A paper by M. Menes and L. H. Fisher (New York University) gave an account of how they have measured the formative time-lag of a discharge on positive metal points (0·07–0·3 mm. radius) in dry air irradiated with ultra-violet light, the negative electrode being a plane at a distance up to 1·5 cm. They found that when the pressure was increased from 30 to 700 mm. of mercury, the time-lag at threshold potential decreased from 1 to about 0·1 μsec., depending only slightly on the radius, distance and illumination. This and the small lag indicate that the multiplication processes leading to the starting of a corona discharge are controlled by the gas.

The starting of a discharge between plane metal electrodes 1–4 cm. apart at pressures of less than or equal to 1 μ mercury and frequencies of 30–90 Mc./s. has been investigated by A. J. Hatch and H. B. Williams (New Mexico College), and they have observed that the starting field decreases with decreasing frequency as known for electrodeless discharges—until the cut-off frequency is reached. An avalanche of secondary electrons supplied by the electrodes is thought to initiate the discharge. However, when a strong field is quickly applied and then slowly lowered, a second field/frequency curve is obtained which lies above the first; this branch seems to depend on surface conditions and gas content of the electrodes.

A. von Engel (University of Oxford) dealt with the growth of an electrodeless discharge in high-frequency electric fields at very low pressure, based on work by G. Francis. From oscillograms of the discharge current and from theory, it is concluded that initially an avalanche of secondary electrons from the glass wall is formed, rising exponentially with time; then positive ions are produced in the gas, reducing the speed of impact of electrons on the walls and thus secondary emission. Finally, the ion concentration becomes so large that the amplitude of electron oscillation is reduced. The losses to the wall are ascribed to self-repulsion. A. VON ENGEL

COLOUR VARIATION IN THE BRUSH-TONGUED LORIES

AT a meeting of the British Ornithologists' Union held in the Zoological Society's lecture room on November 22, Dr. A. J. Cain, lecturer in zoology in the University of Oxford, gave a lecture on colour variation in the brush-tongued lories of the genus *Trichoglossus* inhabiting Australia and the islands of the South West Pacific, where the commoner forms are known as the blue mountain lory and the coconut lory. With specimens kindly loaned from the Reference Collections in the British Museum and by means of attractive Kodachrome slides, Dr. Cain showed that most of the random variation and distribution described by some authors for these birds could be explained satisfactorily in the light of modern evolutionary ideas.

Brightly coloured brush-tongued lories with striking orange and blue or scarlet and black undersides in almost endless variation live in flocks in open wooded areas, on islands from Bali to New Guinea with the Solomon Islands, and from Eastern Australia to the Caroline Islands. Much of the variation is correlated with local climate; but *Trichoglossus hœmatodus weberi* from Flores is a subspecies which is green all over, lacking the red and black underparts of *Trichoglossus hœmatodus mitchelli* from Bali and Lombok or the green and yellow underparts of *Trichoglossus hœmatodus capistratus* from Timor.

In Flores this subspecies of *Trichoglossus* lives quietly in the woods, clad in the sombre jungle green uniform of the forest dweller which seeks its food far and wide in the presence of its enemies. It has apparently changed its ecological niche.

In contrast, there lives on Ponape Island in the Carolines *Trichoglossus hœmatodus rubiginosus*, separated by nearly a thousand miles from its nearest relatives in the Solomon Islands. Except for its tail, it is a uniform, dull blood-red colour, with soft, silky plumage unlike the hard features of all the other forms. This subspecies meets no visual predators in its island and needs no recognition marks between friends, for there are no other lories or parakeets with whom confusion can occur. Consequently it has abandoned the usual coloration in the forms, which is cryptic dorsally and variegated ventrally.

VACUUM PHYSICS

FUNDAMENTALLY, the study of high vacuum is a branch of physics. However, following war demands, there has been a rapid development in recent years of large-scale and industrial applications of vacuum processes, and a new branch of engineering, in which high-vacuum technique dominates, has been developed. This new development, together with the considerable improvements in vacuum technique and equipment which have accompanied it, is not as widely known to research workers in the various branches of science as it deserves. The Midland Branch of the Institute of Physics is therefore to be congratulated on having taken the initiative in arranging an exhibition of modern vacuum equipment and a symposium on vacuum physics during June 27–28, 1950. The proceedings of the meeting have now been published by the Institute of Physics in a special supplement of the *Journal of Scientific Instruments**.

The exhibition and symposium were held in the University of Birmingham, at the invitation of Prof. M. L. Oliphant, and some two hundred members of university, government research and industrial laboratories attended. A wide range of pumps, gauges and associated equipment was exhibited by the leading manufacturers of vacuum equipment in Great Britain. The exhibits were attractively laid out and included many working models arranged for actual demonstration. The Physics Department of the University of Birmingham put on show some pieces of vacuum equipment of a specialized nature which had been developed to meet the requirements of the nuclear research programme carried out in that Department, and several conference members were given the opportunity of inspecting the large particle accelerators under construction in the Department. Altogether, eleven papers, each of which was followed by a lively discussion, were read.

The proceedings of the symposium may be divided into three sections which deal with the production and measurement of high vacua, leak detection and modern applications of high-vacuum processes respectively. In the first section, D. R. Goddard discusses in rather a general manner the

* *J. Sci. Instr.*, Supp. 1 (London: Institute of Physics, 1951; 15*s*.).

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modern forms of the distinct classes of vacuum pump—the mechanical and the vapour pump. The requirements governing the choice of a particular pump are considered and, in particular, the capacity, ultimate pressure (in the case of the vapour pump also the backing pressure) and characteristics are discussed. The paper concludes with the remark that, though the construction of modern pumps is extremely simple, many seem to be designed on a hit-or-miss basis and that more investigation is needed to elucidate the mechanism of the pumping action. Most physicists will, undoubtedly, heartily agree with this conclusion.

The two other papers in this first section are by T. S. Miller on the design of industrial vacuum systems, and by W. Steckelmacher on vacuum gauges. The latter is a brief but comprehensive review of methods of measuring pressures below 10 mm. of mercury in which the limitations of the conventional gauges for accurate measurement are carefully examined.

In the second section the general principles of leak detection are reviewed by J. Blears and J. H. Leck. Emphasis is placed on the simpler methods. The mass-spectrometer leak detector which has been extensively developed both in the United States and in Great Britain is now an extremely sensitive and efficient leak detector, and the cold-cathode instrument described by C. J. Milner, of the British Thomson-Houston Co., Ltd., has the advantages of robustness, long life and the avoidance of refrigerated traps. The use of the mass spectrometer, not as a leak detector but for analysing the residual gases in normal dynamic systems, is discussed by J. Blears in a separate article.

The third section, dealing with modern applications of vacuum processes, contains papers on large-scale vacuum dehydration, freeze drying, vacuum coating plant and techniques, the vacuum melting and sintering of metals and a description of the vacuum system of the Birmingham proton synchrotron. These illustrate the many and varied industrial and research developments made possible by improvements in vacuum technique.

Altogether the supplement describing the symposium forms an excellent report on the progress made during the past ten years, and should help considerably to stimulate further research on the basic problems of creating and measuring vacua, in addition to bridging the gap between the standard text-books and recent publications in the specialized periodicals.

S. WEINTROUB

BRITISH GUIANA FOREST DEPARTMENT

REPORT FOR 1948

THE annual report for 1948 of the British Guiana Forest Department* has only been recently received and is in consequence rather out of date; but it discloses a curious position for a Forest Department to be in. From the introductory notes it is difficult to gather the real forest policy of the Colony; for the different parties who appear to be organizing the forest policy seem to have conflicting aims. In any event, the report commences with the remark of the Conservator: "I regret to have to report that during the whole of 1948 the work of the Department has been paralysed owing to the failure to fill staff vacancies. At such a critical period in the development of our forest resources, this state of affairs has been doubly unfortunate".

From this report it is seen that the Evans Commission visited the Colony in the latter part of 1947 with the view of assessing the possibility of settlement of the under-populated areas of the Colony. Particular attention was paid to the development of timber resources. Experts were brought in, and the Colonial Development Corporation suggested the formation of a British Guiana Forestry Corporation, which was set up under the leadership of a former chief conservator of forests of Burma. The Colonial Development Corporation has acquired important forest concessions in the Colony, and a short-term option has been also given over a large area of forest in the north-west district to Canadian interests. Considerable building development is being considered in the Colony, and this will require large amounts of timber.

At a time when the world demand for timber is so great, it seems a great pity that the development of this very important resource of the Colony was not done years ago. The Forest Department was formed in British Guiana in 1925, but it never had more than a handful of staff. Yet there was all this work waiting to be done by professionally trained foresters, who were available to be taken on to the staff at the time of formation and during the following fifteen-year period prior to the outbreak of the Second World War.

* British Guiana Forest Department. Annual Report for 1948. (Georgetown: Forest Department, 1951.)

ORGANIZATION OF ATOMIC ENERGY WORK IN BRITAIN

THE January issue of *Atomic Scientists News* contains a symposium of the views of some leading scientific men on the organization of work on atomic energy in the United Kingdom. The remarks are based on Lord Cherwell's speech in the House of Lords, on July 5, 1951, in which he advocated transfer of the responsibility for work on this subject from the Ministry of Supply to a special organization more flexible than the normal Civil Service system.

The main points of Lord Cherwell's speech are given, and in commenting on them Prof. M. W. B. Skinner and Sir George Thomson agree with Lord Cherwell so far as production is concerned. While, however, he agrees that it was a mistake to put atomic energy under Civil Service control in 1946, Prof. Skinner is dubious as to whether it would now be advantageous to take atomic energy out of the Civil Service and place it under some other organization; he believes that considerable thought should be given to the best form of organization for obtaining clear decisions on technical policy and for the most efficient implementation of the work. Sir George Thomson also doubts whether Civil Service restrictions are now such a serious matter for a going concern as they were in early days at Harwell, and in his tribute to the good work at Harwell in spite of such handicaps, he supports what has recently been said by Sir John Cockcroft elsewhere. Neither believes that scientific freedom in Britain is imperilled by State planning; but Sir George considers that, so far as security is

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