

THE MODERN PERIOD OF TROPICAL MEDICINE
PRESIDENTIAL ADDRESS OF AMERICAN ACADEMY OF TROPICAL
MEDICINE¹

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Permit me again to express to you my sincere appreciation of the honor you have done the Department of Tropical Medicine of Harvard University by electing me as President of the Academy. However, this honor involves certain responsibilities for the incumbent. Not the least onerous of these is the delivery of a presidential address, but I wish I could spare you the task of hearing it read.

Realizing that the sessions of our American Society of Tropical Medicine are more appropriate for the consideration of technical subjects than our annual meeting about this banquet board, I have decided to discuss topics of a more general nature, and first to ask your consideration for a moment, of a few of the outstanding achievements in the field of modern tropical medicine, with the hope of clarifying somewhat our conceptions, and of stimulating our energies regarding the interests and functions of this Academy.

It was Raphael Blanchard, I believe, who first acclaimed Sir Patrick Manson as "the father of the modern science of tropical medicine," and it seems appropriate to regard the beginning of this modern period with the year 1879, when Manson published his investigations emphasizing the importance of insects in the transmission of human disease. The remarkable discoveries regarding tropical disease which have been made since the beginning of this period, in widely separated parts of

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the world, have brought us to the realization that no other field of medical science has developed a broader and more inspiring view of the universe than has tropical medicine. Moreover, the application of the results of scientific investigation in this field have gone far to transform many parts of the world into a more favorable abode for man and to make life in such localities a better thing than it was.

Among the conspicuous scientific achievements of recent years which it may be well to recall upon this occasion, are the discovery of the method of transmission of parasitic diseases by insects, as in filariasis, malaria, yellow fever, dengue, sleeping sickness, cutaneous leishmaniasis, typhus, and relapsing fever; the discovery of the cause of each one of these diseases, as well as of the important infections of cholera, plague, tularemia, undulant fever, bacillary and amoebic dysentery, and yaws; the unfolding of the crustacean or arthropodal transmission of schistosomiasis, paragonimiasis, and guinea worm infection; the discovery of the nature of beriberi and other human vitamine-deficiency diseases, and finally of the demonstration of successful methods of treatment in yaws, schistosomiasis, trypanosomiasis, leishmaniasis, amoebic dysentery, and of avitaminosis. What a galaxy of discoveries!

As Sir William Osler has written, regarding the result of some of these relating to the transmission of disease, in his "Man's Redemption of Man," "there is nothing to match it in the history of human achievement." It is such scientific investigations that obviously have not only added beyond measure to the health and welfare of those residing in tropical countries, and become of the greatest value in many industrial operations related to the tropics, but that also have contributed incalculably to the alleviation of disease and human suffering in many countries *throughout* the world. Lastly, such discoveries have brought about a gradual enlightenment which has finally resulted in a recognition of tropical medicine as an important and special field of medical science.

In their addresses a year ago, both Dr. Charles F. Craig as President of this Academy, and Dr. Edward B. Vedder as Presi-

dent of the American Society of Tropical Medicine, emphasized the fact, that as late as the beginning of the Spanish-American War, 1898, tropical disease was not only practically unknown to American physicians, but that our ignorance at that time of the diseases of such tropical countries as Cuba and the Philippines was colossal.

However, the continued progress that has resulted in regard to the etiology, treatment, and prevention of tropical diseases since that time, through the numerous striking and brilliant discoveries such as I have mentioned (and in which a number of Americans have shared), has gradually convinced many of the more intelligent members of the medical profession, not only of the importance of the recognition of this special field as a branch of medicine, but of the great desirability of special instruction in our medical schools in this subject.

As an example of this I need only quote a statistical study made recently by Reed and Forster, and published in our Journal this year, which demonstrates that at the present time, approximately three-quarters of the medical schools of the United States provide in the curriculum some instruction relating to this subject. But just as is the case with many problems in medical education, there is not entire unanimity of opinion in regard to the importance of tropical medicine in the United States, and, there are a minority who would imply that there is no such thing as tropical medicine, and even some who find it difficult to realize or who decline to realize the significance of the term "tropical disease." Nevertheless, if one will accept the definition of a tropical disease as one which either only originates in, or one which occurs more commonly in tropical and subtropical countries, can one deny the existence of, and the special problems concerning, the causes, treatment, and prevention of such diseases? As an incontrovertible fact that the term "tropical disease" is entirely appropriate, I need only mention, as one example, "African sleeping sickness,"—an essentially tropical disease, which, clearly, cannot be naturally acquired or transmitted outside the tropical countries where the intermediate host, the tsetse fly, abounds.

Other tropical diseases, such as plague, cholera, and leprosy have at times in earlier years caused very grave epidemics in temperate climates. That such diseases are today much more common in tropical countries is especially due to the fact that the sanitary, hygienic, and climatic conditions under which the poorer and undernourished inhabitants live in such countries, are much more favorable for the development and transmission of these diseases, and that the sanitary and hygienic conditions under which the more enlightened people of most of the temperate climates live today are vastly superior to what they were in earlier years.

A few cases of Asiatic cholera introduced today into Boston or New York by immigrants, would certainly not lead to such disastrous results to the community as they did in former years when large epidemics sometimes followed, as, for example, in 1831-1875, when Boston and New York or New Orleans were the first ports infected. At this period there was neither efficient disposal of sewage, nor provision of safe water supplies. Neither should we forget the fact that when the water supply of Hamburg in 1892 became infected with the excreta of one or more persons suffering with undetected cholera (or cholera carriers), that in less than two months there were 17,000 cases and some 8,600 deaths from cholera.

However, many other tropical diseases besides cholera and plague still show from time to time a tendency to invade and spread in temperate climates, and today isolated cases of almost any tropical disease are liable to be encountered in our large cities, and especially in the coastal cities of the United States, where through ships or airplanes infected patients or infected intermediate hosts may be sometimes introduced. Very recently the possibility of the entrance of yellow fever infection into Florida from South America has been discussed, because in Florida extensive epidemics of dengue fever, also transmitted by *Aedes aegypti*, have occurred in recent years. It is only on account of our rigid quarantine examinations that a larger number of travellers with tropical diseases are not admitted into this country, but even in spite of such precautions, it is clear that

many cases of exotic disease do enter every year, and usually it is only when the patient is fortunate enough to encounter a physician with special knowledge of tropical diseases that a correct diagnosis is made and proper treatment instituted; but alas, in how many instances does the patient wander about for long periods of time before receiving proper treatment? Certain it is that there are so many tropical diseases present in various parts of the United States today, that the medical profession should become more familiar with the diagnosis or with the importance of obtaining the aid of trained specialists in the diagnosis of such diseases.

While we may congratulate ourselves that the many important discoveries that have been made in tropical medicine have improved the standing and emphasized the importance of the subject in the United States, the knowledge of the medical profession in general in regard to even the important tropical diseases is still unsatisfactory, and the training in the subject which is offered in our medical schools is far from adequate. Those interested in the study of tropical medicine have for a long time recognized that the general medical education of the student cannot satisfactorily equip him for practice in the tropics where infectious diseases of very diverse nature so often prevail. For the reason that insect-borne diseases due to protozoa and to helminths, as well as to bacteria, are so common in tropical countries, the student, in order to understand properly the nature of tropical diseases, must pursue special studies in entomology, protozoology, helminthology, and tropical bacteriology. Although the authorities of so many of our medical schools have recognized the importance of including instruction in "tropical medicine" or "parasitology, protozoology, or medical zoology" in the curriculum, further evidence is desirable regarding the value of the knowledge gained from many of these courses.

One question that arises in this connection is the training of the instructors, and whether there would be, at least in the next generation, enough first-class men in the United States to fill all these positions in some sixty schools. A comprehensive training in tropical medicine is not as easily acquired as in some other

branches of medicine. To be familiar with all tropical diseases, experience in Asia, Africa, and Central and South America is desirable. However, as our membership both in the Academy and Society of Tropical Medicine reveals, there are at present a considerable number of excellently trained men in this subject.

There is, apparently, wide agreement in the idea that advanced instruction in tropical medicine can more appropriately be given in graduate medical schools. However, I am most thankful for the instruction in laboratory diagnosis I received as a regular student in the Johns Hopkins Medical School in the courses conducted by Doctors Sidney Thayer, Fletcher, Stiles, and others, in the years 1894-1898. I do not feel it would have been possible for me to have pursued the work I was called upon to do in the Philippines from 1899 onwards without this instruction received at Johns Hopkins in the laboratories of pathology, clinical microscopy, and parasitology, where a number of important tropical diseases were studied, and where I acquired inspiration from my instructors regarding the study of tropical disease. Apparently the instruction offered me at that time was more adequate than that which is given today in many of our schools.

While a defective training in general medicine is a great handicap to those taking up the study of tropical medicine, as MacArthur has recently emphasized, the teaching of *clinical* tropical medicine to students well trained in general medicine presents the fewest difficulties for the teacher, for it is merely an extension and elaboration of what the student already knows.

It is the laboratory courses demonstrating the nature and the of diagnosis of tropical disease which are of very great importance in this country. A student who is sent to a tropical country without such training is severely handicapped and may never be able to make satisfactory progress.² It is exceedingly unfor-

² Manson, in his Lane Lectures for 1905, said: "To send a young fellow fresh from the schools to some tropical and unhealthy climate to treat diseases he has never seen before, many of which he has probably never even heard of before, is not only cruelty to the doctor but it may be death to the patients and bad business all around." I could cite hundreds of instances in illustration of this folly.

fortunate that so many of our students complete their courses, even in some of our best medical schools today, with no proper training regarding a number of the most important infectious diseases. Indeed, in some of our most highly esteemed schools, it has not been possible to obtain recognition of the importance of such training and its introduction into the curriculum, and even in schools where such courses are offered, it is sometimes difficult to convince members of the faculty (who themselves have had no training in the subject in earlier years), of the great importance of such instruction, and of the ignorance of many of our graduates in regard to the diagnosis of such infectious diseases. It is only recently that we have had a most disastrous example of this fact, in connection with the Century of Progress Exposition in Chicago in 1933, when there occurred some 1409 cases of amoebic dysentery or amoebic colitis. In the great majority of these infections which originated in Chicago, the patients are said to have contracted the disease through the drinking water supply of two hotels, which water had become contaminated with *Endamoeba histolytica* through human sewage, though infection in some cases had occurred earlier in other parts of the city. Only one-fifth of the cases were originally diagnosed correctly. In the study of clinical data regarding 1,215 cases, the figures just published by McCoy and Hardy show that early diagnoses which proved inadequate or erroneous were reported in at least 214 cases. These figures are of remarkable significance, since the patients concerned were usually in comfortable circumstances and sought relief from recognized physicians. In order of frequency, these erroneous diagnoses were: cancer (rectum, intestine, stomach, or liver), appendicitis or appendicular abscess, and sepsis in or near the gall bladder. Other cases were diagnosed as hemorrhoids, tuberculous enteritis, typhoid fever, and malaria. In 41 cases the diagnosis of appendicitis was made, and, what is worse, 32 of these cases were operated upon for appendicitis and appendectomy performed, resulting in the death of 13, or 41 per cent. Moreover, in half of the fatal cases, mistaken diagnoses were reported, and in more than two-thirds of these, the patients had been treated as surgical cases. Lack

of specific diagnosis not only deprived the patients of effective therapy, but certain of the erroneous diagnoses subjected them to procedures which not only were useless but hazardous to life. According to the report of McCoy and Hardy, in no instance did a fatality follow early consultation, correct diagnosis, and adequate specific therapy. Hence, the prognosis was directly dependent on the promptness of diagnosis and the institution of specific therapy.

In the practice of medicine, some lack of knowledge or imperfection of skill, some erroneous inference or minor error of judgment has occasionally to be recognized, understood and forgiven, but as Sir Henry Brackenbush emphasizes in his book "Patient and Doctor," recently published, "what a patient has a right to expect in every instance is carefulness in making a complete and thorough investigation into his condition." This certainly was not done in many instances in the Chicago epidemic. How many mistakes might have been avoided, how many lives saved, had the physicians concerned received in our medical schools adequate training in the recognition and diagnosis of infectious disease.

What also should we say of the *extent* of this epidemic of amoebic dysentery, and also of the subsequent outbreak in Chicago in 1934, in connection with the fire in the stockyards when some hundred more cases of amoebic affection occurred in those who drank water again polluted by human excreta?

During fourteen years' experience with this disease in the Philippine Islands, from the time of the American occupation in 1899 (when the sanitary conditions were at their worst) until 1913, there was never any such disastrous epidemic of water-borne amoebic dysentery, though the disease is of course endemic there and patients suffering with it were almost always present in the different hospitals in Manila. It was particularly because we already then recognized that drinking water was sometimes the source of transmission of amoebic infection, and because our drinking water supplies were studied and guarded from this point of view, that no such outbreak did occur (see also Craig, C. F., Amer. Jour. Public Health, November 1935, vol. 25, p. 1231).

We must not presume that other outbreaks of water-borne amoebic dysentery have not occurred and will not occur in the United States from time to time. It seems clear that it was especially because this outbreak occurred in a large city like Chicago that it became so widely known about, and that it was largely due to the zeal of a few, tardy though it was, which led to the discovery of many of the true facts in regard to this outbreak. Is it necessary to emphasize further the necessity for proper training in the specific diagnosis of tropical disease? Dr. Meleney has called attention by convincing statistics to the high mortality from malaria in the United States in cases where there has been failure to recognize it by blood examination. Should not the Academy exert its influence for improvement in the diagnosis of these and other infectious diseases in this country?

On this occasion it seems appropriate to refer to the fact that the Academy owes a great debt of gratitude to Dr. Earl B. McKinley, now Executive Secretary of the Board of Directors and the first secretary of the Academy, who planned the present organization and who has done more than any one else to guide its destinies and further its successful progress.

It is understood that our Board of Directors realizes that the establishment of a satisfactory endowment is now the most important step in the development of this Academy, for, obviously, very little more can be accomplished by the Academy without funds. Through the great generosity of Mr. E. B. DeGolia, the first Chairman of the Board, I understand it has already been made possible to inaugurate a study in regard to the most satisfactory way to proceed in securing financial aid.

When such endowment has been realized, there are a number of ways in which the Academy can be immediately useful to tropical medicine in the United States. First, with reference to publications: *THE AMERICAN JOURNAL OF TROPICAL MEDICINE*, the official organ of the Society, under the editorship of Dr. Charles F. Craig, has attained a very high standard of excellence. It is superfluous to point out the many ways in which this *JOURNAL* has furthered and will continue to further the aims and purposes of this Academy. In his reports as Editor for 1934

and 1935, Dr. Craig has outlined the financial needs of the JOURNAL, and it would appear that financial support of this JOURNAL should be one of our first responsibilities when a suitable endowment for the Academy is obtained. Support of this JOURNAL has also been advised by Dr. Vedder in his presidential address of last year, and there would appear to be general unanimity of opinion in regard to such support.

The Journal of Parasitology, under the able editorship of our Treasurer, Dr. Cort, is obviously of importance also to the Academy in furthering the extension of our knowledge regarding tropical disease, and the publication of research investigations in parasitology. It is likewise worthy of our early financial aid. Indeed, a most appropriate gift by someone philanthropically inclined, would be that of an Academy "Publication Fund," for in addition to the needs of these journals, financial support is highly desirable for the publication from time to time of monographs upon tropical diseases. I know of several such monographs the publication of which has been prevented on account of lack of money. Without the financial assistance of the Leonard Wood Memorial Foundation, the publication, during the present year, of that important monograph "A Geography of Disease" by Dr. McKinley, might have been long delayed.

It seems also particularly appropriate to refer to our friendly relationship with this organization, now known as the American Leprosy Foundation, under the directorship of Mr. Perry Burgess, and to the assistance that the Academy has already received from it. It is particularly through the financial support given us by the American Leprosy Foundation that we have been able to progress in our organization more rapidly than we could otherwise have done. For this assistance, and for the wise counsel of Mr. Burgess we are deeply appreciative. As today leprosy is more a disease of tropical countries than of temperate ones, the support and assistance which the Leprosy Association has rendered the Academy of Tropical Medicine is obviously appropriate, and in furthering the advance of knowledge in regard to the prevention and cure of leprosy and those diseases and conditions which predispose to leprosy infection, the two organizations have a common purpose.

Also, it would appear that the Academy Foundation could most advantageously further the work in tropical medicine by granting financial support to scientific expeditions for the study of special diseases in tropical countries, and further carrying out of surveys both at home and abroad. Intensive study by a group of well-trained men who have devoted themselves entirely to one project for a reasonable period of time, has often led to very gratifying results, as a number of expeditions sent out both from Great Britain and the United States have demonstrated.

During the present year, a Tropical Medicine Research Committee has been appointed in London. The decision to appoint this body was taken by the Medical Research Council in consultation with the Colonial Office. While research in tropical medicine has always been a concern of the Medical Research Council, such work has usually been performed in England. The present step indicates an intention to take a more active part in investigations in the tropics. The new Committee will advise and assist in the direction of such investigations, as the Council may be able to promote, into problems of health and disease in tropical countries, and make suggestions generally as to research in this field. The Committee will include representatives of the Colonial Office and of the London and Liverpool Schools of Tropical Medicine, and will consist of Professors Ledingham, Clarke, Jameson, Mellanby, Sir Leonard Rogers, and Wenyon.

The establishment of scholarships and fellowships in tropical medicine is also particularly worthy of the attention of the Academy, and it may be well to call attention to other foundations of the importance of this subject. Among the eighty-seven research fellows connected with the different departments of the Harvard Medical School last year, twenty-seven were representatives of at least nine different foundations; three were Guggenheim Fellows from different countries in South America.

Dr. Reed, in a paper published last year, states that the three chief geographical centers of tropical diseases in the United States are in New York, New Orleans, and San Francisco. It is presumed that he means by this that there are probably more

cases of tropical disease available for study in these localities. He does not mention Boston, though since 1913 there has been a Department of Tropical Medicine connected with Harvard University, and there are associated with it clinical and hospital services for tropical diseases under Dr. George C. Shattuck. Boston has long been interested in the subject of tropical diseases. We must not forget the valuable memoir left by James Jackson, Jr., regarding the cholera outbreak in Boston in 1832, nor the discovery of the parasite of cutaneous leishmaniasis by James Homer Wright in 1903. Last week the second case of visceral leishmaniasis entered the Children's Hospital in Boston. We have especially emphasized the laboratory instruction in the diagnosis of tropical diseases at Harvard, and the study of specific diseases has been undertaken from time to time both in Boston and by sending special expeditions for investigation to Central and South America, the Far East, and Africa.

With the idea of bringing to the attention of the Board of Directors of the Academy the various proposals and projects most worthy of financial assistance by the Academy, I sought the advice of several of the authorities in the localities mentioned by Dr. Reed where departments of tropical medicine exist, and where research and teaching in this subject are emphasized. In this connection I wish to thank especially Dr. Rappleye and Dr. Bachman of Columbia University and the University of Porto Rico, Dr. Reed of the University of California, and Doctors Craig and Faust of Tulane University. The replies have convinced me of the great desirability of financial support for a number of proposals in each one of these universities, for each one offers special activities and opportunities for work in tropical medicine and research.

At Tulane University Doctors Craig and Faust feel that the most crying need is for a small, adequately-equipped hospital, devoted to the care of tropical diseases.

At the George Williams Hooper Foundation of the University of California, Dr. Reed feels that general financial support of the work is necessary if it is not to regress. Some of us most interested in the subject at Harvard feel that we are in a similar

financial position in regard to maintaining the standard of our work of recent years.

Dr. Rappleye, after referring to the geographical advantages which New York enjoys in regard to the introduction of tropical disease through shipping, adds that tropical diseases are prevalent there not only for this reason, but also because there are several hundred thousand persons living in New York who were raised in the tropics on this continent, Europe, Africa, or Asia. I think that on this occasion we should present our hearty congratulations to Dr. Rappleye and Dr. Bachman for the splendid advances which have recently been made and are about to be made in regard to the School of Tropical Medicine conducted jointly by Columbia University and the University of Porto Rico, and in their good fortune in receiving an additional appropriation of \$240,000 in addition to a previous one of \$250,000, for alterations and extension of the facilities at this school to give it a thoroughly satisfactory and complete unit.

On this occasion, it is not practicable to consider more in detail the different proposals from these universities, which should be more fully discussed in our future Council meetings, together with proposals from other institutions.

In conclusion, I realize that my discussion is very incomplete, and it is clear that in so brief a period my recital could include only a fragment of the achievements in this field, for it would require a series of lectures to give even an outline of these contributions to science regarding modern tropical medicine and the opportunities of this Academy to extend and add to them. However, I believe that the enumeration of these few should suffice to emphasize the extraordinary character of what has been accomplished already. With reference to the avowed purpose of this Academy in extending knowledge of the prevention of human diseases in warm countries, and the collection and reception of funds for the other aims and purposes of the Academy, may I emphasize again to our Board of Directors that there is no one measure in preventive medicine that can compare in achievement with the decrease of disease and suffering in tropical countries that has followed the introduction of intelli-

gent public health procedures based upon scientific discoveries. Such discoveries have kept alive the fires on the altars of science, and so opened the doors of knowledge, that we now know the important laws which govern both health and disease in these hot countries. President Angell, in his Carnegie Institute lecture for 1935, in referring to the realms of popular science said: "the public keenly appreciates the innumerable conveniences thus put at its disposal (by science), and money can always be found to promote the newest discovery once it is clear that it has some *practical* and especially *commercial* value." The practical value of many of the discoveries I have enumerated is clear. With reference to their commercial value, it should also be clear that the triumphs of industry in tropical countries which have so greatly enriched many business men, would never have resulted had they not been preceded by scientific discoveries which paved the way for such business success. Not only has scientific research made many industries in the tropics profitable, but in some instances further scientific research has been necessary for the continued prosperity of the enterprise. Let us hope that even in these days, when philanthropy has been deserted and defiled by political procedures and government taxation, that these facts may still be remembered and appreciated by those leaders in industry who have won great financial success in tropical countries. For, it should be understood that the reward to those investigators who have made or been concerned in these discoveries has not been a monetary one, and I know of no one who has acquired outstanding financial success through his research in tropical medicine. But what reward can compare with the inner satisfaction which may come through attainment in this our chosen field,—the most romantic and comprehensive in preventive medicine. And even to the many of us who have not attained that measure of success in research that we have sought, there should be comfort in the thought that it is the seeking for attainment that especially enriches the investigator, for the true success is in labor.