biology how much more difficult the organization and prompt completion of annual summaries requiring, as these do, the cooperation of specialists in less closely associated subjects! Nevertheless Professor Woltereck and his associates have undertaken the seeming impossible and Bd. I. contains as a supplement the first section of the Jahresübersicht for 1908 including: I., Limnography; II., oceanography; III., fresh-water botany; IV., marine botany; V., applied hydrobiology (polluted waters and water supplies); VI., fresh-water zoology (excluding vertebrata). The remaining parts (with Nachträge to those above named) will be issued in the current year. These are VII., marine zoology (excluding vertebrata); VIII., marine and fresh-water fisheries with supplement on "Aquariumkunde"; IX., potamology, moorkunde, thermal and cave waters.

Obviously a considerable part of this field (III., IV., VI. and VII.) is already covered in the long-established botanical and zoological summaries and bibliographies, but all too often imperfectly and not from the standpoint of hydrobiology. The other fields are sorely in need of just such summaries and bibliography as are here projected. Every worker in these fields should help on the project of securing complete and prompt representation of the literature by providing the *Revue* with reprints or notices of his work. Naturally there are many deficiencies in the parts now published, but they are to be expected in the initial stages of all such enterprises. The bibliography and summaries of literature form a supplement with independent pagination.

The new *Revue* should receive the cordial support and cooperation of all who are interested in the manifold phases of hydrobiology, whether descriptive, experimental or applied.

CHARLES A. KOFOID
UNIVERSITY OF CALIFORNIA

THE TREATMENT OF CERTAIN TICK-TRANSMITTED DISEASES.

EVER since the discovery of the destructive effect of quinine on the causative organisms of malaria, investigators have dreamed of the possibility of discovering similar therapeutic agents for use in other diseases caused by blood-infesting organisms. A recent paper by Messrs. Nuttall and Hadwen,[1] dealing with experiments conducted at the University of Cambridge, seems to indicate that drugs have been discovered which display the same destructive effect upon certain species of disease-causing species of *Piroplasma* as quinine has upon the organism of malaria.

There are four distinct diseases of domestic animals caused by as many species of *Piroplasma.*[2] Of these, splenetic or Texas fever occurs in various of the warmer parts of the earth and causes tremendous economic losses. Malignant jaundice of the dog occurs in India and South Africa and displays a very high lethality. Biliary fever of horses occurs in Africa, the loss is considerable. Carceag of sheep occurs in southern Europe and is considered an important disease. In all these diseases certain ticks have been found to be the agents of transmission.

In the experiments of Messrs. Nuttall and Hadwen the most remarkable results were obtained from the use of the stains known as trypanrot and trypanblau, in aqueous solutions injected subcutaneously. These were found to exert a direct and observable effect upon the

[1] Nuttall, J. H. F., and Hadwen, S., "The Successful Drug Treatment of Canine Piroplasmosis together with Observations upon the Effects of Drugs on *Piroplasma canis*," *Parasitology*, II., Nos. 1–2 (double number), pp. 156–191, July, 1909.

[2] In the literature the organism of the so-called Rhodesian fever of cattle is referred to as *Piroplasma parva.* However, Mr. Nuttall has pointed out that this species is not congeneric with those causing splenetic or Texas fever of cattle, malignant jaundice of dogs, biliary fever of horses and carceag of sheep. He has therefore erected the genus *Theileria* for the organism referred to as *Piroplasma parva.* This is especially interesting in view of the fact that the drugs which were found to have a most decided effect upon the true *Piroplasma* species did not exert any effect whatever on the parasite of Rhodesian fever.

parasites by causing the pyriform stages to disappear quickly and also to cause the total disappearance of the parasites from the peripheral blood. The action was most noticeable on the pyriform stage found in the plasma, which is exactly analogous to the action of quinine in malaria. However, the drugs apparently reached the stages within the corpuscles, causing them to show signs of degeneration. They presented a ragged and irregular appearance, quite different from the normal.

In the experiments with trypanblau ten dogs suffering with piroplasmosis were utilized. Failure to cure the disease resulted in only three out of the ten cases. In the failures distemper and other factors probably contributed to the death of the animals. This is especially likely in view of the effect noted upon the morphology of the organism in the microscopical examinations. In one case, which was repeated successfully, an injection of trypanblau twenty-four hours after inoculation prevented the appearance of the parasites in the blood of the dog which remained perfectly well.

In a note appended to the paper we are informed that trypanblau exerts a very prompt effect on the parasites of splenetic fever. This effect is precisely similar to that on the organism of the dog disease with which the experiments were primarily concerned. It is thus permissible to assume that the agents used by Messrs. Nuttall and Hadwen may be of use in the treatment of this very important disease, as well as in others caused by similar organisms. We are informed that the authors have interested the Colonial Office and the Department of Agriculture and Fisheries in extensive practical tests. We are promised reports upon this work and upon further laboratory experiments at an early date.

The writer commends the paper as one of far-reaching importance. Moreover, it is a model in the treatment of an intricate subject. Full details of experiments are given so that the reader knows exactly what are the bases for the conclusions drawn.

W. D. Hunter
U. S. Department of Agriculture

SPECIAL ARTICLES

DEMONSTRATIONS WITH THE MUSICAL ARC

The musical arc offers a convenient means of demonstrating many important features of electromagnetic theory. It may be of interest, therefore, to give a brief description of apparatus and methods, with references to some of the more elementary experiments which have been found helpful.

As is well known, the musical or "singing" arc[1] is obtained by connecting in parallel with the direct current arc a system containing self-induction and capacity. The arc used without this parallel or "secondary" system may be more or less unsteady, showing at the poles sudden change of potential difference of considerable magnitude. The secondary system may be thought of as supplying the conditions for taking up these fluctuations, and, in turn, emitting electric oscillations of frequencies determined in large part by the secondary itself. These oscillations, reacting on the arc, cause fairly regular interruptions in the discharge, which therefore emits a musical note. The pitch of this note may be varied by changing the conditions of the arc-circuit as well as by varying those of the secondary.

Examination by a revolving mirror and by the spectroscope seems to confirm what might from general considerations be expected in an arc of this kind, viz., that although the arc is interrupted, the poles give the distinctly different and characteristic forms of discharge observed in the continuous arc.[2]

For purposes of demonstration, good results may be obtained by using a condenser with capacity which may be varied from 1 to 10 microfarads and which is capable of standing a potential difference of 1,000 volts. The coil for the secondary may be made with three hundred turns of No. 15 annunciator wire wound on a spool of 10 cm. radius and 3 cm. axial length. The arc is perhaps most easily maintained between carbon poles. Examined

[1] Duddell, *Electrician*, 46, 1900. Simon, *Phys. Zeit.*, VII., 1906. Austin, *Bulletin of Bureau of Standards*, 3, No. 2, 1907.

[2] Vide *Astrophysical Journal*, XXVIII., No. 1, 1908.