

candidates are being selected for a well-organised training scheme, from which the necessary criteria for test validation can be obtained; when the operational situation permits the introduction of classification tests; when the production problem can be solved by aptitude tests; and when facilities are or can be made available for the routine application of such tests. Personnel research deals with people, and for most purposes these people must be subjected to experiment. Laboratory investigation into certain problems encountered in field research projects has become urgent. Current research projects include personnel selection and classification for the Defence Forces; a study of the factors determining fatigue and output among operatives in the clothing industry; the construction of selection and classification tests for operatives in the clothing industry; and standardization of the Wechsler-Bellevue intelligence and achievement test for ex-volunteers in shelter employment, as well as some statistical projects.

In the National Physical Laboratory instruments have been developed for logging temperature and radioactivity in boreholes under South African conditions and for determining very low concentrations of radioactive substances; and a method has been developed for rapidly determining the elastic properties of wool and other textile fibres, under dynamic conditions involving no permanent set. Biological work was undertaken with phosphorus-32 as well as experiments on the action of hydrogen peroxide on bacteriophage, and an extensive survey of particle-size determination was made with the Geiger counter X-ray spectrometer installed in March 1948. A gravimetric survey of South Africa was in progress, and a seismic prospecting unit has been redesigned and modified. The Telecommunications Research Laboratory continued its work on the ionosphere and its effect on high-frequency radio communication, radio noise-levels, radar weather observations and the design of an automatic weather station.

The account of the work of each Institute or Department includes a list of publications by members of the staff during the year. Lists of publications by holders of research grants during 1946-48 are appended to the report, together with the regulations governing the award of research bursaries and grants and lists of research awards made in 1946-48.

FIFTY YEARS OF GENETICS

THE Genetical Society of Great Britain held its hundredth meeting in Cambridge during June 29-July 1. It was also the thirtieth anniversary of the Society, founded by William Bateson in 1919, and the meeting was intended to be one with time and, possibly, atmosphere for taking stock of the past and looking at the future. This aim was substantially attained. There were three addresses at the opening session, by Profs. Punnett, Sonneborn and Nachtsheim. The remainder of the meeting consisted of a small number of papers on work in progress at the Department of Genetics, Cambridge, and of a comprehensive demonstration, including visits to various Cambridge laboratories, of genetical research in Great Britain. A number of geneticists from abroad attended the meeting and most of the genetical societies of other countries were represented.

In his address on "The Early Days of Genetics", Prof. R. C. Punnett gave a vivid account of the crucial period between 1900 and 1906 which witnessed the rediscovery of Mendel's laws and the discoveries of linkage and the chromosomal basis of sex determination. Prof. Punnett's recollections were those of one who played a fundamental part in these developments; they constitute an indispensable record of the early history of genetics as seen by a member of one of the most active teams of those times. Fortunately, the full text will be published soon. Prof. Punnett described anecdotically the violent controversy between Bateson, who championed Mendelism and emphasized the role of discontinuous hereditary variation in evolution, and the biometricians, led by Pearson, who stood for continuous variation. By 1910, Mendelism and discontinuous variation had conquered. In retrospect, however, even in the vivid picture given by Prof. Punnett, this controversy and its outcome seem almost unreal. By 1930 the works of Fisher, Haldane and Sewall Wright had shown that the alternatives on which the battle had been fought were false ones, discontinuity in the cellular basis of heredity being compatible with continuous hereditary variation. The extraordinary development of Neo-Darwinism which followed has led geneticists, systematists and palaeontologists to talk almost the same language.

If Prof. Punnett's paper showed how modern genetics is linked to the ideas and the remarkable experiments of the early Mendelian times, the address which followed on the "Role of the Cytoplasm in Heredity", by Prof. T. M. Sonneborn, of the University of Indiana, left no doubt that these developments have led far and have opened wider new vistas.

Prof. Sonneborn dealt with what have been called "cytoplasmic units endowed with genetical continuity". After summarizing the implications of his own work, now classic, on the inheritance of the 'killer' character and of antigens in *Paramecium*, he dealt with the inheritance of plastids in plants, of certain structures, like the parabasal body of trypanosomes in Protozoa, with viruses, etc. The picture arising from all these once unconnected fields is that of non-nuclear self-reproducing units—normal constituents of the cells or parasitic—which have, in common with the genes, the properties of mutation and reproduction. Some of these structures have been shown to be dependent on a specific genetic constitution of the 'host' cell in order to be able to reproduce or mutate: so far, however, no conclusive evidence has been put forward of the existence of cytoplasmic units, which, besides being dependent on the genes of the 'host' cell for their reproduction, are actually initiated by the genes. Prof. Sonneborn warned the embryologists that such evidence is necessary before further speculation on the role of such purely hypothetical 'plasma-genes' in cell differentiation is permissible.

The third address in the opening session of the meeting was by Prof. Nachtsheim, of the University of Berlin, on "Comparative Investigations on Hereditary Blood Diseases in Man and Animals". This address dealt with one of the important trends in present genetics; namely, the use of mutants in the investigation of morphogenetic processes. In particular, Prof. Nachtsheim dealt with the Pelger anomaly (reduced segmentation of the leucocyte nuclei), which is shown by about one in a thousand

of the inhabitants of Berlin. This anomaly is inherited as a dominant, lethal in the homozygote but not affecting the expectation of life of the heterozygote. The same anomaly occurs in rabbits: here a few homozygotes survive and they show no segmentation at all, and extreme chondrodystrophy with an array of secondary morphogenetic and functional disturbances.

The demonstration of work in progress in most genetic laboratories in Great Britain, with visits to the Cambridge laboratories, included forty-three different lines of research. They ranged from the mapping of mammalian chromosomes to the biochemical genetics of bacteria and other micro-organisms; from the developmental genetics of the mouse to the inheritance of human blood groups; and from experimental studies on the properties of nuclear membranes to the genetics of heterostyly in plants. It is quite impossible, of course, to go into details of this very impressive and comprehensive demonstration.

The meeting has certainly left in those attending it a vivid picture of genetics in its fiftieth year. Started as the somewhat detached, though extremely successful, study of what Muller calls the "dance of the genes", genetics now occupies a key position in biology. The genetical approach, that is, the study of sub-cellular 'self-reproducing' units, is now as essential to the understanding of heredity, variation and evolution as it is in bridging the gap between biochemistry and biology. At the level of these units, biological structure and biochemical activity tend to become one.

G. PONTECORVO

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DEFENCE RESEARCH LABORATORIES, AUSTRALIA

ANNUAL REPORT

9/29/49

THE Munitions Supply Laboratories of the Commonwealth of Australia Department of Supply and Development have now been re-named as the Defence Research Laboratories; and the first annual report under that title*, covering the year ended June 30, 1948, shows that the establishment is becoming recognized as the main Australian centre for the application of science and technology to the day-to-day problems of industry, whether for defence or civil production, as well as being the main standardizing centre for the southern part of the Commonwealth. Long-term investigations represented about 21 per cent of the work of the Laboratories, while 40 per cent was for the Department of Supply and Development and Defence Departments, 23 per cent for other Government Departments or public bodies and 16 per cent for private industry. A new section for electricity and a crystal physics group were formed during the year.

In the General Chemistry Section study has continued on the use of organic titanium compounds in paint; methods of accelerated outdoor-expanse testing; the influence of seasonal variations of weather; and the formulation of roof paints to suit Australian conditions. Studies are being made of the oil obtained from the Makita nut, available in

* Commonwealth of Australia: Department of Supply and Development. Annual Report of the Defence Research Laboratories for the Year ended June 30, 1948. Pp. 46. (Marburyring, Vic.: Defence Research Laboratories, 1949.)

large quantities in Fiji and New Guinea; as well as of methods of assessing the damage to wool caused by shrink-resistant treatments and of detecting and estimating damage to cotton fibres on exposure. A method has been worked out for the preparation of amylene, and advances have been made in the techniques of fractional distillation.

In the Chemical Defence Section a considerable amount of work has been carried out on the determination of airborne water droplets in a saturated atmosphere, on the factors governing the flow of gases through small orifices and capillaries, and on a critical survey of chemical methods used for the determination of atmospheric contaminants, as well as a study of the protection afforded by the service respirator against a wide range of industrial contaminants. The Metallurgy "A" Section was largely concerned with investigations on metal processing and the behaviour of metals in service, while in the Metallurgy "B" Section radiographic examination of welded pressure vessels and the training of workers in industrial radiography have been important features. Long-term investigations in the Engineering Section have been concerned with the effects of surface treatments on fatigue characteristics of an alloy steel. The Physics Section surveyed formulae expressing the refractive index of optical glasses as a function of wave-length and investigated mass spectrometric and ionization-gauge methods of detecting leaks in vacuum systems.

Inquiries received by the Technical Information Section markedly increased from 749 in the previous year to 1,288, of which almost half were from private industry. Some 36 per cent of the inquiries related to chemistry and chemical technology, 22 per cent to physics and engineering, and 20 per cent to metallurgy. Lists of published articles and lectures and of committees on which the staff of the Laboratories have served are appended, but the report does not deal with confidential work for the Armed Services.

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SUGAR RESEARCH FOUNDATION

ANNUAL REPORT

9/29/49

THE Sugar Research Foundation, which is an organisation supported by the great majority of both cane- and beet-sugar producers and refiners of United States territories, has recently issued its sixth annual report*. This document, prepared by the scientific director, Dr. Robert C. Hockett, enumerates the research projects, both those completed and in progress, which have been sponsored by the Foundation, and briefly describes the results so far obtained. The numerous investigations are concerned with sugar (sucrose) in relation to dentistry, physiology, nutrition, botany, biology and pharmacy, as well as the organic and physical chemistry of the substance.

The Sugar Research Foundation was organised to sponsor and to stimulate research on sugar and to disseminate information about it. The way in which the Foundation has organised research on sugar is strikingly demonstrated in its latest report, which describes no fewer than fifty-nine projects that either have been, or are still being, undertaken in

* Research in Review. Sixth Report, 1949. Pp. 44. (New York: Sugar Research Foundation, Inc., 1949.)