SUMMARY

Chicks fed a diet in which corn was the principal ingredient, in contrast to other rations employed, were the only ones in which the typical nervous disorders were noted and typical brain lesions observed upon autopsy.

The preliminary data at hand, although not of a definite nature, would seem to indicate that some factor or factors of the corn used were responsible or at least contributory to this disorder.

JOHN P. DELAPLANE
H. O. STUART
C. P. HART

RHODE ISLAND AGRICULTURAL EXPERIMENT STATION, KINGSTON

THE INSECT VECTOR FOR THE NATURAL TRANSMISSION OF EPERYTHROZOON COCCOIDES IN MICE

IT has been recognized since 1930[1] that the white mice used for experimental purposes in this country may harbor a latent blood infection which is distinct from *Bartonella muris* but which like it is activated by splenectomy. The infecting organism, *Eperythrozoon coccoides,* was first described two years previously in Berlin.[2] It is a small ring-shaped body, usually less than 1 μ in diameter, staining reddish blue by Giemsa or Wright's stain. It appears in great numbers on the red cells as well as in the plasma within one to several days following splenectomy of the carrier animal. The fact that normal carrier mice are apparently little affected by the organism and that (unlike *Bartonella muris* infections) the multiplication of the parasite following splenectomy results in no marked pathological change, has led to a rather general oversight of the possible influence of the *Eperythrozoon* on experimental results. Certain changes in the blood picture and in the size and histology of the spleen in the infected animal have recently been demonstrated.[3,4] These deviations from normal may be sufficiently great at times to be significant when exact studies on the relation of the spleen to disease and resistance are under investigation.

The presence or absence of the latent *Eperythrozoon* infection can be demonstrated by splenectomy. The uninfected mice when kept isolated from other stock will remain free of the organism. The intraperitoneal injection of blood from a carrier mouse or from one showing active infection serves as a simple method for laboratory transmission. The means for the natural transmisison of the parasite from mouse to mouse has not been recorded up to the present time. The fact that the *Eperythrozoon* is a blood parasite and that it spreads gradually but surely through a colony of mice kept under the usual laboratory conditions points to the rôle of an insect vector in its natural transmission. Negative results have been reported with the rat louse and with fleas.[1,5,6] By analogy with the natural transmission of *Bartonella muris* this vector might be suspected to be the mouse louse.[7] A series of simple experiments revealed that the louse *Polyplax serrata* does indeed serve as the insect vector of *Eperythrozoon coccoides* from mouse to mouse.

A group of mice known to be free from latent *Eperythrozoon* infection was splenectomized and kept in rigid quarantine. These served as the susceptible hosts for the transmission tests. The more commonly occurring ectoparasites in an infected colony of mice were identified and used for the transmission experiments. There were no fleas in this infected colony. The two species of mites tested, *Myobia musculi* and *Mycoptes musculinus,* failed to transmit the *Eperythrozoon* by feeding on the test host.

The experience with the louse *Polyplax serrata* was quite different. In each of eleven experiments the adults and nymphs were shown to be capable of transmitting *Eperythrozoon coccoides* to the uninfected test host by feeding on it. The organisms appeared in the blood of these splenectomized animals in from nine to seventeen days, depending on the conditions of the experiment. In two other trials in which the adult lice were kept away from the host for several hours, transmission failed to take place. The nymphs from the same host, however, that were starved for the same length of time were capable of transmitting *Eperythrozoon.* These results suggest that the strong digestive fluids of the adult louse destroy the organism, while the less active alimentary juices of the nymph permit longer survival. The details of these and other experiments are to be reported later.

CALISTA P. ELIOT

SCHOOL OF HYGIENE
THE JOHNS HOPKINS UNIVERSITY

VISCERAL LEISHMANIASIS IN BRAZIL

THE viscerotomy service of The Rockefeller Foundation detected, between March, 1932, and July, 1936, eighty-five specimens of liver containing leishmania bodies morphologically identical with those of *Leishmania donovani,* which produces Indian and Mediterranean kala-azar. These bodies and the liver lesions

1 C. P. Eliot and W. W. Ford, *Amer. Jour. Hyg.,* 12: 677–680, 1930.
2 V. Schilling, *Klin. Wchnschr.,* 72: 1853, 1928.
3 J. Marmorston, *Jour. Infect. Dis.,* 56: 142–153, 1935.
4 M. R. Lewis and C. P. Eliot, to be published.
5 R. Bruynoghe and Vassilidis, *Compt. rend. Soc. de Biol. T. C.* 763, 1929.
6 D. Weinman, Amédée Legrand, Editor, Paris, 1935.
7 C. P. Eliot and W. W. Ford, *Amer. Jour. Hyg.,* 10: 635–642, 1929.

were first described by H. Penna, of the yellow fever service.

In the last five months we have been able to investigate the disease clinically and epidemiologically, as well as to study the parasite in some of its morphological and biological aspects.

Clinically, the evolution of the disease is very similar to that of kala-azar: onset with fever of varying types, progressive emaciation, progressive anemia of a hypochromic type, leucopenia with relative monocitosis and rapid enlargement of liver and spleen. Hemorrhagic symptoms of mucosae are common. No skin lesions or skin color changes have been detected. Some cases have an acute evolution, with death occurring in from one to three months; others have a chronic course, with death occurring, in general, in from eight to fifteen months.

Parasites can be found rather easily by liver and spleen punctures and have also been detected in blood smears after white cell concentration. In human organisms parasites are always found in the form of leishmania, measuring from two to three micra, generally contained in the plasm of macrophages. Cultures have been obtained from spleen punctures in Noguchi and NNN mediums. Leptomonae grow and multiply abundantly in cultures, and their shape is identical with that of *Leishmania donovani*. Experiments are being carried on for identification of the species through comparison with all other known species of the genus *Leishmania*.

The formol-gel reaction has given fairly good results for diagnosis of clinical cases. Visceral lesions vary according to the chronic or acute evolution of the cases. In acute cases, hyperplasia of endothelial cells with monocitic infiltration, focal or generalized, is the principal sign, with a large number of parasites in mononuclear cells and extensive fatty degeneration. In chronic cases, fibrous lesions are dominant, with focal or generalized sclerosis, and a smaller number of parasites.

The disease has been found in almost all northern and eastern states of Brazil, and more recently, by Dr. Romaña, in the Argentine Chaco. No epidemic incidence of the infection has been found in any focus, but the disease exists endemically with scattered cases. No case of infection has been seen in towns, but investigation has shown the existence of jungle infection as a rule. Animal reservoirs of parasites are now being sought. Species of *Phlebotomus* have been found regularly in every focus.

The incidence of the disease, according to age, has been found to be as follows:

Under 6 years	53.1 per cent.
6 to 10 "	17.4 " "
Over 10 "	29.9 " "

Cases have been found in persons between the ages of 45 days and 56 years. Mortality investigation in some foci has shown a leishmaniasis death rate of 1.8 in the Amazon Valley, and one below 0.4 in the northeastern section of Brazil.

The treatment of clinical cases with antimonium derivatives—Neostibosan and Fuadine—has proved to be efficient.

EVANDRO CHAGAS

OSWALDO CRUZ INSTITUTE
RIO DE JANEIRO, BRAZIL

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE DETERMINATION OF THE INTERNAL GASES OF PLANT TISSUES

MAGNESS[1] has described a method of extracting the internal gases of plant tissues, uncontaminated by air, by submerging the material in mercury in a special tube to which is attached a mercury leveling burette that may be lowered to create a partial or almost complete vacuum in the tube containing the material. The gas escapes from the tissues, collects over the mercury and is then analyzed by means of the Bonnier-Mangin gas analysis apparatus.

The writers, in carrying out a large number of routine analyses, found the use of the Bonnier-Mangin apparatus rather tedious and time-consuming. It is frequently necessary to check the results several times to be certain of the accuracy of the values obtained. Consequently the Bonnier-Mangin apparatus was discarded and an Orsat gas analysis apparatus was used instead.

In order to make satisfactory determinations with the Orsat apparatus larger quantities of gas are necessary than is the case with the Bonnier-Mangin apparatus. To obtain an appropriate quantity of gas a larger extraction cylinder was provided. This was constructed in the laboratory by taking a piece of heavy-walled (2 or 3 mm) Pyrex glass tubing 35 mm in inside diameter, bending it at a right angle near one end and drawing it out to a nozzle to which a piece of heavy-walled rubber tubing was attached. A 1-liter aspirator bottle was attached to the other end of the rubber tubing, which served as a leveling bulb. The other or upper end of the glass tube was provided with a rubber stopper fitted with a capillary stopcock.

[1] J. R. Magness, *Bot. Gaz.*, 70: 308–316, no. 4. Illus. 1920.