

TROPICAL MEDICINE IN OUR TIME: DEVELOPMENT, RESPONSIBILITIES AND NEEDS*

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There are those who believe that we should ever look forward and should eternally fix our eyes on far distant goals, but sometimes it is pleasant to turn backward and in a contemplative mood review the events and vagaries of the past. I had been thinking about the genesis of the American Society of Tropical Medicine and its early activities, and in so doing found great satisfaction in perusing again Ernest Carroll Faust's warm and vibrant account of the first 40 years of that Society's existence. This led me to other thoughts of the past and provoked a curiosity with regard to conditions which existed at the time that Society was founded. You will recall that the Society was organized in Philadelphia in 1903 but that the charter did not become effective until early 1904.

In many respects these years were eventful ones in tropical medicine and witnessed basically important discoveries. They marked the elucidation of the etiology of kala-azar in the separate investigations of Leishman, Donovan, Rogers and Cathoire, and the description of *Leishmania tropica* by Wright. Castellani discovered trypanosomes in the cerebrospinal fluid of sleeping sickness patients and Bruce and Nabarro elucidated the method of transmission of the parasite. Katsurada discovered *Schistosoma japonicum*. Gautier and Raybaud at Marseilles transmitted plague from rat to rat by means of the bites of fleas. Graham in Beirut successfully infected human volunteers with dengue through the bites of mosquitoes. African tick fever was first described as a spirochetal infection by Cook. The year 1904 witnessed the appointment of the Royal Commission on Malta Fever, which a year later was to establish goat's milk as the source of infection. Finally, Watson in Malaya was demonstrating convincingly the basic principles of species sanitation in the control of malaria.

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The chief causes of morbidity and mortality in the United States at that time were the infectious diseases. The construction of the Panama Canal had not yet begun and most of the great achievements in sanitation and disease control were yet to be realized. The annual report of the Surgeon General of the U. S. Public Health and Marine Hospital Service for the fiscal year ending June 30, 1904, listed for the continental United States 1,228 cases of yellow fever with 139 deaths and 17 cases of plague with 17 deaths.

With a population in 1904 of 82,165,000, there were approximately 100,000 cases of typhoid fever with 26,400 deaths; about 90,000 cases of malaria with 3,500 deaths; close to 300,000 new cases of tuberculosis with 167,000 deaths; and 25,106 cases of smallpox with 1,118 deaths. The registration areas at that time comprised only 17 states plus a few cities outside such states.

In 1958, with the population of the country practically doubled, there were reported 1,042 cases of typhoid fever with 23 deaths; 85 cases of malaria with 6 deaths; 63,000 new cases of tuberculosis with 12,361 deaths; and no cases of smallpox.

Between 1900 and 1955, the mortality rate per 100,000 from infectious diseases was reduced from 115.9 to 0.4 and the mortality rate per thousand in children under 5 years of age from 19.8 to 1.1.¹

By the time of the birth of the Tropical Medicine Society, the great 19th century discoveries in bacteriology and parasitology were beginning to pay dividends. The etiology of many infectious diseases was now clear and the science of public health was being born. Central water and sewage systems were coming into being in our cities and even in some of our smaller towns. The way was paved for the control of many of the principal bacterial, viral and parasitic diseases which accounted for the highest morbidity and mortality.

LAYING THE FOUNDATIONS

The Spanish American War served as a great impetus to tropical medicine in the United States.

This represented the first major foray of our armed forces into tropical areas. The Navy's disease record was excellent but the Army was faced with greater sanitary difficulties. During 4 months of the summer of 1898, 67 of its officers and 1,872 of its enlisted men died of disease out of an average total strength of 227,494.² The disease ridden camps at Tampa and in Cuba were described vividly by war correspondents not lacking in imagination.

With the Treaty of Paris, the United States became a colonial power, even though one of small dimensions. If the Medical Department of the Army was in any way at fault for the disease losses of the war, it soon retrieved itself brilliantly. The Yellow Fever Commission under Walter Reed solved the age old problem of yellow fever transmission. Gorgas, Carter and LePrince cleaned up Havana and other Cuban cities and obtained the knowledge and experience which was to stand them in such good stead in Panama. Bailey K. Ashford recognized hookworm disease in Puerto Rico and laid the foundations for the School of Tropical Medicine at San Juan which later was to provide research facilities for many American and Puerto Rican workers. In the Philippines, the Bureau of Government Laboratories was organized in 1901. In 1905, the name was changed to the Bureau of Science. This institution, now known as the Institute of Science and Technology, has contributed magnificently to tropical medicine research. Among the great names associated with the early investigations were the Americans Strong, Walker, Sellers, Haughwout, Siler, Craig, Vedder, Simmons, St. John, Kelsner and Reynolds, and the Filipinos Tubangui, Manalang, and others.

The Rockefeller Sanitary Commission which had made such great strides in the control of hookworm disease in our Southern States gave way to the International Health Board in 1913. Under this banner, the research and preventive medicine programs sponsored by the Rockefeller Foundation practically girdled the tropical world. The hookworm campaign alone extended to 52 countries in 6 continents and to 29 islands of the seas.

The establishment of the Peking Union Medical College in 1915 under the aegis of the China Medical Board was followed by a notable list of researches in tropical medicine by American members of the faculty. These men included

Loucks, Meleney, Young, Faust, Kessel, the Hertigs and others. In the meantime in China, medical missionaries such as Barlow and Wassell carried forward the research tradition and made substantial contributions.

The School of Tropical Medicine at Harvard was founded in 1913 under Richard Pearson Strong. Strong was a firm believer in the value of field research and the many tropical expeditions headed by him and Shattuck provided unusual opportunities for junior associates and brought widespread recognition to the school. Later the School of Hygiene and Public Health came into being at The Johns Hopkins University, and Cort, Hegner and Root led study groups to many parts of the tropics. In 1929, the Gorgas Memorial Laboratory began operations under Herbert Clark.

Thus the first three decades following the Spanish American War witnessed the flowering of tropical medicine in the United States. "Adventure beacons through the summer gloaming" and those who heeded the call blazed trails through many a far land. When these Argonauts of Science came homing to take up anew their laboratory research, they did so with intimate knowledge of the conditions they were studying.

CHANGING TIMES—CHANGING PATTERNS

Unlike the Spanish American War, the resurgence of interest in tropical diseases inspired of necessity during World War II was of short duration. By 1953, this Society was considering ways and means of impressing on government officials and others the importance of tropical medicine in relation to our national economy and our international obligations.

Fortunately the Army and Navy were able precariously to salvage a few remnants from World War II activities in the field. The Navy's research units at Cairo and Taipeh have contributed notably to progress in tropical medicine, as have the Army's 406 Medical General Laboratory in Japan, its Tropical Research Medical Laboratory at San Juan and its research unit at Kuala Lumpur. The Rockefeller Foundation has continued its interest in arbor virus research. In the meantime, the Liberian Institute for Tropical Medicine has been established. The National Institutes of Health have finally gained a research foothold in the tropics in the shape of the Middle America Research Unit in the Canal Zone, operated in co-operation with the Army.

Many foreign programs have encountered staffing difficulties. There has seemed to be a lack of interest on the part of American workers in overseas assignments. The situation is reflected in the record of fellowships and research grants in this country during the 5-year period 1954-1958 inclusive. Of 2,545 medical fellowships granted by government and private agencies to United States citizens, only 172 were in tropical medicine. Of these, 104 were in the Louisiana State University program in San Juan or San Jose. The remaining 68 fellowships were taken at various places—19 in the United States, 5 in England, and 44 in tropical countries.

During the above-mentioned period 164 grants were made for research in tropical medicine by government agencies and private foundations in this country. Of these grants, 51 were for projects to be carried out in whole or in part on foreign soil, *i.e.*, in countries other than the United States, the former Territory of Hawaii and the Commonwealth of Puerto Rico. In only 20 of these grants were American research workers represented.

The unpopularity of overseas posts stems from a variety of reasons. For one thing, research in tropical medicine is now more highly specialized than in the developmental era. An analysis of research grants would indicate that the majority of the work represented is basic in character. The interests of specialists are not sufficiently broad to lure them from the cozy comfort of their highly instrumented laboratories to overseas institutions not so elaborately equipped.

In many instances funds for travel and maintenance in foreign assignments are not adequate. The individual is frequently required to assume unusual and unanticipated expenses for which regulations do not permit reimbursement.

In the past, recruitment of health personnel for its medical programs overseas has presented a difficult problem for the International Cooperation Administration. Many of its foreign staff have been reserve officers of the Public Health Service; some are in the State Department reserve. Unfortunately these people have no assurance of continuous employment. Many of them have made considerable sacrifices in the course of their foreign assignments only to find on their return home that there is no further need for their services.

If this country is to continue its foreign aid

programs which have been in force for so many years under different designations, it should develop a career service. Such a development would be instrumental in attracting and retaining better trained and better oriented personnel.

France, faced with this same problem, established in 1944 the Office de la Recherche Scientifique et Technique Outre-Mer (O.R.S.T.O.M.). This organization recruits and trains scientific personnel in 21 different disciplines for overseas research. The medical science categories include entomology and helminthology. After a 2-year period of training, the candidate is integrated into the permanent scientific cadre of O.R.S.T.O.M. Overseas pay and allowances vary with the post of duty and according to European standards are quite generous. Housing is furnished for a nominal fee and medical care is provided. A foreign tour of duty lasts from 15 months to 3 years. Between tours the individual is permitted a long vacation in France. The accepted candidate may rise to the rank of inspector general. Retirement with suitable pension comes after 25 years of service at ages 57 to 59, depending on grade.

There are many scientific laboratories in the tropics which would welcome more American visiting scientists. However, instead of encouraging such activities, government and private agencies bring large numbers of foreign health workers and scientists to this country. In fact, the Jones Committee in its recent report³ on "Federal Support of Medical Research" has stated: "The dread diseases know no geographic boundaries and the research on these great problems should therefore be truly international." The committee recommended that additional support be given to foreign scientists and that an international medical facility be established at the National Institutes of Health. These recommendations are commendable. However, they do not represent a well rounded program. It would be much more rational if the program provided for more foreign research opportunities for American workers. An adequate comprehension of foreign research needs in the "dread diseases" can hardly be acquired without observing these diseases in their endemic areas.

Spink⁴ has pointed out that the infectious diseases will continue to menace the United States for some time to come. He believed that it is essential for an adequate number of young

physicians to receive comprehensive training in the natural course of infectious diseases. This training can best be obtained in the tropics where clinical material is available in abundance. In this connection, the summer clinical training program in tropical medicine for students at the College of Medical Evangelists is especially noteworthy.

It must be recognized that after training under near ideal conditions in the United States, many foreign scientists become discouraged and disheartened after returning to their homeland where facilities are often much more modest. The acquisition of knowledge from visiting American workers might be of greater benefit in the long run without the risk of developing psychological handicaps.

HEALTH NEEDS IN THE TROPICS

Measurement of health needs in the tropics presents a difficult task. It is not possible to obtain a true picture of the extent of disease because epidemiological services for many parts of the area are non-existent or are only poorly developed. The reporting of vital statistics from these areas is very incomplete. For instance, the data relative to infant and neonatal mortality are lacking for many countries. Certain of the infectious diseases are generally notifiable but a large number are not reportable in most countries. These include many of the parasitic, mycotic, and viral diseases.

An accurate evaluation of the nutritional disease problem is almost impossible at this time. There is no complete information on composition of diets in various tropical countries and no complete coverage of caloric and protein intake. Information is especially needed on sources of protein.

Protein malnutrition may not only lead to serious disease and death in young children; there is evidence that it may also leave sequelae which adversely influence health in later life. This and other nutritional deficiencies affect both physical and mental development. The relationship between mortality in a given age group and malnutrition is invariably complex, because of numerous factors other than nutrition which influence the health of the individual. Information concerning the incidence of malnutrition which any available figures can provide cannot be regarded as more than suggestive.

Health problems in many parts of the tropics are intimately linked with other factors. These factors are multiple and it is difficult to assess their influence on disease per se. Such factors include social mores, native cultures, religion, education, food production and distribution, transportation facilities, sources of energy, general economic levels, and others. All of these are more or less intertwined with disease problems.

In the lesser developed areas, the illiteracy rate is 65 per cent in contradistinction to only 5 per cent in the more developed areas of the world. There are only 75 miles of road per 1,000 square miles of area in the tropics as against 1,000 miles in the same area in developed countries. Gross national product per capita in dollar equivalents runs about \$120 for the tropics whereas it is approximately \$1,400 for Western Europe and the United States and Canada.⁵

There are other indices which point up striking differences. For instance with 43.0 per cent of the world's population in 1957 tropical countries produced only 29.86 per cent of the world's electric energy, had only 12.15 per cent of world railway traffic, and possessed only 9.4 per cent of the world's automotive vehicles.⁶

Even though it is not possible to portray the true extent of disease in the tropics, there are certain criteria which give some inkling of the seriousness of public health problems in this part of the world. Three of these indices comprise infant mortality, proportionate mortality (the percentage of deaths under 5 years of age), and life expectancy at birth. These indices in the tropics may be compared with similar ones in the United States and certain northern European countries.⁷

The highest infant mortality rates per 1,000 births occur in Africa, followed by Asia, South America, Oceania, Central America and the Caribbean area. In only two countries in this vast area is the reported rate lower than that of 26.3 in the United States; these countries are Lebanon with a rate of 12.1 and Guam with a rate of 24.0.

In the case of proportionate mortality, the rate is again highest in Africa (64.0) followed by slightly lower rates in Asia, the Caribbean area, Central America, and South America in that order. In no tropical country does the rate parallel that for the United States (8.0). Even

lower rates are found in northern European countries, such as Sweden with 3.3.

In the United States, life expectancy at birth was 69.6 years in 1956. In no tropical country is the average life span as high; in most, it is much lower.

The remarkably high mortality rates among infants in the tropics are associated mainly with infectious and nutritional disorders. The infectious diseases are the chief cause of general mortality. Among 20 countries in the Americas, they are the main cause of death in 16.⁸

RESOURCES AVAILABLE FOR HEALTH NEEDS IN THE TROPICS

It is obvious that health needs in the tropics are not being met and that resources must be grossly inadequate. It may be questionable of course whether health needs in any community are ever entirely satisfied. However, in the case of the underprivileged countries, we have certain criteria which indicate the wide gap which exists between needs and resources.⁹

For instance, there are in the United States 756 persons per physician. For Africa, the figure is 9,000; for South Central and Southeast Asia 7,000; for the Near East 5,000; for Oceania 3,800; and for tropical America 1,900.

In the case of graduate, registered nurses, there was in the United States in 1958 one employed nurse for each 353 inhabitants. For 1957, the following are the figures for the number of persons per nurse in various tropical areas: Near East 12,100; South Central and Southeast Asia 11,700; Africa 4,900; tropical America 3,800; and Oceania 2,100.

In the United States, there are 9.01 hospital beds per 1,000 population. In South Central and Southeast Asia the figure is 0.64; in the Near East 1.24; in Africa 1.79; in tropical America 3.16; and in Oceania 6.01.

The Federal Government per capita expenditure for health in the United States in the fiscal year 1957-58 was \$11.60. In 1957 the corresponding figure for South Central and Southeast Asia was \$0.83; for Africa \$1.21; for the Near East \$1.66; for tropical America \$2.68; and for Oceania \$4.51. These figures do not include capital expenditures.

These stupendous gaps between health needs in the tropics and the resources available to meet them can probably not be closed for many

years to come. In fact, there is good reason to believe that in certain areas the discrepancies may become even greater before improvement can be expected. At present the independent countries of the tropics have a per capita health expenditure considerably lower than that of countries in which health services are subsidized by a metropolitan power. The accentuated movement for independence in Africa is bound to react adversely, at least for a time, on health services. The seventeen newly independent areas are not in a position to match services, either in terms of money or personnel, with those which have been maintained by the metropolitan powers. Africa has received more bilateral aid per inhabitant than has any other part of the globe.¹⁰ For the period 1954-1956 this aid amounted to \$7.33 per capita, more than twice that of any other continent. Of this \$7.33 the United States contributed only \$0.64; the remainder came from European countries. It seems extremely doubtful that these countries will continue to pour the same amount of funds into the newly created African republics. It is also doubted that the United States will ever make up the deficit, although the International Cooperation Administration is inaugurating a special Africa program this fiscal year.

The situation as regards research will probably worsen also. Of the approximately half a hundred medical research institutions in Africa, nearly all are staffed by European scientists. In the past there has been a heavy exodus of research investigators from areas with a newly won independence. Research is inevitably one of the first activities to suffer when funds are inadequate. In the long run any lessening of research efforts in the tropics will result in decreased disease control and lower health standards.

The United States has been generous in its support of international health programs. This aid takes many forms and comes from many government agencies. The Bureau of the Budget has calculated that our actual fiscal year 1959 obligations for such programs amounted to 154.9 millions of dollars, of which 114.8 millions were included in the Mutual Security Program.

OUR STAKE IN THE TROPICS

The tropics constitute vast reservoirs of raw materials in many of which this country is

deficient. The industrial machine of the United States would be subjected to heavy strain if the steady flow of strategic raw materials from the free nations of Africa, Asia and Latin America were cut off or seriously reduced. We import from these areas 100 per cent of natural rubber, tin, industrial diamonds, graphite, abaca, and quebracho; 86 per cent of manganese ore; 78 per cent of bauxite; 60 per cent of cobalt; and considerable amounts of chromite, tungsten, platinum, mercury and other materials.¹¹ Of the materials needed for one jet plane, we import 92 per cent of the chromium, 97 per cent of the nickel, 76 per cent of the aluminum (bauxite), 35 per cent of the copper and 88 per cent of the cobalt;⁶ most of these come from tropical countries.

It is probable that our dependence on tropical areas for raw materials will increase as time goes on. The President's Materials Policy Committee headed by William S. Paley estimated that by 1975 United States consumption of all raw materials will increase by 53 per cent, with increases in total minerals of 90 per cent, non-ferrous metals 85 per cent, mineral fuels 97 per cent, and other nonmetallic minerals 133 per cent. Most of these materials will have to come from the free world outside the continental limits of the United States, and a large proportion of them will be obtained from tropical areas.

Our trade with tropical countries varies from year to year. Actually, there has been a percentage decrease during the past 10 years, as Europe has increased her industrial capacity. For instance, imports from the tropics in 1949 represented 59 per cent of total imports; in 1953 they amounted to 51.5 per cent; and in 1959, 42.1 per cent. Along with declining imports, there has been a corresponding decline in exports to tropical countries, as European countries have taken more of our goods.

United States private investment abroad is increasing year by year. In Latin America alone in the last 30 years, it has increased from 3,600 million dollars to 8,730 million dollars.¹² At the end of 1959, total United States investment abroad was more than 30,000 million dollars, of which 46.22 per cent was in the tropics.¹³ The returns on this investment are affected by tropical diseases just as these diseases add to the cost of imports from tropical countries.

In one of its special survey reports, the magazine *Business Week* estimated that by 1975 United States investments abroad will amount to 75,000 million dollars, of which approximately 55,000 million will be invested in Latin America, the Middle East and Africa.¹⁴

THE TROPICAL DISEASE TAX

Unfortunately, when it comes to the economics of tropical disease, we have few factual data upon which to draw conclusions. Some of the data are no doubt suspect.

It has been stated that annual expenditures on medical services by the Standard-Vacuum Oil Company in Indonesia, an amount equivalent to 10 per cent of total wages and salaries, have paid off in an extremely low "noneffective sickness rate."¹⁵ The figures on absences caused by malaria are particularly impressive. In 1940, the average absences because of malaria were over 8 per cent of total employment, while in 1956 the figure was down to 0.3 per cent. In addition, a well-planned anti-tuberculosis program has resulted in a reduction in annual occurrence of new cases to a low rate of less than 1 per cent. Jonk¹⁶ has published an interesting account of the medical operations of this same company.

Since malaria is one of the few tropical diseases in which spectacular advances in control have been achieved in recent years, it is pertinent to estimate savings from such control.¹⁷ Malaria is said to have cost Afghanistan 20 million dollars per year and Ceylon about 30 millions. In India, the disease exacts a toll of about \$500 million per year, a sum about two and one-half times the calculated price of eradication. The annual loss from malaria in Mexico is reported to be \$174 million; the estimated cost of eradication is approximately 20.5 million dollars.

Calculated costs of a malaria epidemic in 1953 in Kao-shu Township in southern Taiwan amounted to \$29.64 per person, whereas the per capita cost of malaria control in Taiwan at that time was below \$2.28. In Thailand before 1950 malaria is said to have been responsible for an annual loss of 50 million agricultural-worker days, an amount of labor sufficient to produce 150,000 metric tons of milled rice with an export value of \$15 million.

Attempts have been made to estimate the economic loss due to schistosomiasis in certain areas.¹⁸ The World Health Organization Leyte

schistosomiasis project in the Philippines calculated the annual wage loss for 125,000 infected persons at \$1,350,000. The total medical expenditure for 100,000 persons who showed definite symptoms was \$5,282,500. In Japan the economic loss, plus the cost of treatment for sufferers in an area of 90 square miles, was reckoned at \$3 million per year, and the loss for the Island of Kyushu at \$2,500,000. In Egypt, where the disease is hyperendemic, the reduction in total economic productivity is estimated to be some 30 per cent, and the financial loss \$57 million annually. Medical treatment for 1,700 American soldiers infected in Leyte during World War II cost \$3 million, and it was calculated that 300,000 working days were lost. In *Schistosoma japonicum* infections the working ability of patients is reported to be reduced by 15 to 18 per cent in mild cases, by 50 to 57 per cent in moderate cases, and by 72 to 80 per cent in severe cases.

Some of the cost of tropical diseases is passed along to the ultimate consumer of the products or goods produced. It has been estimated that such products are priced at least 5 per cent higher than need be if it were not for the cost of malaria.¹⁹ The total value of United States imports from malarious areas in 1958 was \$2,156,180,500. A 5 per cent added cost for these imports would amount to \$107,809,025. Acceptance of figures such as these must of course be tempered with judgment and reservation.

Even in the United States, the infectious diseases are the cause of considerable loss of working time. According to the National Health Survey, 237.5 million days were lost from work because of respiratory diseases by all people 17 years of age and over during the year July, 1957, to June, 1958. At the same time, 24.2 million days were lost from work because of infectious and parasitic diseases. The loss of 261.7 million work days is equivalent to an annual wage loss of 2 billion 617 million dollars.²⁰ In spite of the magnitude of these figures, losses from similar diseases in the less sanitized countries would probably be significantly greater.

It would be much easier to calculate monetary losses from animal diseases if reliable data were available concerning the extent of such losses. However, reporting in this area is even less satisfactory than is the reporting of human disease. In fact, the Food and Agriculture Organization of the United Nations makes no

attempt to summarize the number of cases of animal disease but issues reports in terms of relative prevalence. In Colombia, however, official estimates²¹ put the annual economic loss from diseases of cattle to be 526,797,300 pesos or \$210,718,920. In Argentina, a country contiguous to tropical areas, a survey²² has estimated the annual losses suffered by the livestock industry from brucellosis to be 900 million pesos or 50 million dollars and from hydatid disease 25,500,000 pesos or \$1,416,600.

WEAK POINTS IN OUR PLANNING

We have seen that this nation has a considerable economic stake in the tropics and will probably have increased dependency on this part of the world for essential raw materials. It is also recognized that the underdeveloped countries are politically important to us.

It would seem that we have failed in some respects to prepare ourselves for the responsibilities which we have assumed in the international health field. We have already pointed out recruiting difficulties in connection with these programs. Other areas point up deficiencies.

Thurber, Frye and Swartzwelder²³ have recently made a survey of the teaching of tropical medicine and parasitology in the United States. Only one of the seventy-six medical schools reporting maintained a separate department of tropical medicine. There was a greater tendency than formerly to integrate courses in tropical medicine and parasitology into those of other departments so that the disciplines tend to lose identity. Teachers of these subjects in approximately one-third of the schools lacked any experience in the tropics; 56 per cent of them did not belong to either the American Society of Tropical Medicine and Hygiene or the American Society of Parasitologists. These and other facts brought out in the survey would tend to indicate decreasing emphasis in the teaching of tropical medicine and parasitology. The situation with regard to tropical experience of faculty members would no doubt be less encouraging if it had not been for the eminently successful training program of the Louisiana State University in providing opportunity for such experience.

Some of our public and private research grant and fellowship programs in tropical medicine have not been as productive as one might wish. Some provide a picture of many isolated indi-

viduals delving into minor problems on the outer fringes of tropical medicine. They are in contrast to a relatively few outstanding projects exhibiting well coordinated research on problems of major importance. It is hoped that the newly established institutional grant program at the National Institutes of Health will stimulate more effective research in tropical medicine.

Perhaps no single area signalizes the lack of concern in tropical medicine in this country as much as do the various fellowship programs. They indicate only a mere trickle of interest. There is a bright spot in this picture though—that is the training programs newly sponsored by the National Institutes of Health. These provide for a period of instruction to be followed by research overseas.

The World Health Organization is embarking this year on a research program in its own behalf. The research proposals for the infectious and parasitic diseases emphasize vividly the vast chasm existing between present knowledge and that required for control. WHO will need personnel for this program. Such personnel is not readily obtainable. This country will in the future no doubt be called upon for its share.

L'ENVOI

I have endeavored to analyze the position of tropical medicine in this country in the light of its past history, its present status, and its future responsibilities. Undoubtedly its star is rising from the low point in 1953.

The Society and its individual members have had a considerable hand in this improved situation. Our Public Relations Committee has functioned effectively. Our members in professional and academic institutions have stimulated interest among students and are in a position to do even more in this respect. There is much the Society can still do.

Clinical tropical medicine is a dying art in this country. One of the reasons for its practical demise is the lack of opportunity for clinical research. We should have some facility whereby young physicians could find support for study at recognized clinical centers in the tropics. It is hoped that the new training programs at the National Institutes of Health will provide such opportunities. The Society should give greater recognition to workers in this field. The Bailey K. Ashford Award has never been bestowed for

clinical research. Clinicians should be considered for this award. In fact, the Society would be justified in setting up a separate award for outstanding clinical research.

Our few foreign research facilities need more adequate support. Fortunately the situation of the Gorgas Memorial Laboratory has improved recently. The Liberian Institute for Tropical Medicine has not received the backing which it deserves. It is the only research foothold this country has in Africa south of the Sahara and it is on friendly soil. American investigators have not utilized it to advantage. Fortunately, the gap has been bridged by some of our distinguished colleagues from abroad so that the quality of its research has not suffered. It needs support of a permanent nature.

It is hoped that overseas medical research laboratories operated by the military will have more assurance of permanence than in the past and that they may receive the additional encouragement and support which they deserve.

Our younger workers have failed to take advantage of fellowships available for research opportunities abroad. This is one of the many signs indicating a general lack of interest in the field. Our teaching members are in the best position to remedy this situation.

It would be salutary if more research grant funds could be channeled into projects more closely aligned to the solution of health problems. Basic research is needed also to close many gaps in our present knowledge.

These are only a few of the problems which should concern us. Our overseas commitments are mainly in the medically underdeveloped countries of the tropics and contiguous areas. Tropical medicine will continue to play a large role in our aid programs, probably for many years to come. It is hoped that we can meet these obligations and those entailed by our dependence on tropical areas for our raw materials and our export trade.

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