a little bit farther north. We continue to have the Aëdes aegypti mosquito in large areas in this country. All they need is some cases of yellow fever to feed on in order to spread the disease in this country.

One of the major activities of the quarantine service of the Public Health Service, with respect to the ports of entry from this part of the world, has to do with the screening for cases of yellow fever and for mosquitos. If you have been on planes that have had to be bug bombed and have had to wait inside for a few minutes after landing until an inspector can look through the cabin, this is what he is looking for.

Chart 4, page 15.--Schistosomiasis involves about 150 million people in the world, mostly in tropical and subtropical regions. A debilitating parasitic disease caused by several species of blood flukes, it is most prevalent in tropical Africa; along the Mediterranean coast; the Nile Valley, especially the Nile Delta; along the Yangtze River; the China Mainland; Japan; certain of the Philippine Islands; in the Western Hemisphere, Puerto Rico, Venezuela, and Brazil.

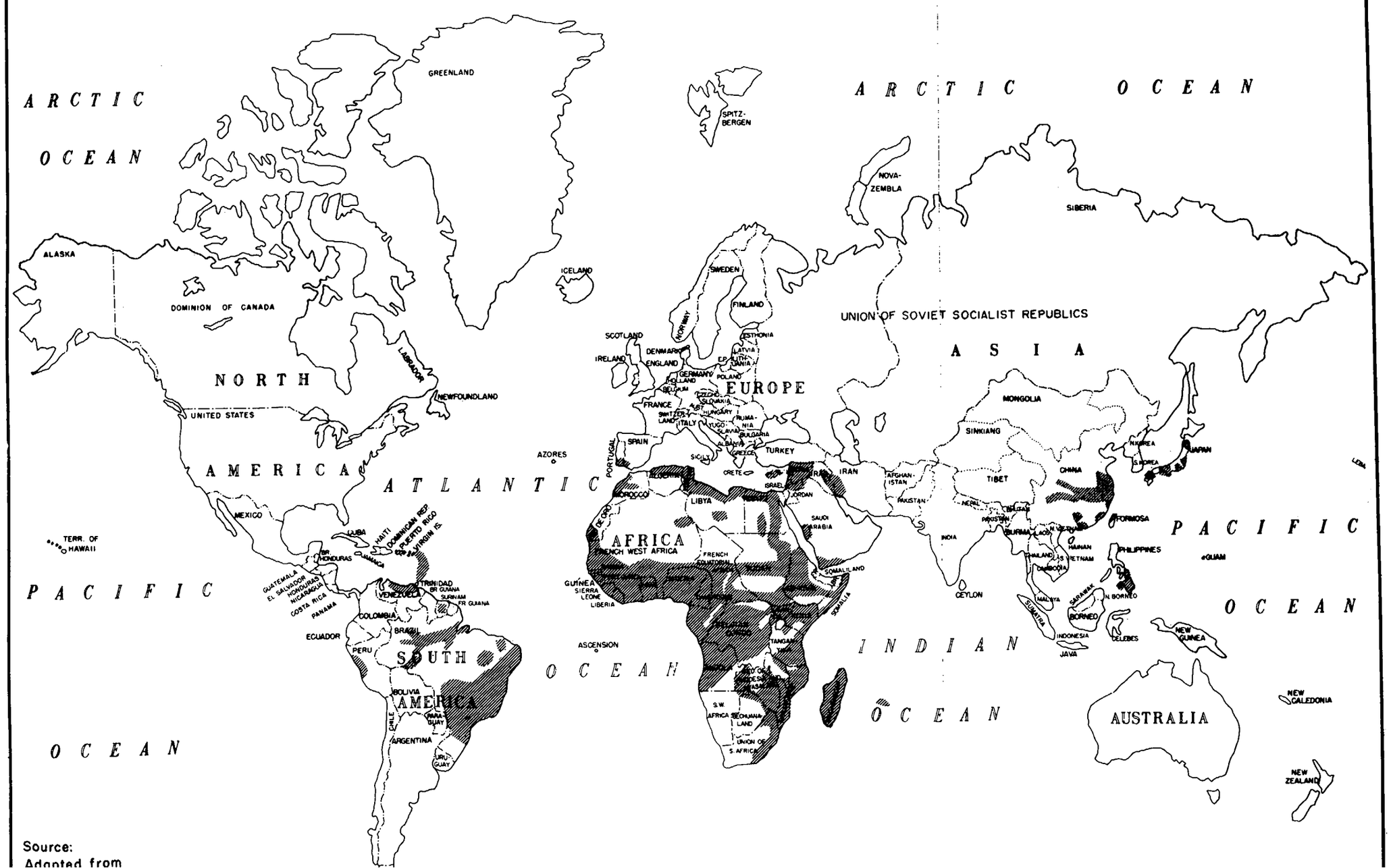
Schistosomiasis has a peculiar life cycle, too, in that these parasites get into the bodies of humans through the skin. There are aquatic larval forms of the blood fluke, and poeple bathing in infected fresh water may get these through the skin. Various species of snails are the intermediate hosts that carry the flukes. The humans pollute the water with their sewage; the snails pick up these blood flukes, carry them through an important part of their life cycle, send out the larval forms, and they get back into humans that way. The adult flukes in the human body live in the smaller blood vessels of the intestine and of the bladder and cause an awful lot of tissue damage there, in the liver, and in other parts of the body.

This results in a sort of vague disease with emaciation, weakness, and increased susceptibility to many other infections. Schistosomiasis disables the worker. It is a serious economic problem. Together with a form of eye disease, this is one of the biggest problems in the flood areas of the Nile basin.

The most obvious solution is to stop the contamination of water with feces from infected humans, and to get rid of the snails. Treatment in the person who has the disease is difficult, expensive, and not very effective. The education of the people on protecting their water supply and the eradication of snails is the only approach which now offers any real hope.

CHART 4

DISTRIBUTION OF SCHISTOSOMIASIS



Source:
Adapted from

Schistosomiasis must be ranked as one of the world's larger public health problems as far as economic effect is concerned. In one country in Africa not too long ago, they decided that what the country needed for its economic development was power. The only source of this they could discover was hydroelectric power. They built a big dam which would produce an enormous reservoir upcountry, and found that their biggest problem then was that they were just enlarging by manyfold the breeding areas of snails. Since there was schistosomiasis in the country, it would not take long for the snail population to become infected, and whatever gain they obtained by the development of a power source would be offset materially, if not completely negated, by the epidemic of schistosomiasis which would follow in the population of the country.

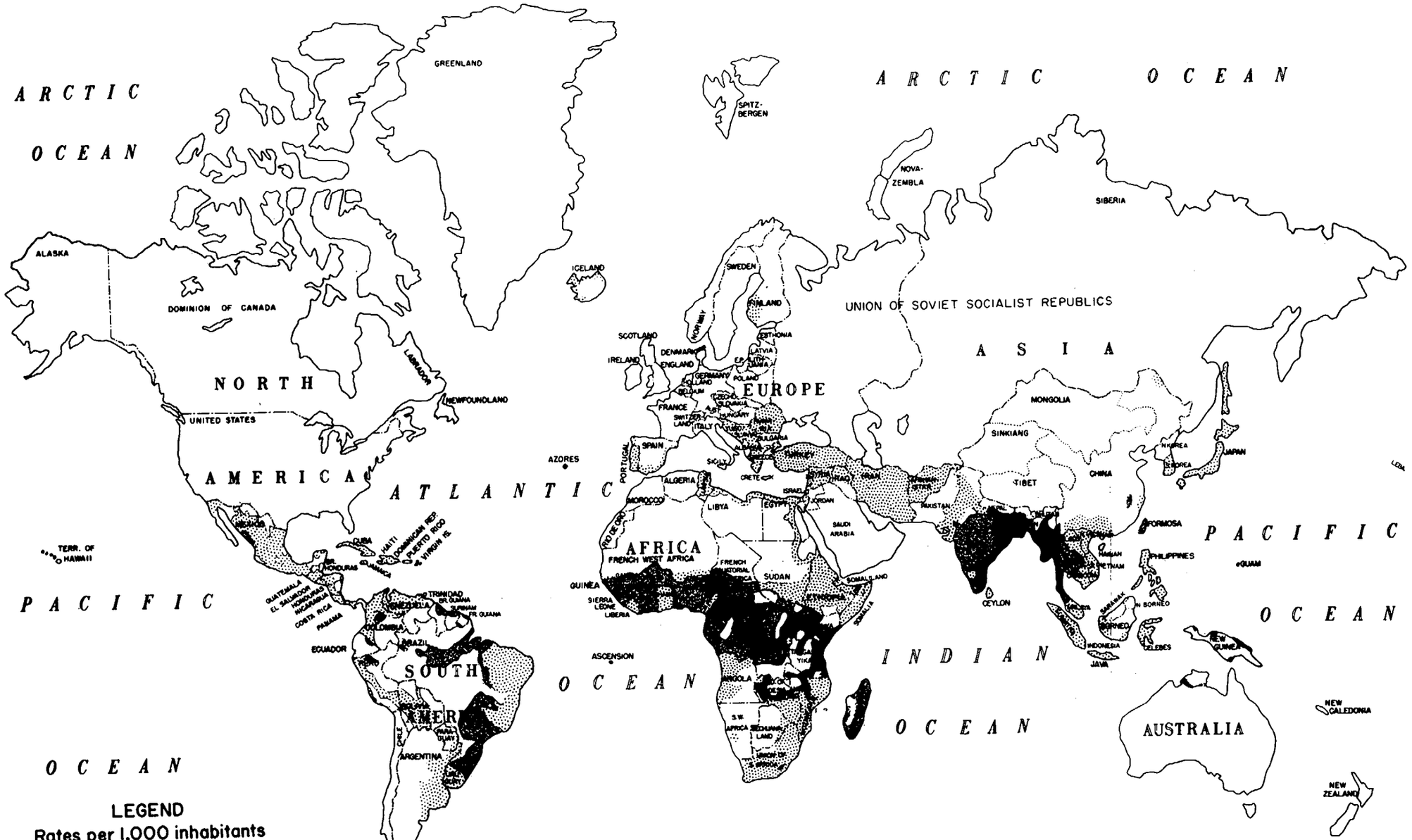
Chart 5, page 19.--Now we come to something with which I think many of us are a little more familiar, and that is hookworm; but I don't think we have realized that it exists as much outside of the Faulkner novels as it does. Worldwide in distribution, with the greatest prevalence in Middle and South America, it is also prevalent in the West Indies, in tropical and South Africa, in south central, southeast, and east Asia.

Mass treatment, coupled with improved environmental sanitation, is effective in controlling or completely eradicating the disease. But this has not been achieved except in very circumscribed areas. Where people use as a restroom whatever part of the roadside they are at, you may not entirely change such cultural habits; but it would be a worthy control measure to promote the wearing of shoes by the population. However, you can guess the difficulty there is in shoeing the population of southeast Asia, for example.

This is how we manage to get rid of hookworm to a considerable degree in this country--the building of privies and the shoeing of the population.

Chart 6, page 20.--Leprosy, about which you know, certainly, occurs primarily in the warm and humid climates. It is associated with overcrowding and poverty. However, many of the preeminent factors which affect the distribution of leprosy remain undetermined. Whether the poverty factor is crowding, diet, or what, we don't know. There does seem to be some significance with respect to race. The disease occurs more frequently or more easily in some than in others. Europeans and Mongolians are more susceptible to the severe form, whereas the darkly pigmented peoples develop only the mild form in most cases. Children are much more susceptible than adults. Malnourishment, as I said, may be one of the things which favor its onset.

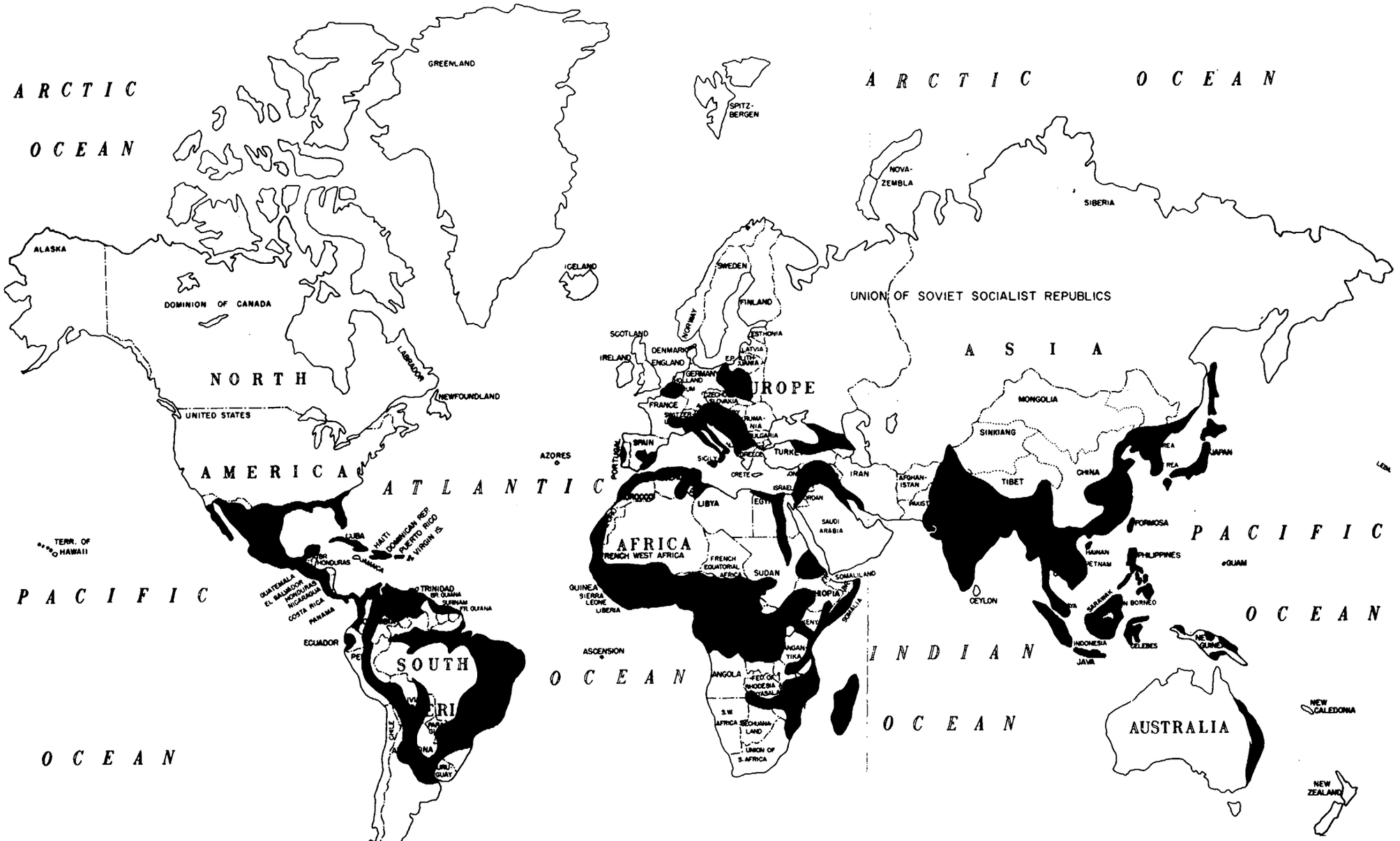
DISTRIBUTION OF LEPROSY



Adapted from Atlas of Diseases, Plate 7, American Geographical

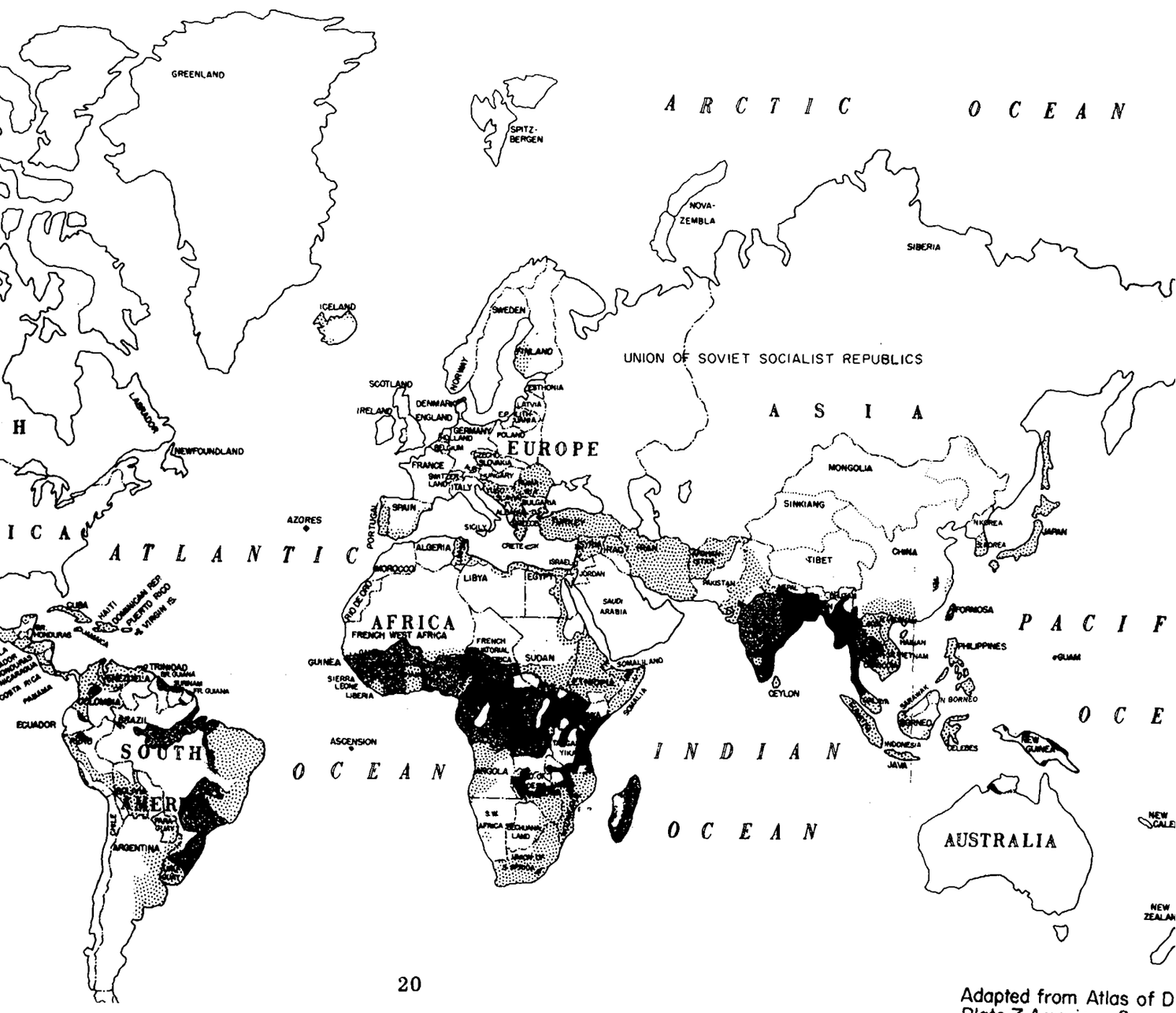
CHART 8

DISTRIBUTION OF HOOKWORM



Source: Adapted from American Geographical Society Atlas of Distribution of Disease

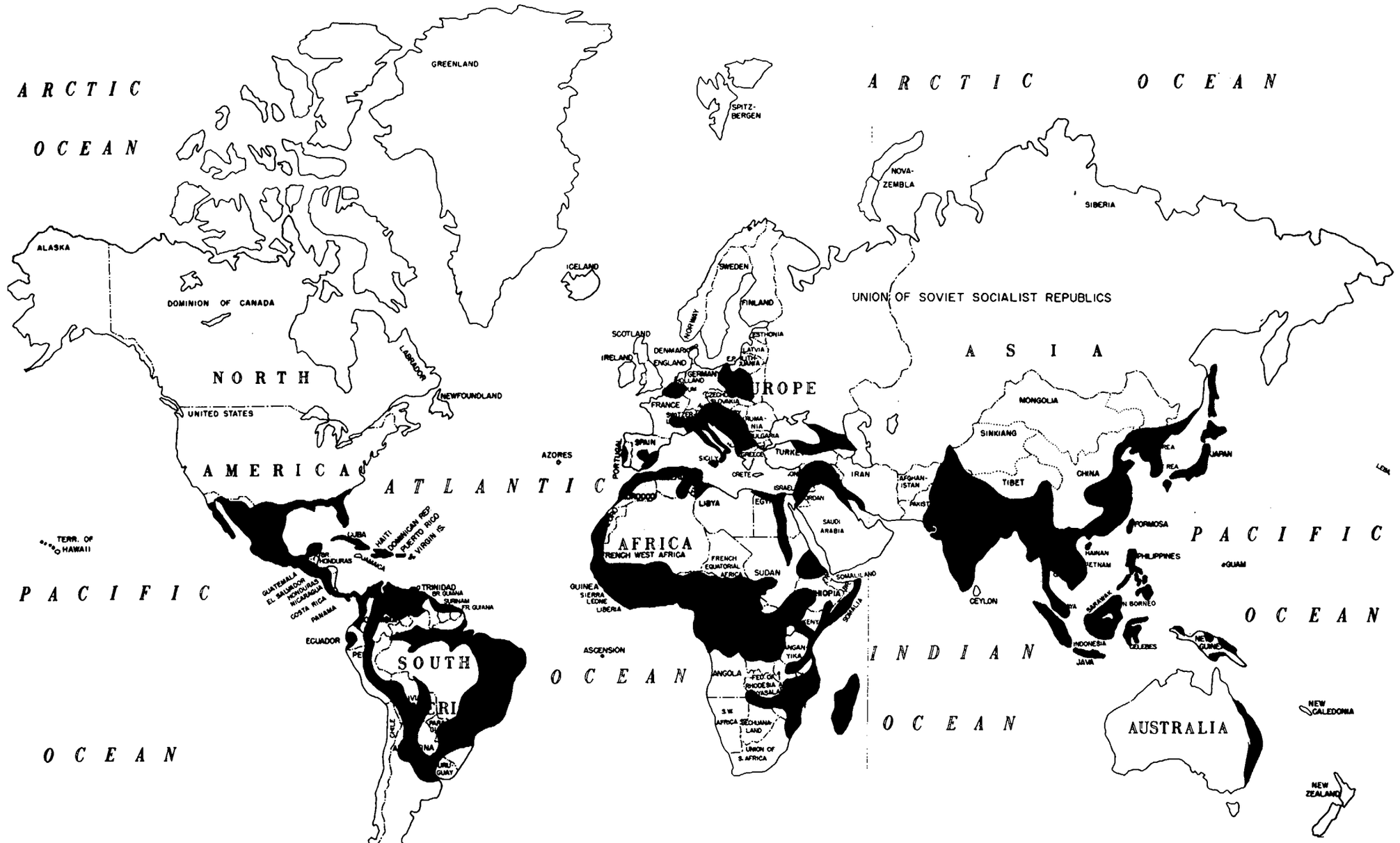
DISTRIBUTION OF LEPROSY



Adapted from Atlas of D
Plate 7, American Geogra

CHART 5

DISTRIBUTION OF HOOKWORM



Source: Adapted from American Geographical Society Atlas of Distribution of Disease

There are anywhere from 2 to 12 million cases of leprosy in the world. The reason for this wide range of estimate is that the disease in its early stages develops very insidiously and may not be recognized for many years.

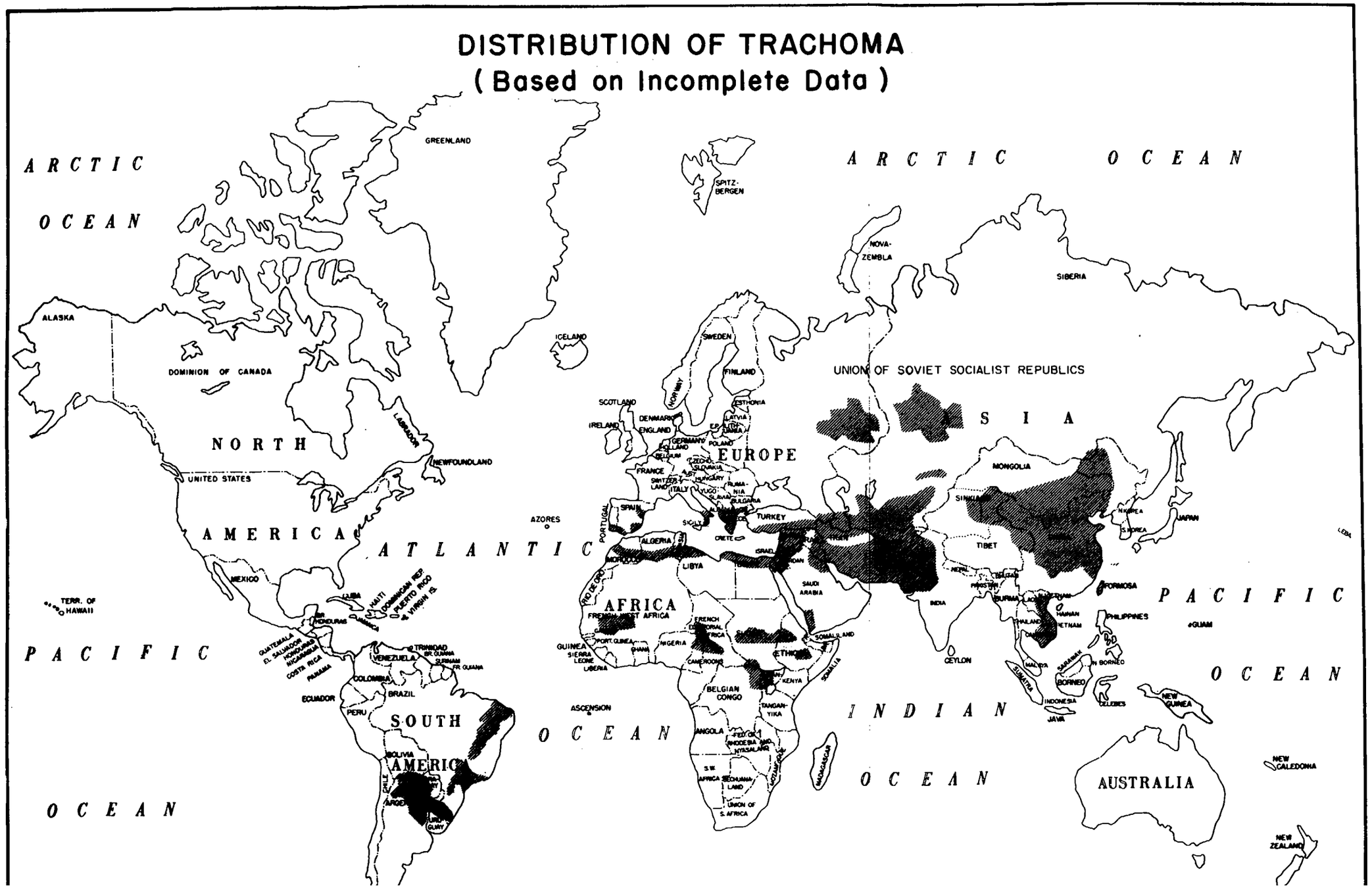
The major attempt at control is to find the cases as early as possible when cure has much more hope of success than it does in the later stages. As a matter of fact, we have now a bit of a problem in Hawaii, where we have a leprosarium, not because the disease has not been arrested, as far as we can tell, nor because the people are not in reasonably good shape, but because of the cosmetic changes in the face and the skin of these people, and the loss of fingers, and whole arms and legs, and the handicap for economic employment, which keeps these people in the leprosarium because there is no place else where they can be sent to live. It is a domiciliary problem as well as a disease problem, and this can be a major economic strain upon an economy.

Chart 7, page 23.--Trachoma is a virus disease which affects the eye. It produces a high percentage of blindness if it is neglected and goes on for any length of time. We don't have much in the way of statistics on this disease, but there are probably about 400 million people affected in the world. About 10 million of these will become completely blind. This is a disease of poverty, poor sanitation, and ignorance. It affects all age groups, but particularly children. In some sections of North Africa the entire adult population suffers from the disease, and the rate among children of preschool age runs between 70 and 100 percent.

In India prevalence rates in some localities have reached 78 percent. In Taiwan recently a survey showed 48 percent of the children infected. We found new areas recently in South Africa and in Western Australia. We have had this disease in our own American Indians for a number of years. We had an epidemic only a few years ago. But the disease is rapidly vanishing in this country through improved sanitation and through early treatment.

The fact that trachoma produces blindness in a percentage of cases obviously imposes a tremendous economic burden in the country in which the disease is prevalent and resistance is low. It reduces the earning power and productive capacity, and it increases the welfare load.

CHART 7


DISTRIBUTION OF TRACHOMA
(Based on Incomplete Data)
ARCTIC OCEAN
ARCTIC OCEAN
GREENLAND
SPITZ-BERGEN
NOVA-ZEMBLA
SIBERIA
ALASKA
DOMINION OF CANADA
ICELAND
SWEDEN
FINLAND
UNION OF SOVIET SOCIALIST REPUBLICS
NORTH AMERICA
UNITED STATES
LABRADOR
NEWFOUNDLAND
SCOTLAND
IRELAND
DENMARK
ENGLAND
NORWAY
ESTHONIA
LATVIA
POLAND
GERMANY
HOLLAND
BELGIUM
EUROPE
FRANCE
SWITZERLAND
ITALY
HUNGARY
RUMANIA
BULGARIA
TURKEY
SPAIN
PORTUGAL
SICILY
CRETE
ALGERIA
MOROCCO
LIBYA
ISRAEL
SAUDI ARABIA
AZORES
ATLANTIC OCEAN
MONGOLIA
TIBET
INDIA
CEYLON
JAPAN
FORMOSA
PHILIPPINES
GUAM
PACIFIC OCEAN
PACIFIC OCEAN
TERR. OF HAWAII
MEXICO
CUBA
HAITI
DOMINICAN REP.
PUERTO RICO
VIRGIN IS.
HONDURAS
JAMAICA
GUATEMALA
EL SALVADOR
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
VENEZUELA
TRINIDAD
BR. GUIANA
SURINAM
FR. GUIANA
COLOMBIA
ECUADOR
BRAZIL
PERU
SOUTH AMERICA
BOLIVIA
CHILE
ARGENTINA
URUGUAY
ASCENSION
AFRICA
RIO DE ORO
FRENCH WEST AFRICA
PORT. GUINEA
GUINEA
SIERRA LEONE
LIBERIA
GHANA
NIGERIA
FRENCH EQUATORIAL AFRICA
CAMEROON
BELGIAN CONGO
ETHIOPIA
KENYA
SOMALI LAND
SOMALIA
TANGANYIKA
ANGOLA
FED. OF RHODESIA AND NYASALAND
S.W. AFRICA
BECHUANALAND
UNION OF S. AFRICA
MOZAMBIQUE
MADAGASCAR
INDIAN OCEAN
INDIAN OCEAN
AUSTRALIA
NEW GUINEA
NEW CALEDONIA
NEW ZEALAND
BORNEO
N. BORNEO
CELEBES
JAVA
SUMATRA
INDONESIA
MALAYA
SARAWAK
THAILAND
BURMA
VIETNAM
HAINAN
PAKISTAN
NEPAL
SINKIANG
N. KOREA
S. KOREA
LIBIA

In Tunisia, for example, with a population of about 3.5 million people, there is an infection rate of 40 to 50 percent. It is estimated that this disease causes the loss of 25 million working days a year.

Mass campaigns, employing either the sulpha drugs or antibiotics, have shown results in controlling this disease in certain places where they have been tried, like Morocco, Taiwan, and Tunisia. Similar campaigns are now under way in several other countries.

This, too, is an interesting problem of motivation of the people, because you can't handle them all, health manpower being in such poor ratio to the populations in these countries. So they have developed a campaign of educating the people to use little tubes of the drug themselves. While this is to be deplored from some points of view in a highly professionalized country like the United States, it works beautifully in reducing incidence in these other countries.

Finally I come to tuberculosis, for which I have no chart. But it must be mentioned, since it is a disease of truly worldwide proportions. It occurs in both the temperate and tropical countries and for many centuries it was one of the chief causes of death in practically all areas of the globe. In the last 10 or 12 years there has been a material decline in the death rate from this disease due to the new chemotherapy which is available. But the problem with this is that we have not materially changed the incidence of the disease. By having reduced the mortality, we have tended in many places to increase the number of cases existing at any one time. This produces one more enormous economic problem.

The fact that so many parts of the world are increasing their urbanization and getting so many big cities, even in some of the underdeveloped countries, accentuates the dangers of this disease, because overcrowding and poor nutrition are among the things that accelerate its spread.

The tuberculin test to determine who in the population has been infected with tuberculosis at some time shows some amazing prevalence figures. For instance, in Bombay, India, 77 percent of the population under 15 years of age were positive; in Tangiers 72 percent; 66 percent in the cities of Taiwan; 59 percent in Yugoslavia; 52 percent in Egypt; and 49 percent in Ecuador. This compares, for example, with the population under age 15 in New York City, where tuberculin surveys show about 9 percent tuberculin positive.

The clinical treatment of the disease has been pretty well developed. The problem now is the development of effective immunizing agents. Not so much in this country, where the risk is relatively low, but in many other countries B.C.G. has been used extensively as an antigen against tuberculosis. It is felt to develop some protection for the individual in populations where there is a very high risk.

In this country it is used only in high-rate populations. For example, it is used in medical schools and nursing schools, where the physicians-in-embryo and the nursing students are exposed to the disease much more than the general population. It has been urged in some cities, although it has not become very widely used, because this antigen has its disadvantages too.

Well, there you have a picture of some of the major disease situations in the world today. The problem is just staggering, because of the fact that most of these diseases have a high environmental component. What you would have to do to counteract this unfavorable physical environment staggers the imagination. I read in one report from the Far East that it would take something like $2 billion in dirt-moving equipment to approach the problem out there of developing a more hygienic physical environment. You may add to this the biological environment in which these people live. Whenever we are plagued with insects, whatever they may be, we haven't seen anything, as many of you probably know, compared to the multitudes of parasites and insect vectors that are present in many other parts of the world.

Other Health-Related Problems in Underdeveloped Areas

Sanitation is just not known in many of these places. As a matter of fact, in many places the cycle of protein in the agricultural economy may far outrank sanitation. In Japan, for instance, they have probably the most intensified agricultural program in the world, not only in the amount of land used--every foot of land possible--but also in the way they cultivate their crops. Their major source of fertilizer with animal protein in it is human feces, and therefore they have an islandwide sanitation problem, since the feces contain not only the protein that they want for fertilizer but also any of the infecting agents possessed by the people who have provided the fertilizer.

When you add to this the problems of health manpower in these other areas of the world, you realize the extreme difficulty in meeting their problems. We have just published in this country the so-called

Bane committee report, "Physicians for a Growing America," which talks about the fact that there are 132 physicians per 100,000 population in this country, and at the present rate of physician production we will drop below that over the next 10 years, and that it will go down even further later on unless we build something on the order of 10 to 20 new medical schools. This means a pretty sizable investment, both in capital and operating cost, just to keep us at 132 physicians per 100,000 population, assuming that if this is not the optimum rate, certainly it is the minimum ratio to meet the need. This would not touch the increase in medical-care demands of the general population, the increased need for physicians in public health and in industrial medicine, and medical-care programs for our aging population. But when you talk to somebody from India or from an underdeveloped area, you discover the fact that they have a few 500-bed hospitals with only two physicians on the staff, or you find that they have millions of new cases of tuberculosis a year and 1,200 beds to accommodate them.

The problem we have, actually, in this country, with the high degree of medical care that we like to think we have, is that we actually import graduates from foreign medical schools to this country each year. We accept 600-800 physicians trained in foreign schools and license them for practice in this country every year. I think that if we take the pride we do in being world leaders, we should really be an exporting rather than an importing country. And yet, even with our shortage of homegrown physicians, we cannot bring ourselves, and I think perhaps rightly so, to the solution which the Russians have found, which is to train medical workers at about the level of what are called "practicantes"--that is, people who have a facile trade knowledge of matching symptoms with specified treatments and of the simpler sorts of medical practice. We probably do still have physicians do many things that could be relegated to other types of health manpower, but we haven't gotten around to developing this area.

International Health Organizations

What do we have in the way of international health organizations? The first international sanitary conference which was ever held met in Paris in 1851. This conference was a happy thought, but it took 52 years and 11 international conferences before enough medical knowledge was available to make such meetings really worthwhile. By the 11th international sanitary conference in 1903, there was sufficient factual knowledge to make the conference reasonably successful in developing some worldwide plans.

At that conference they developed a plan for an international health agency, which led to the creation of the Office Internationale d'Hygiene Publique, established in 1907.

In this country in 1902, the International Sanitary Bureau was formed covering both continents of the Western Hemisphere, primarily to cope with yellow fever. This Bureau became the Pan-American Sanitary Bureau and is now the Pan-American Health Organization, the Western Hemisphere branch of the World Health Organization.

In 1923, after World War I, the Health Organization of the League of Nations was established. It functioned between the First and Second World Wars.

The World Health Organization

The World Health Organization was established after World War II. It came into existence formally and legally in 1948 and absorbed the previously existing organizations, such as the Office Internationale d'Hygiene Publique, the Health Organization of the League of Nations, and the Health Division of UNRRA. It has functioned since that time, and at last count, I think had 90 member countries.

The World Health Organization, while truly an international organization, is financed in very substantial part by the United States.

The function of the World Health Organization is to attack disease, not at country borders but at the source of the disease. WHO supplies technical assistance to the member governments in disease-control programs in the way of provision of advice, educational material, professional help, and even funds. It also arranges for the training of national health workers outside of their own countries and at the same time supports the improvement of indigenous training facilities within countries.

The budget of the World Health Organization is based on a fixed scale of assessment under which the smallest states pay a minimum of around $7,000 a year. The United States currently contributes about $4.5 million to WHO per year.

The headquarters of WHO is in Geneva. It has regional offices in Washington; Copenhagen; Alexandria, Egypt; Brazzaville, French Equatorial Africa; New Delhi, India; and Manila in the Philippines.

There are about 1,000 professional people under WHO direction. The Director General is Dr. Candau, a Brazilian physician. He is the second Director General; the first was a Canadian.

Other International Organizations Concerned with Health

There are several other international governmental agencies in the field of health. The United Nations Children's Fund, so-called UNICEF, participates with the World Health Organization in health projects because of the interest in children and their mothers. Their charter is for the welfare of children and mothers, but this obviously involves health. UNICEF contributes funds to be matched locally in providing facilities, services, or personnel in the recipient country.

Second there is the International Labor Organization, which attempts to promote the voluntary cooperation of nations in improving labor conditions and in raising living standards. Obviously again this calls for an important health component, particularly in the area of occupational diseases and occupational safety. They have also developed programs on protection against ionizing radiation in industry.

Third is the Food and Agriculture Organization (FAO) which has as one of its objectives the raising of the nutritional level of the populations of the world. This has obviously a very important bearing on health programs. FAO participates actively with the World Health Organization in that it has to concern itself with diseases in animals from an economic point of view, to be sure, but many of these animal diseases are transmissible to man. These diseases, problems of food additives, and other matters bring the FAO into direct contact with the World Health Organization.

Finally we have another agency, the UNESCO, the United Nations Educational, Scientific, and Cultural Organization. This has a number of programs in the areas of school health, health training for teachers, and teaching of basic sciences in the various countries. It was active in the formation of the Council for European Cooperation in Nuclear Research and the subsequent establishment of an International Radiation Agency which attempts to exploit the peaceful use of nuclear energy, and which has just recently become active.

U.S. Financial Participation in International Health

The United States, as I said, contributed about $4.5 million in 1959 to WHO. In addition to that it contributed $2.3 million to the regional office of WHO for the Americas, the Pan American Health Organization. And it has on several occasions made special contributions: $7 million for malaria eradication in calendar year 1958, dividing the money between WHO and PAHO, and again, now, in 1959, it has contributed sizable amounts for this purpose.

In 1958 the U.S. Government contributed $11 million to UNICEF. About 90 percent of this money went into health programs.

The International Cooperation Administration

In addition to these multilateral programs, the United States operates sizable health programs through the International Cooperation Administration, amounting in 1959 to about $46 million in money and kind. ICA has something like 350 people serving overseas, professional technicians of one kind or another.

ICA, the bilateral agency of our nation in the health area, assists other countries with funds and personnel. It discusses the health needs of a country with its health staff, helps to determine the major health problems, and works out specific approaches to control them in whatever way seems needed as well as acceptable.

ICA is operating at the moment in about 24 countries of the world and providing consultation to a considerable number more--giving training or educational support in one fashion or another to about 31 countries.

ICA assists in such activities as a smallpox vaccination campaign in Bolivia; the establishment of 25 soybean milk stations in Brazil, where the milk protein problem is acute and where they just can't get the cows and the milk production; in the development of water purification programs in Ceylon; establishment of food-handling programs in Santiago, Chile; drilling of wells in Cañes, Costa Rica; training of students in Iraq; controlling of cholera in the Katmandu Valley in Nepal.

Benefits of International Health Programs

I am sure, with the lectures you have had and with the kinds of studies you undertake here, you know much better than I, more acutely, and in better outline, the benefits to this country on the one hand from improving the level of living of other countries and what this means to our own security, and on the other hand the health needs involved as a result of world transportation: the increased volume and speed with which people can move from one place to another. We just can't maintain an island of health in a world which is not healthy. The quarantine system just cannot do it.

For example, some years ago I was a health official in the State of Ohio, which you would think is comfortably inland and separated even from our neighbor, Canada, by a fair number of miles. One day a plane landed in Columbus, Ohio, which had taken off from Alexandria, Egypt. In Alexandria, in the previous month, there had been two cases of reported plague. If one of these passengers had happened to be infected but had not yet developed the clinical symptoms of the disease, you could see what would happen to this inland State which foresaw no fear.

As a matter of fact, back in 1880, the Ohio State Board of Health was established because of the cholera epidemics in Europe.

Public Health Service Assistance to other Countries

Last year the National Institutes of Health gave not quite $3 million in grants to what in the service are called "offshore" research projects, that is, projects to grantees outside the United States. In addition we have given about $1 million in training grants to institutions or to individuals outside of this country. There is a progressive increase of interest in the development of this approach by the Congress: The Humphrey committee has made three reports: on international medical research, on the status of world health, and one reviewing the statutory authority for medical and health related research in the U.S. Government. Senate Joint Resolution No. 41, which has passed the Senate and is in the House, proposes the establishment of an international medical research institute which will organize the small efforts we are making now in improving the interchange of information and talent and cooperative work in research in the major diseases of mankind.

There is also another resolution, Senate Joint Resolution No. 129, proposing an international public health and medical research year, analogous to the International Geophysical Year.

As you see, some efforts are being made and organizations have been developed to meet the problems of international health. I think it is essential and unavoidable that we continue to do this and to expand it for your own sake as well as for the sake of the world.

I have overtalked my time, but I guess there will still be a few minutes for questions.

Thank you.

COLONEL HAWKINS: Gentlemen, Dr. Porterfield will take your questions.

QUESTION: Doctor, the distribution charts used for your lecture showed the high incidence of practically all the diseases to which you addressed yourself in large areas of both Africa and India. Should we assume from that that practically all the natives living in those areas suffer from at least one of those diseases? If this is not a safe assumption, do you have any guesstimates of how many people would be free of disease? I know you have no statistical means of arriving at that. What would be your guess?

DR. PORTERFIELD: It is true that the statistical data from many of these parts of the world are more a guesstimate than an accurate determination. But the sampling that has been done gives us reason to think it is fairly close. I would say in answer to your initial question that it is a fair assumption that maybe 90 percent of the native populations of these countries have one or the other of these diseases, yes.

QUESTION: My question refers to your comment about the shortage of qualified physicians in the United States, and, for that matter, the world over. Does the trend toward increasing the specialists in medicine pose any great problems in health?

DR. PORTERFIELD: In my mind I don't remember any discussion in which that question was considered with reference to world health problems. But in this country it is a very serious consideration. It is quite true that, as you look at the statistics in this country we are moving more and more toward specialization. The number of family

physicians, those who first see the family as a social unit and who refer them when necessary to specialists, is becoming smaller every year, even when you include internists and pediatricians as general practitioners. We include these latter two groups because a pediatrician is a specialist only in the sense of the age group with which he works, and the internist is the primary diagnostician of the specialist team.

As a result, patients now tend to make their own decision as to what kind of specialist they need. As a matter of fact, it was only yesterday that somebody said to me, "Well, I have gone to this doctor, but he is only a general practitioner, and I really think I ought to go to a thyroid specialist." This kind of talk always makes physicians very unhappy.

This is one of the findings of the Bane committee report which points toward the thought that 132 physicians per 100,000 population will probably become an inadequate ratio in the future. The trend toward specialization is unavoidable, however, because the complexity and breadth of medical knowledge today, compared to even 50 years ago, is so great that no one man can know enough to be able to handle all the problems of a patient or family. He has to have specialists behind him.

One of the things which I think is already happening to some degree and which I think will continue even more in this country is the trend toward group practice, where the people will go to a group clinic and will be seen by a diagnostician--the general practitioner--who will then refer them within the group, to the services required to handle their problem. He knows a little bit about everything, as opposed to the specialist, who knows much about a smaller field.

QUESTION: My question has to do with the relationship of public health with the population explosion. Some of the demographers that we have had talk to us here have said that public health had a great effect on the population explosion. When I looked at your charts, I noticed that it didn't look like Africa has a chance, and it seems that India doesn't have much of a chance. It seems to me that the more people a country has the more people die from disease. So the amount of money you say you are putting into public health is really peanuts, relatively speaking. What is your opinion of the effect of public health on the population explosion?

DR. PORTERFIELD: I had been warned that you folks had been exposed to a lot of the demographers, and I am supposed to be a little careful about getting into this subject. It just happens that we have spent some time lately in my office fretting about this. It is quite true that, where we have initiated public health programs, as in Ceylon, the first example I gave, they did affect population growth. In the island of Ceylon, where there was a mass insecticide campaign of just dousing the island with DDT, it resulted in the death rate dropping from 22 to 12 in three years while the birth rate stayed the same. This means a marked acceleration in population growth rate.

This is a very complex question which I cannot cover in a short time. But there are several things I would mention briefly. The first is that most public health programs which prevent death do not materially affect the birth rate. The birth rate is high in many underdeveloped countries. The increase in population is due only to the reduction in death rate and only rarely is there a simultaneous increase in the birth rate. Second, public health programs prevent deaths primarily in the younger age groups, and one would expect this to increase the proportion of persons in the productive age groups. Finally, the prevention of debilitating diseases improves the potential productive ability of the country.

It probably is inevitable that some day we will have to attack this population problem in two ways. First is the agricultural and industrial development of each country to its full potential. After that, after the better development of the country to support a larger population may come a necessity for population control. We have discovered that most of the major religious leaders in the world have agreed that population control, particularly in terms of child spacing, concern for the health of the mother, and that sort of thing, is acceptable within the rules of their creeds. The only difference between various religions is in the method used to control the family size.

We will come to this, I know. In talking to some of the Indian health leaders, I learned that they have very seriously considered this problem.

QUESTION: Doctor, how much are the Russians doing in the field of preventive medicine in the underdeveloped countries? Can you give us your ideas on that?

DR. PORTERFIELD: Not too much, unfortunately. The expert on that, Dr. Hyde, the Chief of our Division of International Health, happens to be in Moscow today. He is over there on a followup of the negotiations that were begun when the Russians were here. They are trying to export physicians and technicians as much as they can. Wherever they find a receptive country they move in rather quickly. They have not, as far as we know, tried too much to help other countries develop their own potential for health programs. They try to do it for them, which may be significant.

The quality level of their programs in various fields is in some respects as good as, and, in some technical aspects, better than ours. In the medical-care field it tends to be lower. But, where there are no physicians, any physician is usually an improvement.

I think the proposal the Russians made on their trip here, that we develop bilateral teams, is an indication of the fact that they are very anxious to pursue this method of ingratiating themselves with other countries. They have found a considerable number of doors closed to them. For instance, many of the South American countries, even those with some Communist element, just are not prepared to accept the Russian work parties coming in. They are not much happier about ours.

QUESTION: Doctor, I read--I think it was this morning--about this program to irradiate the male fly that has to do with the screw worm disease.

DR. PORTERFIELD: The mosquito.

STUDENT: It seemed that it was quite successful. As I understand it, they irradiate the male and it was still sexually potent but, of course, it was incapable of producing offspring. Does this technique have application in, say, malaria and some of these other fly- or insect-carried diseases? Is it being used?

DR. PORTERFIELD: Yes, it might have application in a number of diseases that have an insect vector. It is being studied for some of them. I don't know how wide the application may be. This is one of the curiosities of disease control. You catch the male insect and, instead of killing him, you irradiate him, make him sterile, and let him go, the point being that if it is a species in which the female will mate only once, her mating with a sterile male will produce no fertile eggs. Therefore, you try to get as many sterile males into the population as

you can, so that most of the females mate with sterile males. They are doing this now in some of the areas in South America to test, on a practical scale, whether this does result in mosquito control.

QUESTION: You mentioned the level of medical education in Russia. I wonder if you would just like to give your personal opinion as to the comparison in the state of the art in the Soviet Union versus that in the United States. You know the latest figures do say that they have more physicians per 100,000 than we do at the present time.

DR. PORTERFIELD: This is my understanding, that they have passed our ratio now and are producing considerably more thousands per year than we are, to the point of expecting to be able to export. They have made offers to export physicians to other countries. As to the quality of their physicians, this is a judgmental question. A mission went from this country to Russia about two years ago, headed by Dr. Thomas Parran, former Surgeon General of the Public Health Service. The report they made indicated the Russians were fairly well skilled in many of the aspects of medical practice, but behind us in a number of areas.

The quality of care appears to be somewhat behind ours, except in certain selected areas where they are as good as or ahead of us. I would suggest that you obtain a copy of the report if you are seriously interested. 2/

QUESTION: Sir, recently there has been a considerable amount of publicity on this Great White Fleet going around the free world, or around the world in general. Can you comment on that project?

DR. PORTERFIELD: As I understand it, the Great White Fleet exists mainly in the minds of the editors of "Life." There is, as far as I know at the moment, only one ship in existence, which is still being outfitted in a west coast port. There are different views on the desirability of this endeavor.

I think the idea, the principle, and the concept are sound. I think there are some very serious bugs which will take a lot of effort to work

2/ The Report of the U.S. Public Health Mission to the Union of Soviet Socialist Republics, including Impressions of Medicine and Public Health in Several Soviet Republics, August 13 to September 14, 1957. (PHS Publication No. 649. 1959)

out. I think the results can be very good and would be worth the trouble. It is going to take a while to work out.

It is a little unfortunate in one sense that it had to appear on the cover of "Life" first. But maybe this will get some contributions in, which will help. I think it is a sound idea that there be some kind of people-to-people operation in addition to government-to-government operations. I think this would be very helpful.

Some of our people went over to the Moscow Fair last year and were asked questions by the Russians. It's interesting that when a person talks to another person of the same occupation--one physician to another physician, or one farmer to another farmer--they find they have many of the same aspirations and goals. They develop a warmth of feeling that is definitely in the interest of peace.

So a program which would direct itself to people getting together in a common interest--the health of their families--would, I think, offer a lot of hope for success, in spite of all the complex problems there would be in developing it. This is my personal opinion.

COLONEL HAWKINS: Sir, sometimes our time goes by much too rapidly. On behalf of the Commandant and the students, I thank you for having been with us today.

DR. PORTERFIELD: Thank you.

(23 Aug 1960--4,600)O/de:pc

PUBLIC HEALTH AND ECONOMIC DEVELOPMENT

(From the terminal report to I. C. A. of Dr. E. Ross Jenney, Chief, Health and Sanitation Division, Brazil, February 12, 1959.)

(c) Public Health and Economic Diplomacy: Inasmuch as I am returning to the Public Health Service after nine years with ICA and its predecessor agencies and five previous years of similar foreign assignments, I should like to add some observations to this report. I have developed, not without reason, a growing apprehension over the open field we are leaving for the (to me) inevitable appearance of Soviet preventive medical programs in the underdeveloped countries. Although our general viewpoint has evolved into a type of economic diplomacy, the position of public health campaigns, except in the recent case of malaria, does not seem to be well defined within that sphere.

American foreign policy has drawn public health programs into official activity on foreign soil. Although this has been going on for some time, economic diplomacy still seems to retain a rather unformed conviction that such programs really can contribute vitally to our economic and political objectives in the underdeveloped areas. I believe that the untouched potential in this field deserves a closer scrutiny.

Planning for economic assistance seems to be missing the proper estimates of productivity returns to be expected from health services and campaigns against specific diseases, which as a result are simply tacked on to economic schemes rather than incorporated in them. By incorporation I do not mean administrative integration, sometimes cherished as an end in itself, but rather an intelligent linking of functions. If we do not do this more purposefully and effectively than at present, American assistance in economic development will continue to lose a needed propulsive force and a political asset. It is not enough that diplomats "cannot afford to be against health" and that economists continue to simply "recognize health problems" in economic analyses that cover every conceivable aspect of productivity except the strength of the producer.

We were a long time coming to the conclusion that the basic economic units under all circumstances are men and that the proportion that is strong is an economic as well as a health statistic. Perhaps the transition to modern thinking on this point can be marked by the publication of Alfred Marshall's Principles seventy years ago, in which a chapter opens with, "We have next to consider the conditions on which depend health and strength, physical, mental and moral. They are the basis of industrial efficiency on which the production of material wealth depends."

Today the direct relationship between total health and total productivity is part of the enlightened viewpoint in the entire industrialized world and we now are reaping the rich reward of having recognized the truth of the concept. As Henry Sigerest predicted twenty years ago the high priority which Communism gives to public health already has yielded, by itself, an immense benefit to the Russian economy. However, more than one Western economists has frankly admitted that "until fairly recently, economist have given little thought to the market organization of health services or to the net economic yield of the investment in the health of people." Because the preventable diseases in rich nations have decreased so rapidly, or even vanished, our focus has changed from pediatrics to geriatrics and our economists tend to retain this focus when turning their attention to underdeveloped areas, where it does not illuminate the true situation at all.

I have just said that the relationship between productivity and health is part of the enlightened viewpoint. Perhaps this is an optimistic statement, but in any event, our negligence is that we are too apt to assume that the viewpoint is worldwide. It is neither generally accepted in underdeveloped areas, nor - and as we assume responsibilities this is becoming our fault - is it generally understood. Furthermore, our economists and diplomats are woefully missing the point if they look upon their technical assistants in health as Americans who are busily transferring key techniques, bringing to the foreign land the magic of problem-solving instrumentation, so dear to the American heart.

That exhausted and (to me) odious cliché, "know-how," is far too pat a phrase to hold up much longer unless we actually seek to delude ourselves with it, in the belief that education is a process of transferring techniques. As one medical officer said upon emerging from a jungle mission: "It's not lack of know-how, it's lack of give-a-damn," and officialdom sometimes warrants the same observation. The manual techniques are easily transmitted, because our hand, which gave us our

less prehensile brain, is still much the abler pupil of the two. The plain fact is that in the underdeveloped areas the economic philosophy that embodies considerations of total health in relation to total productivity is woefully missing, and this is a far more important deficiency than the lack of instrumental techniques. Much could be accomplished if our own diplomats and economists, while looking at the fiscal policies, capital investment needs and foreign credit problems of one-crop economies, would incorporate in their analyses and pronouncements the net economic returns from investment in health. They would be acknowledging their understanding of a basic problem of underdevelopment of a magnitude quite foreign to their European or homeland experience. They would be admitting that the level of human productivity in a hookworm belt may not respond dramatically to export subsidies. Lacking any reliable formula for correcting underdevelopment, one can at least fall back on the observation that a preventable disease is an expensive and unnecessary handicap for a start in any endeavor.

Unfortunately, few economists discuss public health at all and most of those who do seem to be carried away by the demographic aspects exclusively. True, health measures applied to a population with high fertility and high mortality rates will explode the population (Ceylon) and a subsequent decline in birth rate, although usual, cannot be relied upon. We can save lives faster than we can produce jobs. But who will decide which areas will be allowed to keep their high mortality rates; who will take this responsibility for selective genocide? We might do well to associate our Malthusian concern with a less gruesome - even though less "natural" - method of birth control. As Gunnar Myrdal says: "The urge to prevent illness and death cannot be inhibited; it is planted too deeply in our Western system of ideals, which is now strengthening its hold all over the world. . . . High mortality in early ages and poor health at every age in the population . . . imply a great waste of productivity which we must try to combat. This is, in fact, a very important part of an effective plan for economic development."

The age structure of an unhealthy population of high fertility may yield as much as twice the number of mouths to feed as it does hands to work, relative to a healthy population, because of the smaller proportion which survives to enter the productive age. A larger fraction of children are fed and housed only to die before reaching an age at which they can contribute to the economy. The productivity of the survivors, moreover, is reduced by the same disease that kills those who have never produced. In 1880, only 14 percent of all Americans born lived

through the productive years to reach the age of 65 or more, while today approximately 50 percent reach or pass that age. This addition to adult human resources provides an enormous economic asset not enjoyed by underdeveloped areas. Since the situation often can be rectified, sometimes at a cost of fifty cents per capita, its correction would seem to appeal to an economic advisor as a sound recommendation, in the interests of putting first things first.

In a political environment of ideological contest, or in an economic environment in the throes of foreign exchange deficiencies, both so common today, the proponent of health is often a budgetary stepchild because his motives are appreciated only from the humanitarian aspect rather than from any dynamic economic significance. Vital statistics are not seen as a component of the "cold, hard facts" of immediate urgency, while they are, in reality, the coldest and hardest facts with which we must contend, as was recognized by Edmund Halley in 1693. Health, it is thought, will naturally follow the attainment of commercial goals as it did in the industrialized nations. To try to do this in extractive economies is to put harvesting before planting.

Buried too remotely in medical textbooks and reports are the stories of what disease has done and is doing to commerce and to productivity. I do not mean the wrecking of Europe by the Black Death, or the story of typhus in Eastern Europe, or the commercial catastrophies caused by cholera - these were the great scourges which, although skipped over far too lightly in conventional histories, are not likely to occur again in such proportions.

What fails lamentably to be transferred from medical to economic and historical knowledge are the studies of the more chronic and insidious ways in which disease warps an economy. In general the economic, and both the direct and indirect cultural effects of disease, have been only partly recorded, poorly interpreted and mostly forgotten, at a time when we have the urgent obligation to be acutely aware that such processes, historical to us, are major economic drains in the here and now in underdeveloped areas. Back of the modern enclaves of spectacular development in the tropics, represented by the capital cities and large ports with which we are too exclusively familiar, lies the supporting hinterland, a shaky basis. Here disease, far from merely representing a "health problem," plays a role of vast socioeconomic significance directly related to our stated foreign policy objectives.

Here is underdevelopment at its root, enmeshed with multiple needs of productivity, transportation, markets and schools. But the worker is a sick man and he will produce only as sick men produce and his children will learn only as sick children learn. In the complicated network of economic deficiencies, the improvement of a man's health is an achievement that will neither create a new need, nor in turn depend upon another capital investment for its success. It is unique in that it is a successful end in itself, economically basic, politically unquestionable, and in most cases technically negotiable. Sometimes, as in the eradication of a disease, it is a single investment, ended forever, a paid-up endowment for the infinite future. We are living on such an endowment; the underdeveloped areas are not, and this most acute difference is reflected on every facet of economic and cultural contrast.

We need to take a deeper look at public health efforts in underdeveloped areas, far beyond even the most cogent of humanitarian motives, into the concise economic potential of these endeavors in relation to what we are trying to do. Also, if our objectives of economic development recognize a health sector, then we must look more carefully at what medical investments will have economic meaning and what will not. Judgment requires an understanding of the rather unique role of the clinical physician in the urban centers of underdevelopment. A certain degree of foreign liaison is in his hands due to his knowledge of languages and upon returning from training abroad he quickly finds himself in a position of prestige and influence. He tends to institutionalize his specialty and personalize his career, too often associated with redundant research. He may advance his knowledge and skill to a high level but his pursuits are those of foreign-oriented clinical medicine and, although valuable to a few, they are often irrelevant to the major needs of his country. As a consequence, competent heart specialists are available where one searches in vain for a plumber, and skillful brain surgery is performed in lands where myriads of large towns have not a single physician. Institutes are expensively equipped to care for infantile paralysis, cerebral palsy and relatively exotic disorders while, nearby, the untreated but preventable diseases deprive the economy of millions of man-days of productivity annually. In India, enteric diseases alone are estimated to cost the nation a billion man-days of productivity each year.

A striking fact should impress the economist at this point: several hundred farmers bed-ridden with yaws can be put on their feet for a cost that may bring but slight improvement in only one case of a neurological

disorder. It would be absurd to decry the elevation of scientific clinical medicine in the capital cities, but it should be obvious that, if foreign assistance seeks to directly promote economic development, the first public health objective must be the control of the preventable diseases now crippling rural productivity in the extractive economies of underdeveloped areas.

Among the myriad unknowns in planning for economic development, among market manipulations in non-ferrous metals, rubber and coffee, among proposals for costly capital investment where capital doesn't exist and therefore must be loaned or given, we can cite this one truly basic factor with a perpetual detrimental effect that is indisputable, with a remedy that is at hand and inexpensive and which, once removed, will unquestionably yield economic benefit. The despair of planners is the requirement of balance in economic development, always beyond capital means and usually predicated on discouragingly long-range education and cultural change. Let the economist note that campaigns against disease require neither balance in other sectors of the economy nor cultural shifts but need only preparatory health education. One of many examples of this phenomenon is the successful campaign conducted by the World Health Organization against one million cases of yaws in Haiti. Why can't we bring ourselves to drive with impact at the point we know to be vulnerable when the opportunity is so ripe, the cost so little, the service so welcome and the economic and political benefits so certain, in this increasingly uncertain field called economic development?

Malaria kills 6,000 and disables 500,000 inhabitants of the underdeveloped world every 24 hours although annual cases of malaria already have been reduced from 300,000,000 to 200,000,000 in the last ten years. The enormous worldwide campaign now being launched has the goal of eventual eradication. Unfortunately it is seldom possible to measure concisely the productivity gains even from much smaller programs and most figures are estimates. When we are able to do this in finite terms of tons of rice, or man-days of work, or per capita earnings, or export-import balances, or absenteeism from school, factory and farm, or in any other unqualified measure that can be compared with the per capita cost of the program, we usually have a startling statistic for those who seek a dollar yield on a penny investment.

The need is there. The economies of the underdeveloped areas that circle the globe are almost entirely extractive, largely agricultural, and whether on a subsistence basis or at the level of export,

productivity stems chiefly from the physical capacity of human labor. Millions upon millions of the workers are staggering under the load of debilitating diseases, their physical and mental growth stunted by hookworm, their feet ulcerated with yaws, their strength sapped by schistosomiasis or African sleeping sickness and their initiative drained by malaria. They scratch the soil to feed their own intestinal worms which consume not a negligible fraction of their scarce food (and of our relief shipments). The malaria, the worms and most of the other diseases give them an enervating anemia invisible beneath their dark skins, leading to what is too casually referred to as tropical apathy. The word "mañana" often simply signified anemia.

The visitor, if he is not blind to the relation between the yield of a hoe and the strength of the hand that holds it, readily senses the loss in productivity. What he does not see is the stunted growth, the loss of initiative, the dulled mind, the distortion of the entire age structure of the population and the deep and permanent effect on culture itself and hence on the capacity to absorb, utilize or even be interested in proposals for economic development.

Techniques are available. A foreign policy that sponsors a technical action must tangibly fulfill its promises or go down in public opinion as being either insincere or naive and the conundrums of the underdeveloped world present just these dangers. This urgent need for tangible results should swing more of our attention to programs in preventive medicine, where we know our tools and know how far they will go with reasonable certainty. Furthermore, an American action policy should propose techniques in which Americans themselves have a recognized competency. In programs directed against preventable disease, we are limited only by the progress of science and by the opportunity to demonstrate its utility beyond our shores as we are doing in the case of malaria.

The cost is negotiable. Let us ignore for the moment the humanitarian satisfaction gained and the political goodwill engendered by improving the health of a population. At this point let us think only of economic gains in productivity versus the cost of creating a producer, but particularly with reference to how much upkeep such a program requires. A man with "crab-yaws" of the feet - and there are millions - can be put on his feet with penicillin for less than one dollar, including administrative costs. If his value as a producer is only ten dollars a year, the economic returns are too obvious for comment, but it should be noted that this investment does not lead to new needs. A bulldozer

gives rise to the immediate secondary needs of bridges, fuel and maintenance, and many a bulldozer rusts away in the jungle for that reason. But the introduction of a well man into an economy does not create problems - it solves them, and the follow-up of a program against a preventable disease (the "surveillance") is usually within the financial and technical capacity of the country. Therefore we have introduced into the economy, at small cost, a catalytic element of production without creating more secondary problems and needs, and without committing ourselves in perpetuity. Isn't this what the economists are looking for?

Let me hasten to acknowledge that in using yaws as an example, I have selected a disease in which costs versus returns are unusually dramatic. To control the diarrheal diseases we need expensive water supply systems, but in this case there are additional returns beyond the field of health which repay the investment with dividends so familiar to us that we take them for granted, i.e., the opportunities for economic development on a broad geographical basis by making the small town a safe place to live in and hence to invest in. Perhaps the most difficult challenge is sleeping sickness, which renders virtually idle 4,500,000 square miles of fertile land in Africa - an area much larger than the United States - which is waiting to become the world's largest land reclamation project.

The objective is usually feasible. The use of the word "feasibility" in public health does not differ from its use in economics; it is not synonymous with "possibility." An assault on a preventable disease becomes feasible if the cost is commensurate with the returns, if the time required is reasonable, and if subsequent maintenance of control measures can be expected. I doubt that in the entire field of endeavor in economic development there await such opportunities in terms of feasibility as in some of the programs in preventable disease. But they await the assignment of priority, apparently because the economic aspects are not generally understood, the present endeavors against malaria notwithstanding.

The programs are acceptable. Anthropologists have contributed invaluable advice in describing actual or potential cultural resistance but they provide guidance, not discouragement. Although an occasional doctor is speared by jungle savages, we are not dealing with savages in our economic development. We are dealing with ignorance, poverty and disease in civilized races composed of people whose burdens have taught them pragmatism. If an injection seems to cure a tropical

ulcer, injections are accepted and often demanded. In contrast, let us admit candidly, few public health programs anywhere in the world have met a cultural obstacle more formidable than the recalcitrancy demonstrated by organized groups in the United States against vaccination and flouridation of water.

The emerging truth is that, in spite of the huge educational needs and the pervading mysticism, programs in preventive medicine encounter perhaps some initial doubt, but eventually an easily won appreciation in the pragmatic hinterland. Nor is acceptance luke-warm in the capital cities when American cooperation has proven its worth in health programs. The leading Brazilian newspaper said editorially on April 7, 1956, in reference to the U.S.-Brazilian Cooperative Health Program, that it "has become one of the greatest monuments to the traditional friendship between the United States and Brazil - a friendship so often referred to and so seldom proved. Our two countries should not let SESP silently fade away to leave still another skeleton on the road of international cooperation."

The economic effect is at the root. The writing of mature economists who have more than an armchair experience with underdevelopment reveal a viewpoint somewhere between reticence and downright pessimism as to the greener meadow over the underdeveloped hill. The capital investment requirements are far beyond local means and capital is seldom generated in a population of low productivity increasing at more than two percent a year. Private foreign capital is helpful but is insufficient and not always welcome. Foreign government loans and grants cannot suffice while military expenditures continue and in any event, are governed by the limited absorptive capacity. Each investment, however wise, leads to new requirements.

In short, the twentieth century has no ready solution for the problems of disparity it has created by leaving so much of the world in the eighteenth century. As a result, economists ask us to accept the fact that much of the world's population must remain at a subsistence level for a long time to come, and even this is threatened by the population explosion. Very well, accepted, but the producer is still there and he must produce, die, or be fed by others. The quickest, cheapest and easiest means of increasing his productivity may be to rid him of those diseases we can conquer, an endeavor untroubled by questions of absorptive capacity. This at least will give him the strength to maintain his subsistence and remove him from the debit side of his country's economy, poor as it may be. It is Gunnar Myrdal's opinion that

considering "the virtual certainty that foreign credits and aid from the advanced countries will continue to be relatively insignificant in relation to needs, it is difficult to avoid the conclusion for most of the underdeveloped countries that, looking at the matter objectively, the most probable outcome is failure and consequent social disintegration and political upheavals. A reservation has to be made, however, for an imponderable in the problem: the faith and devotion of their intellectual and political leaders."

Mr. Myrdal might have pointed out that if our ultimate hope is in such leaders, their hope in turn is in the stamina of their human resources, now taxed with preventable disease. Our contribution here, at least, would not "be relatively insignificant in relation to the need." If we are interested in grasping the initiative in an ideological contest, this point might bear looking into while we still have certain strategic advantages that may not always be ours.

* U.S. GOVERNMENT PRINTING OFFICE : 1960 O—564269