Rhipicephalus and *Hyalomma* and on paramphistomes of domestic ruminants and on the larvæ of *Haemonchus contortus*.

Good progress was made with the construction of the Central Trypanosomiasis Research Laboratory at Sukulu, Uganda, and fields-trials to determine the role of biting-flies in the spread of animal trypanosomiasis in tsetse-free country were continued, while treatment with 'Antrycide' pro-salt at two-monthly intervals for a limited period protected cattle exposed daily to attacks of the tsetse *Glossina austeni* even after cessation of treatment. Research on the race of *G. morsitans*, which occupies about a hundred thousand square miles of the western fly-belt of Tanganyika, was extended to include the race of *G. morsitans* inhabiting a different type of vegetation in some ninety thousand square miles of eastern and southern Tanganyika. Important advances in the determination of blood meals taken up by tsetse flies have been made and were due to be published.

A comprehensive collection of hydrological data from Lake Victoria by the Fisheries Research Organization indicated a significant lack of sulphates in the waters of Lake Victoria, and the complicated water movements in this lake have to some extent been related to the variable growth of plankton in different areas. Data on the growth-rate of *Tilapia* indicate that the quality of the food may be more important than the amount. Some successful fish-marking experiments were carried out in the Kavirondo Gulf, while in marine waters the Marine Fisheries Research Organization made extensive studies on pelagic fish as well as correlated investigations on the plankton or biological content and the hydrography of the area. Good progress was made on the construction of a new headquarters building for the Meteorological Department, which was occupied mainly with providing a forecast service covering East Africa and an area of the Indian Ocean and with the collection and collation of climatological records.

At the end of 1953 the total strength of the Desert Locust Control and Survey was 174 officers and 522 vehicles and, besides the major operations in the Somali Peninsula and in Kenya against the increasing extent and intensity of the plague of the desert locust, fifty swarms of which invaded British East Africa early in 1954, control measures were carried out in Aden, Yemen, Kuwait and Oman. About £1 million was expended on control and research during the year. The Filariasis Research Unit began to operate on July 1, 1949, and the report gives a brief general review of the results achieved by the Unit in its study of bancroftiasis and onchocerciasis methods of control. The reduction of staff in the early stages has necessitated an extension of the scheme before the work in East Africa can be completed. The first phase of the East African Medical Survey also terminated in December 1953. In the five years work reviewed in this report, the surveys conducted in Kenya and Tanganyika have yielded statistical data which illustrate the relation of such influences as agriculture, animal husbandry and domestic practices to the health of the community.

Early in 1953 the Virus Research Institute undertook an investigation which has elucidated the nature of dengue-like fever around Newala in south Tanganyika. Work on yellow fever was less extensive, but a survey was made at Newala; and the Institute is also studying the inter-relation between a virus and its insect host, using rift valley fever and *Aedes aegypti*, and the relation between virus and the host's tissue, using influenza virus and the embryonated hen's egg. Although the activities of the Malaria Unit were restricted by absence of staff, an investigation of the epidemiology of malaria in Buganda was initiated, and one on residual house spraying with 'Gammexane' in the Northern Province of Tanganyika, which was concluded, indicated the uncertainty of house-spraying over a limited area as an anti-malarial measure. Use of mass house-spraying technique indicated that the total anopheline population in an area was about 40 per acre.

The Inter-Territorial Leprologist estimates that £200,000 a year over ten years would be required to attack leprosy on a broad front in all the Territories simultaneously, with good prospect of reducing it to negligible proportions in that period; there are at present some 216,000 leprosy cases, with eighteen leprosaria and various out-patient and rural schemes. Good results are being obtained with sulphone and other specific drugs, and under the regional leprosy surveys of the Territorial Leprologist, rural leprosy work developed particularly well in Uganda.

INTERNATIONAL CONFERENCE ON ELECTRON MICROSCOPY

LONDON, 1954

DURING September 1950 an international conference on electron microscopy was held in Paris, and at an informal meeting of members of the various national groups it was decided that some international organization should be set up to arrange international conferences at regular intervals. The British Group, namely, the Electron Microscopy Group of the Institute of Physics, was asked to investigate the best method of attaining this object. Mr. F. W. Cuckow, who was secretary of the British Group at the time, approached the International Council of Scientific Unions, and it was eventually decided to set up a Joint Commission on Electron Microscopy on which the scientific unions interested in the subject would have representatives. It was the privilege of the Committee of the British Electron Microscopy Group, together with those members of the Joint Commission who could attend committee meetings in London, to organize the first International Conference under the auspices of the Joint Commission, at the London School of Hygiene and Tropical Medicine, during July 15–21. The detailed organization was carried out jointly by Mr. F. W. Cuckow (acting as secretary of the Joint Commission) and Dr. C. E. Challice (as secretary of the British Group). Office facilities were made available by the Institute of Physics. A programme committee, consisting largely of the secretaries of the national groups, was set up, with Dr. V. E. Cosslett (chairman, British Group) as its secretary. At the beginning of the conference the Joint Commission held its first meeting and before the conclusion of the conference a committee had been set up, under the Commission to co-ordinate future international meetings.

After the Conference had been formally opened, three invited survey papers were read. First, Prof. B. von Borries (Technische Hochschule, Aachen), a

pioneer in the electron microscope field, reviewed recent developments in the use of beams of fast-moving corpuscles for microscopy. Dr. F. S. Sjöstrand (Karolinska Institut, Stockholm) outlined recent advances in biological knowledge achieved with the electron microscope, and devoted most of his review to the outstanding results obtained in the past two years by the application of the ultra-thin sectioning technique, of which he himself was a pioneer. Dr. J. Nutting (Metallurgy Laboratory, Cambridge) then surveyed the developments in metallurgical, chemical and industrial applications of the instrument.

Following these three papers came the sessions of original contributions. It would be impossible to present, in the space available, even an indicative review of the 160 papers read, as the result would be merely a list of titles. In any event, in order to get through this number of papers in the five working days assigned to the meeting, parallel sessions had to be held on four of the afternoons and one morning, thus making it impossible for anyone to hear all the papers read. As the authors' abstracts are available[1] and the full proceedings are to be published[2], the scientific sessions will be reviewed here in a superficial manner only.

Electron Optics

Seven sessions were devoted to subjects which can be classified under this general heading. Two theoretical sessions, one on electron optical theory (twelve papers) and one on electron interference and phase effects (three papers), showed that more consideration is now being given to aberration theory than to general lens theory. Some interesting practical results from a 'phase-contrast' electron optical system were produced by M. Marcel Locquin (Paris). A more experimental session on ion microscopes and X-ray microscopes (six papers) included papers on a lithium ion microscope (Dr. M. Gauzit, Paris) and a proton microscope (Prof. G. Magnan and Dr. P. Chanson, Paris) together with three papers on the theory and application of the X-ray shadow microscope. Dr. R. Castaing (Toulouse) gave a summary of his work on electron probe techniques. A session on emission and reflexion microscopy (six papers) included a report from Prof. G. Dupouy and Prof. Ch. Fert (Toulouse) on reflexion electron microscopes and a description of metallurgical emission – microscopical techniques by members of the Philips Co.'s research team. Spectacular results obtained by Prof. G. Möllenstedt and Dr. M. Keller (Mosbach-Baden) were shown. Their apparatus consisted of an emission microscope in which the cathode (specimen) emission was excited by ion bombardment. Other aspects of emission microscopy were presented in three further contributions.

Three sessions devoted to the conventional type of electron microscope were all intended to be of general interest to users of the instrument. "New Electron Microscopes" (four papers) contained descriptions of two experimental instruments and two commercial models (R.C.A. and Siemens), and "Apparatus; Operation of Microscopes" (nine papers) contained descriptions of a number of pieces of experimental apparatus directly connected with the electron microscope or its use. "The Attainment of High Resolution" (three papers) provided a promise of 5 A. or so resolving powers in the foreseeable future.

Specimen Techniques

Four sessions were devoted to specimen preparation techniques. In that on general specimen techniques (eleven papers) Dr. Marcel Locquin (Paris) described how living specimens contained in a small water-containing cell can be examined in the electron microscope. A number of replica processes for different particular types of specimen were described by other workers, particularly striking results being obtained by Mr. D. E. Bradley (Aldermaston) by the use of carbon replicas. In the session on metallurgical specimens techniques (six papers) a number of methods of preparing metals and metal surfaces for examination by electron microscopy were discussed. The microtomy session contained descriptions of two new microtomes, together with a method of preparing steel knives for cutting ultra-thin sections. A symposium on the preservation of biological material contained five papers. This included two major American contributions, one by Dr. G. E. Palade (New York), whose introduction of the practice of buffering osmic acid for the fixation of tissue has been copied by practically all workers in the field, and the other by Prof. T. F. Anderson (Pennsylvania) on the preservation of structure in dried specimens. The results of Prof. Anderson's technique of taking the medium in which the specimen is suspended around its critical point were presented in a number of most impressive stereo slides.

Non-Biological Applications

The three sessions falling under this general heading showed that considerable progress has been made in this field of application since the 1950 conference. On metallurgical applications there were thirteen contributions in which it was described how the techniques of emission and reflexion microscopy have enabled a number of problems to be studied directly, without the use of replicas, while the carbon replica process has enabled the full resolving power of the conventional transmission electron microscope to be exploited. Studies on steels subjected to various treatments, together with studies on a number of non-ferrous metals, were described. Industrial, chemical and other applications (thirteen papers) referred to all non-biological work not covered by metallurgy, and included some studies on crystals, colloids, rubber, paper and gels.

A symposium on the action of the electron beam on the specimen (five papers) was concerned with the changes both morphological and chemical which take place in the specimen when the electron beam is applied.

Biological Applications

Fifty-seven papers were presented in the sessions on biological applications, and the diversity of the biological fields covered was so great that it is quite impossible to do justice in this review to the work described. Generally speaking, the contributions were dominated by the application of the thin-sectioning techniques which, at the Paris Conference in 1950, were still in their infancy. Bacteria, viruses, spermatozoa and cilia have all been sectioned and examined, together with a large number of tissue cells. Among the virus studies described (fourteen papers) were animal, plant, insect and bacterial viruses, and the bacterial studies (ten papers) covered work performed on a number of different strains of

organisms. Internal structure of cells (thirteen papers) included studies on muscle, pancreas, retina, nerve cells and yeasts. Five papers were devoted to the structure of cell and body walls, while eight papers on fibrillar structures included some interesting work on the application of the reflexion technique to the examination of fibres. Work on muscle and collagen was also described. A symposium on the microanatomy of cilia, flagella, etc., included some interesting speculations by Miss W. van Iterson (Amsterdam) on possible relationships between flagella, cilia and sperm tails.

It was interesting to note, throughout the conference, the increasing use which is being made of the stereo technique. This technique is proving of real value, as it is impossible in many specimens to obtain adequate information on spatial relationships by any other method.

In connexion with the Conference, an exhibition of commercial apparatus and books, and also of research micrographs, was held at the London School of Hygiene and Tropical Medicine; indeed, the Conference owed much of its success to the dean and staff of the School for their generous help and for making available excellent facilities.

C. E. CHALLICE

[1] Handbook of the International Conference on Electron Microscopy, London, 1954 (obtainable from the Institute of Physics, 47 Belgrave Square, London, S.W.1).

[2] Proceedings of the International Conference on Electron Microscopy, London, 1954 (Royal Microscopical Society, London) (in the press).

THYROID FUNCTION

AS part of a joint meeting with the Association of Clinical Pathologists held at the Grand Hotel, Brighton, on October 2, the afternoon session was devoted to a programme of papers on thyroid function organized by the Association of Clinical Biochemists.

The subject was introduced by Prof. E. J. Wayne (University of Glasgow), who discussed the use of radioiodide in the diagnosis of thyroid disorders. The opinion was expressed that it is preferable to use two or three tests, especially the determination of the thyroid uptake of radioiodine, four hours after a dose, and the plasma protein-bound activity forty-eight hours after a dose. The latter corresponds best with the final clinical diagnosis in cases of hyperthyroidism, while tests based on urinary excretion are specially valuable in the diagnosis of hypothyroid states.

The results of some five hundred cases in which the iodine-131 thigh-neck clearance test was employed were reviewed by Dr. B. W. Meade and Prof. N. F. Maclagan (Westminster Medical School, London). In only forty cases was there a discrepancy between the results of the test and the clinical condition. In seventeen cases which showed a high clearance-rate, sixteen were due to goitrogen administration and one to a large non-toxic goitre. The remaining anomalous results were low—eleven were due to iodide and six to thyroxine; two were post-thyroidectomy, and four were not explained.

Drs. F. Brown and H. Jackson (Christie Hospital, Manchester) then reported the results of the treatment of thyroid carcinomata with therapeutic doses of iodine-131. The plasma was found to contain thyroid protein in addition to thyroxine, and in some cases small amounts of diiodotyrosine. The results of certain animal experiments which were also reported showed that the metabolism of thyroid protein shows a definite species specificity: dog thyroid protein is not metabolized by rats, nor is that from rats metabolized by dogs.

Dr. A. Tickner (Guy's Hospital Medical School, London) discussed the serum cholinesterase level in thyroid disease. It was found to be high in thyrotoxic states and low in myxœdema, but there was some overlap. Since the liver is regarded as the source of cholinesterase, it seems that in thyrotoxicosis the cholinesterase activity is a measure of liver function.

The measurement of thyroid-stimulating hormone in thyroid disorders was reported by Dr. I. C. Gilliland (Postgraduate Medical School, London), who found that the level is high in myxœdema and low in Simmond's disease, whereas in thyrotoxicosis it is low unless eye signs are present, when it is raised. In cases of exophthalmos without thyroid involvement, there is no increase in the thyroid-stimulating hormone-level. Dr. Gilliland therefore concludes that more than one factor is involved.

Drs. A. L. Tárnoky and P. White (Royal Berkshire Hospital and University of Reading) have investigated the relationship between a number of conventional tests in thyroid disease. Highly significant correlations were found between the basal metabolic rate, the serum cholesterol and the urinary pigment: creatinine ratio.

The last paper was by Mr. C. H. Bowden, Prof. N. F. Maclagan and Dr. J. H. Wilkinson (Westminster Medical School, London), who described the application of the ceric sulphate – arsenious acid reaction to the detection of thyroxine and triiodothyronine in plasma. An outline of the techniques employed for the extraction of the protein-bound iodine components from normal plasma and their detection on paper chromatograms was given. Preliminary results indicate that thyroxine and triiodothyronine are components of both normal and thyrotoxic plasma.

J. H. WILKINSON

PERTURBING ACTION OF THE EARTH ON METEOR STREAMS

A PAPER discussing a criterion concerning the perturbing action of the earth on meteor streams by L. Kresák, of the Astronomical Observatory of the Slovak Academy of Sciences, Skalnaté Pleso (*Bull. Astro. Inst. Czechoslovakia*, 5, No. 3; 1954), deals with the possibility of the dispersion of meteor streams by the earth. He makes use of Tisserand's well-known criterion for the identity of comets which are perturbed by a comparatively close approach to a planet; this states that

$$1/a + 2\sqrt{a(1-e^2)}\cos i = C,$$

where a, e and i have the usual significance in dynamical astronomy. He then develops another criterion, the earth being the disturbing body and a meteor stream taking the place of a comet. The treatment has some advantages: for example, geocentric velocities of meteors can be determined more directly than orbital elements involved in Tisserand's criterion, and also they can be obtained directly by means of radio-echo technique. After a few substitutions and transformations of the above equation, it can be expressed in the form:

$$1/a + 2\sqrt{a(1-e^2)}\cos i = 3 - w^2,$$