The rooms are of a standard size, 5·4 m. × 4·4 m. Installations (gas, water, compressed air and a reserve pipe) are led around the room over and under a small shelf (27 cm.) fixed to the wall at table height, and water outlets are built in this shelf. Electrical installations are separate, with a main switch for each room. The wiring consists of lead-shielded cables which are led around the room with multiple outlets at every 1½ m. for 220 V. D.C., 110 and 220 V. A.C., battery voltage and earth. In addition, one of these outlet boxes, with flexible connexions, is placed in the middle of the room. The potential difference between the conducting surfaces in a laboratory (screen of electrical installations, gas and water pipes, etc.) is less than 10 mV. Ice boxes in five of the laboratories are supplied by a central refrigerating unit. They contain a refrigerating mixture which can be piped to any desired location.

The furniture consists of interchangeable units, 1·08 m. × 0·5 m., tables, and drawer and shelf cupboards. By standardizing the room-size, installation and furniture, it has been possible to keep the building expenses to a reasonable figure (£13/cu. m.).

UNITED STATES NATIONAL ACADEMY OF SCIENCES

AT the annual general meeting of the United States National Academy of Sciences, held in Washington, D.C., during April 28–30, the following officers, new members and foreign associates were elected.

Treasurer: W. J. Robbins, director of the New York Botanical Garden, for a further four-year term.

New Members of Council: R. F. Loeb, professor of medicine, College of Physicians and Surgeons, New York; and W. M. Stanley, chairman of the Department of Biochemistry, University of California, Berkeley.

New Members: F. Albright, associate professor of medicine, Harvard Medical School; R. McL. Badger, professor of chemistry, California Institute of Technology; H. R. Byers, chairman of the Department of Meteorology, University of Chicago; C. Chevalley, professor of mathematics, Columbia University; G. M. Clemence, head astronomer, United States Naval Observatory, Washington, D.C.; L. R. Cleveland, professor of zoology, Harvard University; J. S. Fruton, professor of biochemistry, Yale University School of Medicine; C. H. Greenewalt, president of E. I. du Pont de Nemours and Co., Inc., Wilmington, Del.; D. T. Griggs, professor of geophysics, Institute of Geophysics, University of California, Los Angeles; S. B. Hendricks, chief chemist, Bureau of Plant Industry, Soils and Agricultural Engineering, U.S.D.A., Beltsville, Md.; H. H. Hess, head of the Department of Geology, Princeton University; C. L. Hubbs, professor of biology, Scripps Institute of Oceanography, LaJolla, Cal.; W. S. Johnson, professor of organic chemistry, University of Wisconsin; B. P. Kaufmann, Department of Genetics, Carnegie Institution, Cold Spring Harbor, N.Y.; C. K. M. Kluckhohn, professor of anthropology, Harvard University; D. B. Lindsley, professor of psychology, University of California, Los Angeles; P. D. McMaster, member of the Rockefeller Institute for Medical Research, New York; C. G. Niemann, professor of organic chemistry, California Institute of Technology; C. L. Pekeris, member of the Institute for Advanced Study, Princeton; N. F. Ramsey, jun., professor of physics, Harvard University; E. Segre, professor of physics, University of California, Berkeley; R. Serber, professor of physics, Columbia University; F. H. Spedding, head of the Department of Physical Chemistry, Iowa State College; L. Spitzer, jun., director of Princeton University Observatory; G. L. Stebbins, jun., professor of genetics, University of California, Berkeley; E. L. Tatum, professor of biology, Stanford University; V. F. Weisskopf, professor of physics, Massachusetts Institute of Technology; J. A. Wheeler, professor of physics, Princeton University; J. W. Williams, professor of chemistry, University of Wisconsin; and D. W. Woolley, member of the Rockefeller Institute for Medical Research, New York.

Foreign Associates: N. Bjerrum, professor of chemistry, Royal Veterinary and Agricultural College, Copenhagen; T. Reichstein, director of the Organic Laboratories, University of Basle; and H. U. Sverdrup, director of the Norsk Polarinstitutt, Oslo.

The following four gold medals have been awarded by the Academy: *Alexander Agassiz Medal*, to Dr. Harry A. Marmer, United States Coast and Geodetic Survey; *Henry Draper Medal*, to the late Dr. Bernard Lyot, Meudon Observatory, Paris; *Daniel Giraud Elliot Medal*, to Dr. Henry B. Bigelow, Harvard University; and *James Craig Watson Medal*, to Dr. Herbert R. Morgan, Yale University.

The Agassiz Gold Medal, established by Sir John Murray in 1911, is awarded "for original contribution in the science of oceanography to scientific men in any part of the world". Dr. Marmer, in addition to his leadership in the programme of tidal surveys along the coasts of the United States and its dependencies, initiated the co-operative tidal programme on the west coast of South America in 1941, and the tidal survey of the western Pacific Islands in 1947. These projects have made available to oceanographers accurate, long-period records for large areas where previously very few observational data were available. He has introduced methods, analyses and criteria which permit the separation of the effects of local crustal deformation from those of eustatic changes in sea-level.

The Draper Medal, which the Academy bestows from time to time in recognition of outstanding contributions in the field of astrophysics, has been awarded to Dr. Lyot for his work in solar physics and in particular for his development of the coronograph, whereby the inner corona of the sun may be observed continuously; previously it had only been possible to observe the solar corona at times of a total solar eclipse. Dr. Lyot, who died recently in Cairo while directing the French solar eclipse expedition at Khartoum, was elected a foreign associate of the Academy in 1949.

Dr. Bigelow is the senior author of "Fishes of the Western North Atlantic", Part 1, published in 1948 as Memoir No. 1 of the Sears Foundation for Marine Research, and it is for this that he receives the Elliot Medal, which is for the year 1948, an award which is made annually to the author of the work in zoology or palæontology considered by the Academy to be the most meritorious of the year. The volume covers in three separate parts the lancelets, the cyclostomes and the sharks, with Dr. Bigelow as senior author for each part and associated in each with another author. Dr. Bigelow has been a moving spirit in work on the fish fauna of the

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western Atlantic Ocean during the past two decades, and his book is another of his contributions on the elasmobranchs and related fishes, to which may be added his important published researches in such invertebrate groups as the Medusæ, Siphonophores and Cœlenterates.

The Watson Medal, established in 1874, is awarded "from time to time to the person in any country who shall make any astronomical discovery or produce any astronomical work worthy of special regard as contributing to our science", and Dr. Morgan's outstanding contribution to astronomy is his interpretation of his transit-circle observations. Since 1947, after his official retirement as principal astronomer of the United States Naval Observatory, he has taken part in the construction of an improved catalogue of the best-determined stars, a work which is under the joint auspices of the Naval Observatory, the Watson Scientific Computing Laboratory and the Yale University Observatory. Dr. Morgan's discussion of his own observations, as well as of other series, has contributed materially to present knowledge of the fundamental constants of astronomy.

CARNEGIE INSTITUTION OF WASHINGTON

ANNUAL REPORT FOR 1950–51

YEAR Book No. 50 of the Carnegie Institution of Washington covers the period July 1, 1950–June 30, 1951*, and consists mainly of the usual competent administrative reports of the several departments, together with auditors' report and a bibliography of publications during the year. Once again, what lends distinction to the whole is the annual report of the president, Dr. Vannevar Bush, in which Dr. Bush once again ranges over science in the United States and selects for comment some features which are of interest to the world of science as a whole. Looking, for example, once more at the function of the voluntary institution in the context of the new situation in which, in the United States, the National Science Foundation is one factor, and commenting on the need to preserve freedom of action and initiative, Dr. Bush remarks on the danger that, in the effort, by State intervention, to protect the unfortunate or underprivileged, may be quenched the spark which has so far given the United States a higher standard of living than any other part of the world enjoys.

That danger exists in Great Britain also, and Dr. Bush's further warning to his countrymen that a State devoted to protecting all its citizens from all the normal hazards of life may become merely a battleground for highly organized special interests should be heeded equally in Britain. The consequences of a growing dependence of universities on government funds and the trend towards a control of research which could become bureaucratic are recognized by Dr. Bush, but with no more dismay than that with which he witnesses the dwindling resources of the Carnegie Institution itself in comparison with those which the Federal Government devotes to research. Such government intervention he accepts as inevitable, and respects it as he does the quality of much of the industrial research to which he pays tribute. Unperturbed, he insists that the voluntary or independent institution has a contribution to make out of all proportion to its quantitative magnitude by reason of its quality and orientation.

The essential function of such an institution is, in Dr. Bush's opinion, to seize the opportunities within its range which appear to be neglected but are of large potential for enhancing the basic understanding of Nature and of man. Particularly is this true of the unconventional. The independent institution can afford to take risks, even of complete failure, which no government institution could without fear of repercussions. It can examine a theory which has yet to gain acceptance in powerful scientific circles, and can search for any new knowledge which it regards as basic to man's understanding of himself or his environment, or as likely to broaden his conception of his place in the universe.

From the research activities of the year, reviewed more fully in the departmental reports, Dr. Bush selects for mention first the observations now beginning to come from the 200-in. Hale telescope at the Mount Wilson and Palomar Observatories. Observations made by Humason with the prime-focus spectrograph of the Hale telescope have included three nebulæ with velocities up to 61,000 km./sec., or more than 20 per cent of the velocity of light. When combined with the results of the more precise methods of measurement of nebular distance now being developed, these new velocities should lead to a much more accurate formulation of the distance–velocity law. Continued studies by H. W. Babcock of the general magnetic field of stars has led to the discovery of the largest field so far observed—9,000 gauss in *HD* 133029. This star has a field fluctuating down to 5,000 gauss, and it appears that stars with variable spectra are members of a much larger group of magnetically variable stars. Variability of spectrum is only observed in stars of which the magnetic oscillations are of large amplitude with a regular period of only a few days, and the magnetic polarity of which reverses with each period.

New experimental methods developed at the Geophysical Laboratory of the Institution have accelerated progress in the investigation of hydrous silicate systems. The nature and mechanism of processes in the formation of serpentine, granites and pegmatites have been demonstrated and unforeseen complexities revealed in the composition and forms of the feldspars. Advances in the techniques for quantitative studies of silicates at high pressures and temperatures are giving a clearer picture of geological processes within the earth and leading to new methods for the study of metamorphic rocks and their rock-forming minerals, as well as providing a clue for unravelling some mysteries of magma formation and for understanding the strong forces of movement and deformation that occur in the crust of the earth.

In the Department of Terrestrial Magnetism the development of a means of approximate estimation of the total ionization of the upper region from the ionospheric record, replacing the older values of ion density, has removed much of the uncertainty as to the mechanisms producing the principal ionization in the high atmosphere. Simultaneous observations using three different sets of ionosphere equipment spaced at different distances in triangular or linear formation were used for studies of winds and turbulence in the very high atmosphere, and large

* Carnegie Institution of Washington. Year Book No. 50, July 1, 1950–June 30, 1951, with Administrative Reports through December 14, 1951. Pp. xxxv+260. (Washington, D.C.: Carnegie Institution, 1951.) 1 dollar.

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