

Anniversary Meeting of the Royal Society

THE report of the Council of the Royal Society, presented at the anniversary meeting on November 30, refers to a grant of £1,500 made from the accumulated and current income of the anonymous bequest fund to the Assam Medical Research Association, in support of a research by Col. J. Morison, of the Pasteur Institute, Shillong, on the preventive treatment of cholera by means of a special preparation of bacteriophage.

During the year the Society received a further sum of approximately £9,700 under the will of the late Dr. R. Messel; this has been added to the Messel Fund. A sum of £450 has been left to the Society under the will of Miss M. S. Greg; and a sum of £2,000, with part of the residue of the estate, under the will of the late Sir Dugald Clerk, F.R.S.

The Council reports that the policy of appointing Yarrow research professors has been eminently successful, but the financial position of the Yarrow Fund is such that the Council considers that no appointment of a successor to Prof. A. Fowler on his retirement should be made until the income of the Fund justifies the reconsideration of the appointment of a third Yarrow Professor; and that any surplus available should be added to the Yarrow Reserve Fund with the view of aiding any special research for which money is urgently required.

Sir Frederick Gowland Hopkins, in his presidential address, referred to the deaths during the past twelve months of two foreign members and fifteen fellows. He then indicated briefly the work and influence of the three Government research councils of Great Britain, the Medical Research Council, the Advisory Council of the Department of Scientific and Industrial Research and the recently formed Agricultural Research Council. Through the work of these bodies, men of science are now in control of the scientific policy of the country. A survey of progress in various branches of science followed, extracts from which appear elsewhere in this issue (p. 878), and Sir Frederick then proceeded to the presentation of medals. Extracts from his remarks on bestowing these honours are printed below.

Presentation of Medals

COPLEY MEDAL, awarded to PROF. T. SMITH

Prof. Theobald Smith was director of the Department of Animal Pathology of the Rockefeller Institute for Medical Research, Princeton, N.J., from 1914 until 1929. In 1886 with Prof. Salmon he showed a new method for producing immunity from contagious diseases by inoculating with a dead bacterial vaccine killed by heat, thus advocating a principle which was re-discovered fifteen years later and has been widely used, notably for making antityphoid vaccine. In 1889 he discovered the first known instance of a disease of vertebrates transmitted by an arthropod—Texas fever of cattle due to a protozoon transmitted by a tick. He introduced differential tests for bacteria based on their biochemical action. In 1896–98 he clearly, and for the first time, distinguished between the human and bovine types of *Bacillus tuberculosis* and the forms of disease which they produce, anticipating Koch's pronouncement in 1901.

In 1903, with Reagh, Prof. Smith described the non-motile variants of certain pathogenic motile

bacteria and their important serological differences. He discovered in 1904 the remarkable phenomenon known as anaphylactic shock in the guinea pig. In 1926 he discovered the very potent effect of the colostrum, the first milk of cows, in protecting calves from certain severe infections. He also made other notable original observations, such as those on the growth and toxin production of the diphtheria bacillus, and on the production of immunity by mixtures of toxin and antitoxin; he also described disease of the cow's udder communicable to man by the milk.

ROYAL MEDAL, awarded to PROF. G. I. TAYLOR

Prof. Geoffrey Ingram Taylor is distinguished for theoretical and experimental researches covering an unusually large field. In meteorology Taylor's work on turbulence in the atmosphere has very greatly advanced our knowledge, and laid the foundation of all future work on the subject. He studied the effects of turbulence on the transfer of heat and water vapour through the atmosphere and on the variation of wind with height above the ground. He investigated the formation of fog, supplementing theoretical work by his observations on S.S. *Scotia*. He has also added to the knowledge of tides. In hydrodynamics he obtained the first (and only complete) solution of a case of hydrodynamic instability in a viscous liquid, namely, when the fluid is contained between two coaxial rotating cylinders; he has discovered many interesting phenomena associated with bodies moving through rotating liquids (in which surface effects are of minor importance); he has developed the theory of completely developed turbulence, in which statistical methods can be applied; and he has made very important advances in the theory of compressible fluids.

Taylor has rendered important services to metallurgy by his studies of the plastic deformation of metals, both in the form of single crystals and in the mass. In the Bakerian lecture of 1923, in collaboration with Miss C. F. Elam, he gave the first explanation of the mechanism of distortion of single crystals of aluminium, and determined the plane on which slip occurs. The plastic deformation of metals has now been studied by a number of investigators, but the foundations have been largely established on the basis of Taylor's work. Its essential feature has been the application of exact geometrical methods to the determination of the orientation of slip in metals, making use of X-ray and other measurements.

In a recent paper he has laid foundations for a rational theory of the strength of materials—hitherto a purely empirical science.

ROYAL MEDAL, awarded to MR. P. P. LAIDLAW

During a period of twenty-five years Mr. Patrick Playfair Laidlaw has made an important series of contributions to knowledge over a wide field of medical science. Even in his first publication he showed originality when he demonstrated that the stability of iron in the hæmoglobin molecule was dependent on the presence of oxygen, a fact of great significance in subsequent investigations on hæmoglobin chemistry. Following this work, he published a number of papers on the action of various drugs, and especially the natural bases, from a pharmaco-

logical aspect. Thus with Dale he described the pharmacological action of histamine, demonstrating the physiological nature of histamine shock and the extension of the results to surgical shock. The work was revolutionary in demonstrating the part played by the capillaries in circulatory phenomena.

At a later stage Laidlaw turned his attention more particularly to the study of micro-organisms and related problems. He was the first to use spongy platinum and hydrogen in the anaerobic cultivation of bacteria. With Dobell he discovered a method for growing *Entamoeba histolytica in vitro* and also solved the problem as to how emetine acts in curing amoebic dysentery. With Dunkin he undertook an investigation into the cause, prevention and cure of distemper, one of the most successful investigations in medical science.

In a recent extension of this work, in co-operation with Wilson Smith and Andrewes, Laidlaw has shown that a virus can be transmitted to the ferret from cases of human infection diagnosed as influenza, and has thus discovered a technique for its further study.

DAVY MEDAL, awarded to DR. W. H. MILLS

Dr. William Hobson Mills is distinguished for his outstanding contributions to stereochemistry and to our knowledge of the cyanine dyes. He has made important observations in many branches of descriptive chemistry and has extended, especially, the theory of stereochemistry and strengthened its foundations by the devising and the performance of carefully planned experiments. In the most elegant manner he has demonstrated the occurrence of molecular dissymmetry in some of the most interesting cases predicted by theory, but, prior to his work, unconfirmed in the laboratory.

By his resolution of the oxime of keto-hexahydrobenzoic acid, Mills not only justified in a new way a prediction of van't Hoff but also furnished convincing evidence of the validity of the Hantzsch-Werner theory of the configuration of the oximes. Later he explained the existence of stereoisomerism in certain diphenyl derivatives by an 'obstruction'

hypothesis and he brilliantly justified his views by predicting and demonstrating a similar phenomenon in the naphthalene series.

Mills has also developed the theory and practice of spirocyclic compounds of several very different kinds, and he has added a number of elements to the list of those which, acting as a central polyvalent atom, are known to give rise to enantiomorphism.

HUGHES MEDAL, awarded to PROF. E. V. APPLETON

The Heaviside layer, or reflector of electromagnetic waves in the upper atmosphere, was originally postulated to explain the bending of such waves round the earth's curvature. Appleton, in collaboration with M. A. F. Barnett, J. A. Ratcliff and others, has brought it within the range of detailed experimental examination. Working over a moderate distance of the order of 100 kilometres, he was able to examine the interference between the direct ray, and the ray reflected from the layer, by noting the successive intensity maxima as the wave-length of the sending station is varied continuously over a small range. In this way the height of the main reflecting layer is established to be about 100 kilometres, though at night it is found to be somewhat greater. Evidence was also found of a higher reflecting layer, situated at 180 kilometres, which has come to be known as the Appleton layer. In some of the experiments the horizontal distance was only 18 kilometres, so that the reflected ray came nearly straight down.

Appleton has shown that ionisation penetrates downwards, and the height of the reflecting layer becomes less as the sun rises. During the night the number of free electrons diminishes, and the reverse process can be traced.

In a further important series of experiments Appleton and his collaborators have shown that the downcoming electric waves from the Heaviside layer are elliptically polarised in a left-handed sense. This he connected with the modification in the motion of the ions (electrons) by the earth's magnetic field, and predicted a right-hand polarisation in the southern hemisphere, a prediction since confirmed.

The Divine King in Africa

THE death of the Divine King, which may well be regarded as the central picture of Sir James Frazer's shield of Achilles, has been considered by Prof. Moret alone among the Frazer lecturers, and he had concerned himself especially with the Egyptian evidence. Prof. C. G. Seligman made it his object to repair this omission in his Frazer lecture entitled "Egypt and Negro Africa: a Study in Divine Kingship", delivered in the University of Liverpool on November 30. He reviewed the evidence which he and his colleagues have collected in Africa, with the view of shedding new light on the subject, confining himself to the position of the Divine King in living cultures.

In the Sudan in the winter of 1909-10, Prof. Seligman and his wife were able not only to obtain evidence concerning the existence and killing of the Divine King among two great Nilotic tribes—the Skilluk and Dinka—but also in the case of the former, they were given an account of the installation of the new king, part of the ceremony providing the actual mechanism whereby the divine spirit immanent in

the Skilluk king was passed on to his successor. Further evidence has been obtained from the Dinka and Skilluk, and also from the Nuer, by Prof. Evans-Pritchard, and our knowledge has been much increased by the work of Mr. C. K. Meek in West Africa.

On the basis of this material, it is possible on one hand to set forth an account of at least a portion of the recently acquired knowledge concerning Divine Kings in Africa, and then to estimate whether the existence of those rulers is to be regarded as due to the survival in different parts of Africa of the beliefs of a very old immigrant Caucasian stock, the Hamites, of whom the proto-Egyptians were themselves a branch, or whether the belief is to be considered as specifically Egyptian in origin and as having spread from Egypt by culture contact.

The evidence is derived from (1) the Nile Valley south of Khartum, here including the tribes from the neighbourhood of the great lakes; (2) Nigeria and the adjoining parts of West Africa; and (3) parts of East and South Africa inhabited by Bantu tribes.