

PEKING MEDICAL CONFERENCE*Meeting held in Peking, China, January, 1913*

The Vice-President, Dr. O. T. Logan, in the Chair

Officers Elected

The new officers are: president, Dr. D. D. Main, Hangchow; vice-president, Dr. C. F. Johnson, Tsinanfu; secretary and treasurer, Dr. H. H. Morris, Shanghai.

The next meeting is to be held in Shanghai.

The China Medical Missionary Association

This is the only national medical organization in China. It has over 500 members, all foreigners, at work in every province. On this organization, to a large extent, depends the rapidity with which the ideas of western medical science will permeate China's 400 millions.

This association holds a convention every three years. The last one took place in January at Peking. The Chinese Government did all in its power to show an appreciation of the work done by the organization throughout China.

Address by President of Chinese Republic

PRESIDENT YUAN SHI K'AI gave a reception to the delegates and in the course of an address expressed thanks for the work done, especially in those regions where the importance of sanitation is not realized. He said that through the efforts of the association sanitary knowledge and methods were being widely spread; the poor and the destitute women and children were being cared for and given the elements of an education; the plague in Manchuria two years ago had been checked; in the war between the north and the south of China the wounded were cared for; for this work the president was glad to be able to express his thanks in person. He hoped that the work would be carried on with the same zeal as heretofore for the good of all and indirectly for the strengthening of the bonds of friendship between China and the countries represented by the foreign medical missionaries.

Medical Education

The keynote of the convention was medical education. The foreign doctor in China is but a temporary necessity. What happened in Japan will some day happen in China. The preponderance of foreign doctors will decrease each year, but medical schools must first be established. The association made plans along this line to hasten the time when the Chinese will be able to care adequately for their own sick without depending on foreign assistance.

The Chinese themselves realize that for many years the help of foreigners will be needed. The problem of medical education presents a twofold difficulty. As yet there is no complete and uniform medical nomenclature, and there are but few well-equipped medical schools. The Surgeon-General of the Army and a secretary of the Bureau of Education appeared before the convention. They expressed the desire of the government for cooperation in the adoption of a uniform nomenclature as well as in the training of medical students.

Fortunately there is at present the closest sympathy between foreign doctors and the Chinese. The convention passed the following resolutions:

A most important feature of the work of medical missions in China at the present juncture is the work of training Christian young men and women that they may take their place as thoroughly qualified medical missionaries to perpetuate the work we have begun, and occupy positions of influence in the service of their country.

The association therefore considers that the object of our presence here can now best be advanced by concentrating our energies largely on the important centers approved by the association, and forming there efficient union medical colleges and specially equipped hospitals. And we would strongly recommend that all such colleges be affiliated and coordinated with other existing missionary educational institutions.

The association recommends that much of the work done in the less important stations should, wherever practicable, be placed under the charge of qualified Chinese; that missionaries of ability and experience in certain instances should be called in from these stations to the teaching centers to take part in the work of the colleges and large hospitals; and that the staffing and thorough

equipment of these centers should take precedence of the opening up of new medical work throughout the country.

Recent movements in China have developed a natural desire in the people to carry out their own educational reform, and this we must recognize, and make the foreign element in our work as little prominent as possible, by having our colleges gradually and increasingly staffed and supported by the Chinese themselves.

The association considers that the minimum staff for efficient work in a medical college should be ten men on the field giving full time. This means, when furloughs, language study, etc., are taken into account, a total staff of at least fifteen fully qualified teachers, foreign or Chinese.

The association recommends that sufficient lecture and laboratory accommodation should be provided, and as liberal an equipment as possible in microscopes, models, pathologic specimens, etc.; also that clinical opportunities to the extent of three beds to each student in the final two years be considered the minimum.

The association strongly recommends that until union medical colleges mentioned below are efficiently staffed and equipped, no new medical colleges be started in China. The schools referred to beginning with the north, are Mukden, Peking, Chinanfu, Chengtu, Hankow, Nanking, Hangchow, Foochow and Canton.

As medical books in Chinese are necessary in order to carry on the instruction in our colleges and to provide medical literature for graduates, the association would urge on the missionary societies the need for arranging that suitable men should devote a large part of their time to the work of translating and preparing such books, and also the necessity for money grants for this purpose.

We have no desire to create permanently foreign institutions, and we aim and hope that these medical colleges will gradually and ultimately be staffed, financed and controlled by the Chinese themselves.

We are desirous of bringing our teaching work into line with the regulations of the Ministry of Education, and in all ways to cooperate with and assist the government of the republic in medical education so that a strong and thoroughly equipped medical profession may be established in this great land.

In the absence of the president, Dr. Philip B. Cousland, who was detained in Scotland by ill health, the vice-president, Dr. O. T. Logan of Chengteh, Hunan, presided at the various sessions of the convention.

Papers on the following were read by delegates and invited guests: "Climatic Bubo," "Vesical Calculus," "The Behavior of the Organisms in Relapsing Fever," "Notes on the Life-Cycle of Clonorchis," "Gunshot Wounds," "Asiatic Cholera," "An Experimental Study of Racial Immunity," "Sanitary Organization of China," "A Sanitary Propaganda for China," "Medical Inspection of Schools" and "The Need for Physical Training and the Establishment of Physiologic Standards in Schools."

AMERICAN SOCIETY OF TROPICAL MEDICINE*Tenth Annual Meeting held at Washington, May 6-8, 1913*

The President, Dr. EDWARD R. STITT, U. S. Navy, in the Chair

Officers Elected

The following officers were elected for the ensuing year: president, Dr. Richard P. Strong, Boston; vice-presidents, Dr. Creighton Wellman, New Orleans, Dr. Charles F. Craig, Washington, D. C.; secretary, Dr. John M. Swan, Rochester, N. Y.; assistant secretary, Dr. Allen J. Smith, Philadelphia; treasurer, Dr. Joseph D. Weis, New Orleans.

Boston was selected as the place for holding the next annual meeting.

The Value of a Course in Tropical Medicine for the Training of the Internist

DR. EDWARD R. STITT, Washington, D. C.: In the study of tropical medicine there is considerable advantage in having a school located in a temperate climate in order to warrant the necessary amount of work for mastering the subject. Marked advances have been made in the study of the diseases of the tropics by men who were not residents of tropical countries. The work of Robert Koch on the spirillum of cholera, on malaria in various parts of the world, on plague, on amebas, on the spirochete of African tick fever, and on sleeping-sickness is an example of the possibilities for original work open to men residing in temperate climates. If Koch could accomplish such signal service in the interest of tropical medicine, why cannot every internist find something of interest in the diseases of the tropics? There are great possibilities for the internist at home to check the development of infections which are brought to this country by returning soldiers, sailors, business men, missionaries and others. Rare cases of disease fail to be diagnosed because

the physicians at home are not familiar with the possibilities of tropical pathology. In the tropics diagnosis is made almost exclusively in the laboratory. In temperate climates the diagnosis is made partly by bedside study and partly by laboratory work. In an individual who has returned from the tropics, amebiasis, filariasis and syphilis may be present and the patient may be about attending to his ordinary business. It is the duty of the internist who sees such a patient to decide which infection is of greatest importance in the causation of the symptoms of which he complains. It is often difficult to determine the infection which is causing the most trouble and to exclude those that are of less importance. It must be remembered that pneumonia, kidney disease and heart disease are as common in the tropics as they are in the temperate climates. It is possible to give outside of the tropics that instruction which best correlates laboratory work and ward work.

Certain Features of the Physiologic Activity of White Men in the Philippine Islands

DR. WESTON P. CHAMBERLAIN, New York: Three thousand temperature observations were made in order to determine the effect of continued high atmospheric temperature on the physiologic activity of healthy white men. The average of these temperatures was 98.7 F. Sometimes an elevation of one or more degrees was found without apparent cause. The average body temperature of white men at Vancouver was 98.7 F. before drill and 98.8 F. after drill. Blonde men showed no difference in body temperature from that of brunettes. There is no apparent effect of season on the pulse- or respiration-rate and there seems to be no difference in the pulse- and respiration-rate after a year's residence in the tropics. The complexion seems to have no influence on these rates. The average pulse-rate in the men observed was 77.3 per minute. The average respiration-rate was 19.3 per minute.

On the systolic blood-pressure 5,368 observations were made. A 5-inch cuff was used. The average age of the individuals tested was 26.6 years; the average systolic pressure was 115.6 mm. On the weight, 3,040 observations were made. The first observation was made after the person had resided seven months in the tropics, and the second observation was made a year later. The amount of weight lost averaged 3 pounds, or 1.7 per cent. of the original weight. The complexion type of the person seemed to have no influence on the weight. The large men appeared to show no greater change in weight than the small men.

Blood-counts were made in 1,418 men. The red cells averaged 5,200,000 after nineteen months' residence. The hemoglobin averaged 80.6 per cent. The color index was between 0.86 and 0.87. In seventy-two soldiers the leukocytes averaged 7,304. There was an increase in the lymphocytes, 31.7 per cent. small lymphocytes, 6.9 per cent. large lymphocytes. The polymorphonuclear cells averaged 56.8 per cent. In the Arneith count there was a slight deviation to the left. The so-called tropical anemia is due to infection and not to the influence of climate. The pale color of the white men residing in the tropics is due to a cutaneous ischemia.

Urine examinations were made in 576 men, at the beginning of tropical residence and at the end of one year. In five albumin was found at the beginning of tropical residence and in six at the end of one year's residence. Casts were found in the urine of ten men at the beginning of tropical residence and in thirteen at the end of the year's residence. The specific gravity averaged 1.010 at the beginning of tropical residence and 1.0197 at the end of one year's residence. Tropical renal insufficiency does not exist.

After moderate exercise there is a slight acceleration of the pulse-rate and a slight increase of systolic blood-pressure, a slight increase of respiration-rate and a slight increase of temperature, as would be expected. Exercise is as beneficial in the tropics as elsewhere. A great amount of sickness is found among the women who do not go out in the daytime. The influence of tropical residence on the nervous system under the improved conditions existing in the Philippine

Islands seems to be no different from the influence of residence in the United States. The diet in the tropics is to be regulated by the patient's appetite. Men who had lived five and a half years in the Philippine Islands seem to show no difference in weight from those who had lived there nineteen months. The injurious effect of residence in the tropics commonly supposed to be due to light is probably due to excessive heat and humidity. Malaria, intestinal parasites, venereal diseases and alcohol are the causes of bad health from tropical residence.

DISCUSSION

DR. MALCOLM WATSON, Klang, Federated Malay States: As a result of thirteen years' residence in the Federated Malay States, it is my opinion that if certain infectious diseases can be excluded, the white men keep in excellent health. The real difficulty lies in avoiding infectious disease. There is more difficulty with children than with adults. Children cannot be kept away from the natives, and the standard of native thought is so different from our standard that it is almost impossible to rear children in the tropics. The association with the natives in addition to its moral aspect gives greater likelihood for the contraction of infection.

DR. CHARLES F. CRAIG, Washington, D. C.: In the Canal Zone it is a rule that every white man shall take a vacation once a year and go north. It has been found that the men lose energy after they have stayed for a long time in the Zone.

DR. CREIGHTON WELLMAN, New Orleans: The question of staleness, nostalgia and moral and social problems will be at a minimum when the facilities for amusement now to be found in the temperate climates are accessible in the tropics. Granting the control of infectious diseases, the world is open to colonization by the white man.

DR. ELMER F. OTIS, Peñuelas, Porto Rico: There are certain special infectious diseases that are more fatal to the white man in Porto Rico than to the native. Sprue is one of these infections.

DR. HENRY J. NICHOLS, Washington, D. C.: In any discussion of this question, the white woman and the white child must be considered. I accept the data that Dr. Chamberlain gives for troops, but I would not be willing to see the conclusions transferred to women and children. In the Philippine Islands the women are actually damaged by the climate. I have seen women who were interested in the life, who had had no infectious disease, and who wanted to stay; but who were unable to do so on account of the influence of climatic conditions on them. Many of them had menstrual disturbances. As woman is the foundation of the home, I can entertain no great hope of the colonization of the tropics by the white race.

DR. HENRY R. CARTER, Baltimore: The white man who does not drink, who contracts no infectious disease and who takes sufficient exercise, will do well in the tropics. Babies, as a rule, do better in Panama than in the United States; but from the age of 3 or 4 years to 14 or 15 years children do not have enough exercise. They become too fat, have a pasty complexion and do not do well. It is a question in my mind whether under ordinary living conditions, white people will keep well in the tropics.

DR. C. S. LUDLOW, Washington: American women in the Philippine Islands commonly lose interest in the things that they are interested in at home. They do not take sufficient exercise to keep them well.

Taenia Saginata with V-Shaped Proglottides

DR. GEORGE DOCK, St. Louis: The patient was a negro woman who was treated for tapeworm in the dispensary. The greater part of the worm was removed, but the head was not obtained. Two other attempts were made to get the head, but both failed. In the three attempts 280 cm. of worm were obtained, consisting of 700 proglottides. These varied in width from 2 to 22 mm. Forty-five of the proglottides were asymmetric. The asymmetry resembled what would be obtained by putting two worms together at an angle. Each proglottis contained one genital pore usually

situated on the stem of the Y or at the apex of the V. Twenty-one cases have been reported in the literature. In a few cases the heads have been found; but in the majority of cases the heads have not been found. In cases in which the heads have been found, there have been six suckers. These worms are usually considered to be double monsters in which two suckers have fused. Histologic examination seems to throw no light on the details of the monstrosity.

Case of Trypanosomiasis

DR. J. A. CHATARD and DR. C. G. GUTHRIE, Baltimore: The patient was a man, aged 37, a native of Belgium. At the age of 22 he went to the Congo where he served twelve years. While there he had two severe attacks of amebiasis, one severe attack of blackwater fever and malaria constantly. On one occasion after a battle between eight Europeans and several hundred natives in which the mortality of the natives was high, so that their bodies remained unburied for several days, he had an obscure exanthematous disease, which many of the natives also had. This attack was characterized by high fever for four days, followed by a period of apyrexia; this was followed by the appearance of a papular eruption on an erythematous base, which was accompanied by a high fever and delirium. As he had been vaccinated he did not think it was small-pox. For eleven years he was located in the forest where sleeping-sickness was unknown, but later he was located in a sleeping-sickness country. There he had a febrile attack, which was followed by cervical lymphadenitis, depression, dizziness, lassitude, fever without chills, and increased appetite.

Aspiration of one of the cervical lymph-nodes revealed living trypanosomes. He was treated with atoxyl intramuscularly and tartar emetic intravenously. In nine weeks his symptoms disappeared. He was sent home to Antwerp and during the voyage the treatment was continued. When he reached Brussels the trypanosomes were absent. Although he was told that he must continue the treatment indefinitely he discontinued it at the end of the month because he had no symptoms. He came to the United States in 1909. In 1910 he had an attack of fever which was cured by quinin. In July, 1912, he became drowsy and his cervical lymph-nodes again enlarged and his other symptoms returned. He was very emotional and had some ataxia. The spleen was enlarged and hard and there was general enlargement of the superficial lymph-nodes. His blood showed a secondary anemia; there was a leukocyte count of 1,400; polymorphonuclear neutrophils, 40 per cent.; small mononuclears 54 per cent. Examination of the fresh blood was negative for parasites. Concentration methods were negative for trypanosomes. Aspiration of one of the enlarged cervical lymph-nodes showed no motile trypanosomes. Then one of the enlarged cervical lymph-nodes was removed and implanted into six rats. All six rats developed trypanosomes. Inoculation of rats with the patient's blood and the sediment of the cerebrospinal fluid failed to produce trypanosomes in the inoculated animals. After the intravenous injection of salvarsan the symptoms disappeared. The patient had a relapse two months later. He has been lost sight of.

DISCUSSION

DR. JOHN M. SWAN, Rochester, N. Y.: It seems likely that the beginning of the infection in this patient may be detected in the attack of fever followed by the papular eruption which occurred just after the battle between the Europeans and the natives. This exanthem would correspond pretty closely to the eruption described as being one of the early manifestations of trypanosomiasis.

DR. EDWARD R. STITT, Washington: It is well known that perfectly well people can have trypanosomes in their peripheral blood without showing evidences of infection.

The Species of Anophelines Concerned in the Transmission of Human Malaria

DR. FREDERICK KNAB, Washington, D. C.: The habits of all anophelines are not alike. The study of malaria will be advanced by the study of the habits of these mosquitoes,

and such a study ought to help to solve the remaining problems in the natural history of malaria. There are thirty-four species of Anopheles mosquitoes in the United States, of which eight are known to transmit malaria. Other species may be proved in the future to be potential hosts of the malarial parasites. The appetite for blood varies very much in the different species of anophelines and efficient hosts may be found among those mosquitoes having such an appetite. The association of certain species with men, the longevity of the species, and the topographic conditions of the country are also factors in the solving of the malarial problems. No phase of the life-cycle of the mosquito should be neglected in the study of the disease; it is just as important to study the larva and the pupa as it is to study the imago.

DISCUSSION

DR. CREIGHTON WELLMAN, New Orleans: A study of the lists of mosquitoes which have been published as being indigenous to New Orleans makes one suspect that a great deal of careless determination of species has occurred. The careful determination of species and the locality in which they occur cannot be too particularly insisted on.

DR. MALCOLM WATSON, Klang, Federated Malay States: It is quite important to determine the species of Anopheles mosquitoes found in certain localities. It is useless to say that because Anopheles mosquitoes are present, therefore malaria must also be present. In the Federated Malay States the determination of species is absolutely essential if anti-malarial measures are to be successful and economical. We cannot say from experience in one country what sanitary measures will be required in another.

DR. C. S. LUDLOW, Washington, D. C.: *Myzomyia ludlowi* is not thought to breed in fresh water, but the specimens from which the species was originally named were taken from fresh water. There is a species of malaria-carrying mosquito in the Philippine Islands which breeds in soap-suds water.

DR. H. R. CARTER, Baltimore: The determination of anophelines is frequently of importance in telling the sanitarian what he need not do. For instance, *Anopheles malefactor*, which breeds in collections of water, in hollow stumps on the Isthmus of Panama, is not a malaria carrier, and this knowledge is estimated to have saved the Canal Commission from \$150,000 to \$200,000 in its malarial work.

DR. EDWARD R. STITT, Washington, D. C.: At Canacao no malaria-carrying mosquito other than *Myzomyia ludlowi* is found. The highest salt content of the water at that place was 400 parts per million.

DR. ELMER F. OTIS, Penuelas, Porto Rico: Malaria is restricted to the coast regions in Porto Rico, with one exception. In the hilly region in which malaria is present, the disease is brought from the coast by the natives who travel from the latter to the former.

Recent Observations on Malarial Plasmodia

DR. C. C. BASS, New Orleans: The development of malarial parasites in cultures is exactly similar to their development in the blood of man. There is no discoverable difference between the first generation and the fourth generation of parasites grown in culture mediums. If the tubes in which the parasites are growing are shaken, the parasites will be killed. Addition of blood-serum and polymorphonuclear leukocytes to the culture-medium will kill the parasites. When the parasites are liberated from the red blood-corpuscles most of them die and a great deal of debris is left behind. It is probable that not more than two parasites can develop in one red cell. If the red cell is infected with more than two parasites, when the organisms have reached a certain size they cause the red blood-corpuscles to rupture and they are destroyed. The benign tertian parasite is irregular in outline and is elastic, so that a red corpuscle containing such an organism can pass through the smallest capillaries. The estivo-autumnal parasite, on the other hand, is not elastic and will not pass through the smallest capillaries. Consequently, when a red blood-corpuscle containing such parasites reaches the smallest

capillaries it is stopped in its journey by the narrowing produced in the lumen of the capillary by the projection of the nuclei of the endothelial cells. Fifty per cent. of the deaths from malaria are due to cerebral plugging. After the capillaries have been plugged quinin will not reach the parasites; but if the capillaries can be dilated with nitrites then the quinin in the blood-stream may reach the parasites and kill them. The facts concerning cerebral plugging with malarial parasites have been determined by the injection of pure cultures of parasites through the carotid arteries of small animals, which, after a varying time, have been killed and their brains sectioned.

Beriberi

DR. WESTON P. CHAMBERLAIN, Plattsburg Barracks, N. Y.: Beriberi and polyneuritis gallinarum are identical diseases. There is no doubt of the correctness of the theory of the production of beriberi by rice, at least in the Orient.

Researches on the Etiology of Beriberi

DR. CREIGHTON WELLMAN, New Orleans: In feeding rice to fowls, if the pericarp is removed, the fowls develop polyneuritis. Legislation has been enacted in various countries and in California establishing a rice standard which classifies rice as beriberi-producing rice and non-beriberi-producing rice. In the United States this legislation prohibits the sale of rice when coated with glucose and tale, so-called polished rice. Polyneuritis gallinarum has been produced experimentally with milled rice, both cooked and uncooked; corn grits, containing 8.5 per cent. proteid; white wheat flour; a mixed diet containing oxalic acid; cane-sugar; pulsed rice; cream of wheat, containing 11.75 per cent. of protein; sago; white potato; sweet potato; macaroni, and corn-starch. Fowls have been fed with many times the amount of glucose and tale which could be taken by the animals when on a diet of polished rice, without producing polyneuritis, provided the animal received at the same time a mixed diet. Fowls and pigeons, which are equally good for experimental purposes, have been fed on a mixed diet with the addition of 2 gm. of glucose and 1 gm. of tale a day for fifty-three days without producing the disease. When polyneuritis is produced, it appears on an average in about sixteen days, and is not cured by protein.

DISCUSSION

DR. CHARLES F. CRAIG, Washington, D. C.: In countries in which rice is the staple article of diet, laws should be passed prohibiting the sale of milled rice. In the United States, on the other hand, such legislation is absurd. If laws are passed in this country against milled rice it will subject us to much ridicule.

DR. WILLIAM S. KRAUSS, Memphis, Tenn.: In Memphis, during one of the Mississippi river floods, two boys were marooned on a levee for several days and had nothing to eat but beans. Both of these boys had paralysis of both legs as a result of this diet.

An Epidemiologic Study of Pellagra

DR. J. F. SILER and DR. P. E. GARRISON, New York: Spartanburg County, South Carolina, was selected on account of railway conveniences and because an excellent county map was in existence. From June 1 to Oct. 15, 1912, 282 cases of pellagra were reported. The morbidity in 1912 was between 35 and 45 per ten thousand population. In the ten townships of the county the existence of pellagra was greatest in Spartanburg and the surrounding townships. In every township pellagra is in excess in the cotton mill villages. In the city of Spartanburg the rate was slightly in excess of that in the mill villages. In the county of Spartanburg the cases among the white population exceeded those in the negro population in proportion of two to one. The morbidity of the disease among the whites was 45 per 10,000, and among the negroes 9.5 per 10,000. The density of the population alone does not offer an explanation for the incidence of the disease. The excess of the disease in the mill-village population is in the women and children who remain at home during the day. The incidence in the adult females is high. Pellagra appeared in Spartanburg in 1908 and increased pro-

gressively until 1911. There has been no recrudescence in the spring and in the fall. Climatic conditions influence the appearance of the symptoms. The majority of the cases occurred among the poorer families. In the families in which cases of pellagra occurred the absence of properly constructed privies, the absence of effective screening against flies, the limited use of fresh meat and the unhygienic preparations of food were noted. The importance of corn products seems to be less than was originally supposed.

Is the Importance of Intestinal Parasites in Tropical Pathology Exaggerated?

DR. EDWARD R. STITT, Washington, D. C.: Some writers take the ground that intestinal parasites are of no importance. On the other hand, the reduction in the death-rate in Bilibid Prison, from 75 per thousand to 9 per thousand after the quarantining of persons harboring intestinal parasites seems to indicate that there is some importance to be attached to their presence.

DISCUSSION

DR. CREIGHTON WELLMAN, New Orleans: Many men working in the tropics underestimate the importance of intestinal parasites, and some probably overestimate their importance. The idea that they amount to nothing is wrong. It would first seem necessary to define what is meant by the question, whether it applies to metazoan parasites alone or whether it includes protozoa as well as metazoa. Some years ago I investigated a disease which occurred among the fishermen of Western Africa. This disease was characterized by a severe anemia and was attended with a high mortality. It was found to be due to *Dibothriocephalus latus*. In one district in West Africa 13 per cent. of the population was incapacitated by uncinariasis. The activities of the Rockefeller Commission have been highly beneficial in relation to uncinariasis. In highly malarious countries the presence of intestinal parasites affects the mortality in two ways. The presence of hookworm infection increases the mortality from malaria; but, on the other hand, overzealous treatment of hookworm disease increases the mortality from malaria. Amebiasis is an important factor in the morbidity and mortality in the tropics. On the other hand, some parasites have been taken too seriously, such as *Strongylus subtilis*, *Hymenolepis nana* and *Trichuris trichiura*. It is possible that heavy infection with these parasites produce some anemia. In some districts in the tropics 100 per cent. of the children suffer from ascari infection. This worm produces convulsions and even stimulates recrudescences of malaria. It is a difficult question to answer categorically; but I believe the importance of intestinal parasites is not exaggerated. Neglect of routine examination for intestinal parasites is reprehensible.

DR. HENRY J. NICHOLS, Washington: The importance of helminths is exaggerated. It is easy to discover an infection with intestinal worms; it requires no skill or special knowledge. These parasites have not the serious influence that other parasites have because they cannot reproduce themselves in the intestines. Intestinal worms are limited in their capacity for pathogenicity. As a general rule, it may be said that intestinal parasites are injurious in inverse proportion to their size and that intestinal worms are of the least importance. The helminthologists have justified the importance of these parasites, but their bearing on clinical medicine is not apparent. In the tropics a man is likely to suffer from infection with four or five parasites, and the relative importance of these infections must be decided by the clinician. He should be able to recognize the various worms and their possibilities for harm to the organisms. In some instances endeavors have been made to convince well persons who have been discovered to harbor intestinal parasites that they are sick. Of course the intestinal parasite has been used as a text for agitation in order to interest the public and legislators in the necessity for public health measures. For this purpose it is perhaps necessary to exaggerate the importance of the parasites. On the other hand, it is not necessary for medical men to accept this exaggeration.

DR. CHARLES F. CRAIG, Washington, D. C.: It is exceedingly difficult to give a categorical answer to the question of the importance of intestinal parasites. The conditions vary in different localities. In Porto Rico, for example, the importance of the hookworm is not exaggerated. The only intestinal worm of great importance in tropical pathology is the hookworm. *Schistosomum* is important but its locale is limited and the number of cases is small. The whipworm and strongyloides are of no importance whatever. Cochinchina diarrhea is not due to strongylus infection. Ascaris is of no importance. In the Philippine Islands hookworm infection is light and has little to do with the sickness of the natives. We might say that in Porto Rico one has hookworm disease; but that in the Philippine Islands one has only hookworm infection. In the southern part of the United States the importance of the hookworm is exaggerated. The great stress laid on the influence of intestinal parasites takes no account of other infections, like malaria, which have more influence on the morbidity than uncinariasis. The hookworm campaign has improved the health of the people in districts in which there is no malaria, but there is a question whether or not anything has been accomplished in districts in which malaria is present. Leaving amebiasis and other protozoa out of the question, I am inclined to believe that the importance of intestinal parasites in tropical pathology is exaggerated.

DR. EDWARD R. STITT, Washington, D. C.: In cases of hookworm disease, finding the ova in the feces frequently puts the clinician off the track. When the eggs of this parasite have been found in the stool, the clinician is prone to think that the cause of the disease has been discovered, and it takes a long time to get over the idea. I have noticed that in the southern part of the United States men interested in tuberculosis take the tuberculosis attitude rather than the hookworm attitude, while, on the other hand, men interested in hookworm take the hookworm attitude to the exclusion of tuberculosis or other infection.

DR. PHILIP E. GARRISON, New York: The importance of intestinal parasites in tropical pathology is exaggerated. The subject has not been sufficiently studied from the point of view of relative importance, and it is time that an attempt was made to determine the position that the various parasites occupy in their power for producing disease. It is sometimes remarkable how a bacteriologist, for example, will go into a new field, use his own methods and expect the same results. A bacteriologist cannot see the reason for investigating intestinal worms, which are common, while he can see the use of investigating rabies, which is very rare. Intestinal worms are of importance in public health work, although we do not know just what their importance is. For a discriminating view further study of the subject should be encouraged. The relative importance of malaria and uncinariasis in the South should receive careful study. A hookworm carrier is as potential for the spread of hookworm disease as a typhoid carrier is for typhoid fever. The movement to make the hookworm campaign world-wide is thoroughly scientific. In the discussion of the entire subject we must be careful not to confuse the zoologic side with the public health and preventive-medicine side of the subject. I strongly urge that further discriminating emphasis be placed on the subject so that a proper conception of its true significance may be obtained.

DR. JOHN M. SWAN, Rochester, N. Y.: I recall two cases of chronic arthritis in which I thought that intestinal parasites were responsible for the joint conditions. One of these patients was a boy aged 10, a resident of Florida, who had a low-grade multiple arthritis of the finger-joints. On examination, the feces were found to contain hookworm ova. The removal of the intestinal parasites improved the joint condition but did not cure it. In another patient who had spent considerable time in the Far East, an examination of the feces showed numerous ascaris eggs. I told the patient that intestinal parasites were probably responsible for the arthritis; but was much chagrined to find only one unimpregnated female in the intestine. The removal of this parasite did not benefit the joint condition. We must not be too sure,

however, that infection with similar harmless parasites is not productive of serious disease. Some years ago a paper on trichocephaliasis appeared in the *Philippine Journal of Science* in which a case was recorded of plugging at one of the coronary arteries by an adult trichuris. It has occurred to me that a good many obscure disturbances of health are brought about by the presence of intestinal worms, when the parasites first gain entrance to the intestinal tract; but it is likely that after they have been present for a varying period, a certain amount of immunity is developed by the host. I have often thought that the development of this immunity influenced the eosinophilia.

DR. BRAYTON H. RANSOM, Washington, D. C.: From the point of view of the helminthologist the question should read: Is the importance of intestinal parasites overestimated? The answer to this question depends much on local conditions. We are less informed regarding the importance of intestinal worms in animals than we are of their importance in man. At present it is impossible to say that any intestinal parasite is of paramount importance in relation to animal disease.

DR. WESTON P. CHAMBERLAIN, Plattsburg Barracks, N. Y.: A question such as that propounded for this discussion cannot be answered categorically. Some authors have exaggerated the importance of intestinal parasites and some have underestimated their importance. As a whole, it is probable that their importance has not been exaggerated. The subject needs further careful attention until the relative values of the different infections are understood. There is a great deal of difference between light and severe hookworm infection. The importance of these infections in the Philippine Islands is apparently not great. As I have reported elsewhere the polymorphonuclear leukocytes are reduced in the blood of white men residing in the Philippine Islands. The Arneth formula is the same in white men in the Philippine Islands as in the United States. In the native, on the other hand, there is a distinct shift to the left in the Arneth formula. This seems to be due to the lowering of the resisting power of the individual. The cause, however, is unknown; but it is worthy of further research.

DR. ELMER F. OTIS, Penuelas, Porto Rico: In Porto Rico it does appear that infections with intestinal parasites produce a physical, vital and nervous effect that classifies children, particularly, as deficient. Other intestinal parasites appear to produce a toxemia.

The Cultivation of Filaria Embryos in Vitro

DR. CREIGHTON WELLMAN, New Orleans: By using various mediums, such as dog serum and dextrose, human serum, artificial serum, ascitic fluid and salt solution with carbohydrates it has been found possible to cultivate the embryos of *Filaria immitis* and *Cetaria labiata papillosa*. The development of the embryos in the artificial mediums has gone on so that the alimentary canal has been differentiated, and in some cases the spicules of the male have been seen.

Free-Living and Parasitic Amebas and Their Relation to Dysentery

DR. EUGENE R. WHITMORE, U. S. Army: As a result of the study of various cultures of parasitic and free-living amebas, the conclusion has been reached that *Entamoeba histolytica*, *Entamoeba tetragena* and *Entamoeba minuta* are identical. The nucleus of a typical *Entamoeba histolytica* is a senile nucleus of *Entamoeba tetragena*. Spore formation in amebas is due to the extrusion of chromatin granules into the cytoplasm in the old age of the cell. Cultural amebas are not identical with pathogenic amebas and have nothing to do with dysentery. The exposure of the Petri dishes to the air in India will result in the growth of numerous amebas. There are two well-defined species of amebas, *Entamoeba coli* and *Entamoeba histolytica*.

DISCUSSION

DR. CHARLES F. CRAIG, Washington, D. C.: I am convinced that *Entamoeba histolytica* and *Entamoeba tetragena* are identical.