widely protruded from the pallial cavity, and its narrow filaments radiate to form a semi-circular fringe of cirrus-like rods. This is extended over the mantle border and intermittently drawn through the surrounding water like the feeding-net of a cirripede or a serpulid, though in a much more leisurely manner. Mucus is provided by the cells of the endostyle, along the gill axis, and is carried by the frontal cilia to the tips of the filaments, together with particles coming into contact with the extended fringe. Long tufts of apical cilia carry the mucus around the circumference of the fringe, to a position near the opening of the food groove, where collected particles may be either ingested or rejected. In view of the closely aggregated occurrence of *Stephopoma* in continuous masses, this feeding adaptation, the first of its kind recorded among the Gastropoda, is a most efficient method of exploiting the widest possible feeding area, after the manner of both the cirripedes and the serpulid worms.

A fuller account of the biology and structure of these vermetids is shortly to be published.

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THE CARNEGIE INSTITUTION OF WASHINGTON

ANNUAL REPORT FOR 1948–49

YEAR Book No. 48 of the Carnegie Institution of Washington* includes the usual reports of the executive committee, auditors and president, Dr. Vannevar Bush, for the year ended June 30, 1949, together with the departmental reports and a bibliography of publications of the Institution for the year. The presidential report, reviewing particularly the position of the senior investigators on the staff of the Institution, stresses the absence of pressure for periodic publication as one reason for the enthusiasm of the scientific staff. Their performance is assessed by the consensus of opinion of colleagues and investigators in the same general field without any such pressure towards premature or regular publication. The Institution does not use the organised group attack to any extent; but nevertheless staff opinion expects the individual pursuing his own line of research so to select his problems and conduct his work as to reflect favourably upon the progress of the work being conducted by his colleagues in adjacent areas. Dr. Bush points out that the Institution differs from a university in the freedom of its staff from the distraction of other duties; but their isolation from teaching and from youth generally may be an obvious drawback if care is not taken to offset that isolation by participation in the scientific affairs of the nation or attendance at scientific meetings. The fellowship programme of the Institution is also planned to bring in young scientific workers on a temporary basis and also to invite as guests others who are of high standing in the scientific world.

Reviewing the research activities, Dr. Bush points to the initiation of scientific observations by the great Hale 200-inch telescope and the 48-inch Schmidt camera at the Palomar and the Mount Wilson Observatories. Both instruments are the largest of their type yet constructed and will be a powerful asset for astronomical research. A survey of the southern sky for several types of rare stars, which has been carried out for more than thirty years, was completed during the year and has led to the discovery of some fourteen hundred emission-line stars, mostly of class B, and about two hundred new planetary nebulæ. Investigations at the Geophysical Laboratory are now focused sharply on the formation and properties of rock-forming minerals with and without the presence of mineralizers, such as water, for the general purpose of understanding the complex processes by which the earth was formed. Besides the study of anhydrous silicates, including the inversion characteristics of quartz, the Laboratory has studied the behaviour of silicates in presence of water under pressure and has found that the sodic form, albite, may exist in either of two different modifications depending on the temperature of formation, and that solid solutions existing at high temperatures sometimes unmix at lower temperatures.

The Department of Terrestrial Magnetism has concluded a series of experiments, on the maintenance of the earth's electrical charge, in which measurements in the clear air high above thunderstorms have shown that in such localized areas the electric current between the upper atmosphere and the ground is reversed in sign to the fair-weather current and is greatly increased in intensity. Important information has also been obtained on the origin of cosmic rays, while in nuclear physics the major emphasis has been on the problem of proton–proton scattering in the relatively low-energy region of 200–500 kV., using the 1-MV. electrostatic generator. The biophysics programme continues to be evolved; but the work during the year has been largely concerned with metabolic and physiological studies using radioactive isotopes, and with studies of biological effects of radiation, including a comparison of the permeability of *Escherichia coli* to sodium and potassium ions and the biochemical function of potassium. The Division of Plant Biology has found, in its studies of photosynthesis, that the activity of colloidal solutions of chloroplast material obtained by ejection of suspensions through a needle valve at high pressure is greatly increased by the aggregation of the colloidal particles on addition of salt solutions in the presence of dilute methyl alcohol, and that only the light which is absorbed by photochlorophyll can lead to chlorophyll formation by corn and bean seedlings which have been grown in darkness. In co-operative experiments the climatic adaptability of *Poa* hybrids has been tested over a wide range of conditions, and some grass hybrids were selected for quantitative trials of their growth response in controlled laboratory experiments.

The Department of Embryology has continued its collection, preparation and study of human embryos as well as its studies of the physiology of the uterus, the blood vessels of the pregnant uterus, the permeability of blood capillaries and of the human placenta and the physiology of menstruation. In the Department of Genetics further evidence has been obtained

* Carnegie Institution of Washington. Year Book No. 48, July 1, 1948–June 30, 1949; with Administrative Reports through December 9, 1949. Pp. xxxvi+258. (Washington, D.C.: Carnegie Institution, 1949.)

that the unit of heredity, a gene locus, may control several reactions; and, working with maize, use of a special technique has brought an unstable gene into proximity with a stable gene locus, thus permitting a fuller analysis of the composition and action of the normal locus. Studies of the genetics of the resistance to streptomycin of *Escherichia coli* have indicated that what appears to be a single gene locus controls a series of reactions, and the reverse changes in locus are probably not brought about through a reversal of the original chemical reaction, but through some other change in the same gene locus. The bacterial resistance to aureomycin, chloromycetin and neomycin, the mutagenic action of chemicals on the sperm of *Drosophila*, the cytology of bacteria, the organisation of the chromosome, the genetic structure of natural populations among tropical *Drosophila*, and intracellular growth and genetics of bacteriophage have all received attention, while the analysis of the mechanism of action of individual genes has continued. In mouse leukæmia evidence has been obtained that the age of the mouse has as certain an influence on the incidence of spontaneous leukæmia after birth and on the length of life as has the age of the mother before birth. In the Division of Historical Research studies have continued on the early cultures in the Guatemala highlands, of ceramic technology and of the ceramic sequences of the lowland Maya area in eastern Campeche.

PROF. F. SEVERI'S SCIENTIFIC JUBILEE

THE year 1949 marked two events of cardinal importance to mathematics: the centenary of the *Annali di Matematica*, and the seventieth birthday of Prof. Francesco Severi, director of the Istituto Nazionale di Alta Matematica, Rome, and for many years the chief editor of the journal. It thus seemed peculiarly appropriate to Prof. Severi's colleagues that a celebration should be organised to commemorate the double event; accordingly, a national committee was formed, under the chairmanship of Senator G. Castelnuovo, to consider what steps might be taken to this end.

It was then decided: to offer the *Annali* for the year 1949–50 in homage to Prof. Severi, and to invite contributions from representative mathematicians, of all nationalities, to this number; to initiate the publication of Prof. Severi's selected papers in four volumes, arranging to complete the first volume in time for presentation at a ceremony to occur later in the year; and to found a commemorative scholarship at the Institute. To these projects was afterwards added a fourth, namely, the expansion of the ceremony, as originally planned, into a miniature international congress, at which foreign mathematicians should be invited to participate, thereby lending an additional and general interest to the occasion.

Eventually it proved expedient to postpone the proceedings to 1950, again a significant year, as marking the half-century of Prof. Severi's scientific activity. The date finally fixed for the ceremony was April 25, and the place the Aula Magna of the Institute. The ceremony opened, at 10.30 a.m., with *éloges* pronounced by Senator Castelnuovo and the Rector of the University. Then followed a discourse by Prof. G. Sansone, of Florence, who, in his capacity of co-director of the *Annali*, gave a brief history of the journal and presented the three current volumes to Prof. Severi. The fourth leading speech was made by Prof. B. Segre, of Bologna, who, as editor of the "Collected Papers" and with the authority of the master's most distinguished pupil, illustrated the author's scientific achievements, particularly in the field covered by the first volume. To these addresses Prof. Severi replied in simple and moving terms.

On the same evening, a reception was given by Signora and Prof. Severi at their home, at which many Italian mathematicians and notabilities, as well as the foreign guests, were present.

The Congress proper opened on the morning of April 26 and continued, with two daily sessions, until April 28. The speakers were drawn from many European countries, including Poland and also the U.S.S.R., of which the delegation of four was led by Prof. P. S. Alexandroff. From the British Isles came Prof. A. S. Besicovitch, Prof. L. J. Mordell, Mr. L. Roth, Prof. J. G. Semple and Prof. J. L. Synge, all of whom made communications. The opening address was given by Prof. W. Sierpinski, of Poland; about twenty papers were read, covering such topics as algebra, the theory of aggregates, number theory, functions of a real or complex variable, algebraic and differential geometry, topology, differential equations, mechanics and electrodynamics. While some of the papers (in Italian, English, French or German) were of the usual congress type, reporting developments in a selected field, most of them represented original work, some of it actually written for the occasion. It is impossible to give further details here, and it must suffice to note that the University of Rome intends to publish the proceedings in a special volume of the *Rendiconti* of its mathematical seminar, which will include also an account of the ceremony of April 25; this should be available in the near future.

During the three days of the conference the authorities of the University and the City continued their hospitality. On the afternoon of April 27 the Accademia Nazionale dei XL gave a reception in the beautiful cloisters of the Museo delle Terme, which at the same time provided an opportunity of viewing some of the finest extant specimens of Greek and Roman sculpture. Other receptions were held by Profs. E. Bompiani and M. Picone. On the evening of April 28 Signora and Prof. Severi gave a dinner at the Grand Hotel to their foreign guests, who were thus afterwards enabled to express publicly their thanks and to tender their good wishes to the host and hostess.

On April 29 the visitors made their way to Arezzo, Prof. Severi's birthplace, where a civic reception, a presentation by the Accademia Petrarca and other celebrations followed. The next day a whole programme of tours and ceremonies was carried out in the neighbouring country of the Casentino, culminating in an oration by Prof. Severi on Dante, in reply to his election as honorary member of the Dante Society of Bibbiena.

So ended a series of festivities, spiritual and worldly, which none of the participants is ever likely to forget. The kindness and generosity of the organisers, and the smooth working of the programme in all its details, will leave an indelible imprint; while to the newcomers to the scene an eminent mathematician has been revealed as a great, indeed a paramount, personality.