

## Science

## THE NATIONAL ACADEMY OF SCIENCES.

The annual meeting of the National Academy of Sciences was held at Washington on April 17, 18, and 19, and was distinguished by an unusually large attendance of over sixty members and by a programme of about thirty-five papers, well distributed among the different sciences.

S. J. Meltzer, of the Rockefeller Institute, in a paper on "Permeability of Endothelia," undertook to explain the method by which the blood, although flowing in closed vessels, is enabled to introduce liquid into the tissues. It was at first thought that the difference between the intra and extra vascular pressures was a sufficient reason; later osmotic pressure and electro-chemical differences were invoked. The doctrine of vitalism assumes that processes exist which are not explained by physics and chemistry, and that there is a difference between physical and physiological permeability. Dr. Meltzer, however, like most physiologists, believes that chemistry and physics are sufficient to explain all processes in the living body. He assumes that the surfaces of the capillary endothelia are supplied with ultramicroscopic pores, provided with mechanism like that which dilates the pupil of the eye. As the pupil contracts under the influence of light, so these pores contract under the influence of certain substances. Certain solvents can thus pass through, but molecules of the dissolved substance cause contraction, and are in this way sifted out.

Jacques Loeb, of the Rockefeller Institute, reported on an examination of "The Sex of a Parthenogenetic Frog," showing a frog one year old, which was perfectly normal, even in intelligence, although the product of an artificially fertilized egg. All frogs begin as females, and only later develop into males, so that it is difficult to determine the sex unless they can be kept alive for some considerable time. Several parthenogenetic frogs have now been kept alive for a year, and one that was recently killed was found to contain well-developed spermatozoa, confirming the view that all such frogs are males.

E. B. Wilson, of Columbia University, in a paper on "The Distribution of Chondriosomes to the Spermatozoa in Scorpions," demonstrated the behavior of these bodies, which with the chromosomes are supposed to represent the physical mechanism of hereditary transmission. The chromosomes, which belong to the nucleus of the cell, are distributed to the germ-cells by a process of division into equal parts—whether this is true of the chondriosomes, which belong to the protoplasm, is not known.

A feature of decided interest in the programme was a Symposium on the Exploration of the Pacific, arranged by W. M. Davis, of Harvard University, participated in by twelve contributors representing as many phases of the subject. Mr. Davis, in introducing the subject, deplored the lack of information with regard to the Pacific, instancing the insufficiency of former observations on unconformity. Large areas must now be explored, continuously for ten or twenty years. Mr. Davis was put at the head of a committee to report a plan for such an extensive exploration. Mr. J. F. Hayford, of North-

western University, emphasized the importance of observations of gravity at sea in the Pacific, and showed how our knowledge of geodesy and geology can be extended by such observations. These observations of gravity afford the most accurate means that we have of determining the amount of flattening of the terrestrial spheroid. Also the theory of isostasy, or compensation of variation of height by difference of density, is to be obtained in the same way. The observations must be made far from continents, so that the Pacific is far better than the Atlantic for the purpose. Besides this, it has several troughs over 8,000 metres deep, parallel to the continental land elevations, furnishing an incomparable opportunity for studying the variations of gravity.

A means of obtaining an approximation to the accuracy demanded by Hayford was described by L. J. Briggs, of the Bureau of Plant Industry, in a paper on "A New Method of Determining Gravity at Sea." Since the usual accurate method of observing the time of swing of a pendulum cannot be used at sea, it must be replaced by a static method. In Briggs's apparatus, the weight of mercury in a sort of barometer is counterbalanced by the elasticity of a gas contained in a constant volume, and maintained at constant temperature by immersion in an ice-bath, thus having always the same spring. The originality of the new apparatus consists in the mercury being contained in a zig-zag glass tube of sufficient flexibility to admit of being stretched enough to lengthen the mercury column as needed to balance the spring when gravity is smaller.

C. Schuchert, of Yale University, treated "The Problem of Continental Fracturing and Diastrophism in Oceanica." The abysses of the ocean contain little paleozoic life, and the ocean has evidently been refilled since the triassic age. Geologists now believe that the earth periodically shrinks, the continents rise, and the ocean bottom subsides. The continents then break down at the edges, where the stress is greatest.

J. P. Iddings, of the Smithsonian Institution, described "The Petrological Problems of the Pacific." The study of the igneous rocks afforded by the occurrence of the many volcanic islands scattered through the Pacific furnishes material evidence of the composition of the lithosphere, and of its variations in different parts of the ocean. Besides this, the study of the density of the rocks will furnish us information with regard to the question of isostasy.

G. W. Littlehales, of the U. S. Hydrographic Office, described "The Extent of Knowledge of the Oceanography of the Pacific," presenting the manuscript sheets of the United States Bathymetrical Chart, containing all the authentic deep-sea soundings, and showing in a striking manner the limitations of our knowledge of the configuration beyond the continental shoulder. In the North Pacific there is a tract twice as large as the United States which has been crossed only by a single line of soundings 250 miles apart, and there are a number of regions as large as the United States that are entirely unsounded.

C. F. Marvin, Chief of the U. S. Weather Bureau, treated of "Marine Meteorology and the General Circulation of the Atmosphere," and showed the practical as well as theoretical importance of observations made on the oceans.

W. H. Dall, of the U. S. National Museum, in a paper on "The Distribution of Pacific Invertebrates," pointed out that in order to ascertain the distribution of land and water in former times it is necessary to examine the distribution of marine invertebrates today. Many of the islands of the Pacific have about them a fringe of fossiliferous rock of the tertiary age, and before a satisfactory discussion of these can be had it is necessary to examine the local faunas of the present. Passing from fauna to flora, D. H. Campbell, of Leland Stanford University, dealt with "Problems of the Pacific Floras," showing how the Hawaiian Islands offer the best opportunity for the study of plant forms, being the most isolated portion of land in existence. The question arises whether there is in new areas of volcanic origin some new agency for the development of plants, and it would be interesting to have observations on the re-establishment of floras in regions devastated by eruptions.

J. W. Fewkes, of the Bureau of American Ethnology, treated "The Pacific as a Field for Anthropological Investigation." One of the most interesting questions arising is the relation of the inhabitants of the Pacific to the American Indians.

After the symposium on the Pacific, the regular programme was resumed. C. R. Stockard, of Cornell University Medical College, reported on "Hereditary Transmission of Defects Resulting from Alcoholism," the material experimented upon being guinea-pigs treated with alcohol by inhalation, which disturbs the digestive processes less than the administration of alcohol in the food. Several generations were examined, all possible combinations of parents among normal and alcoholized being made and the results carefully tabulated. It was evident that there was a large increase of mortality due to alcoholism, and especially that various deformities, such as loss of the eyes, were prevalent and likely to be inherited among the alcoholic individuals.

W. B. Cannon, of Harvard University, presented "Recent Observations on the Activity of some Glands of Internal Secretion," a continuation of his recent work on the effects of the emotions, such as fear and rage, which constitute a common language for man and animals. During these emotions, the contractions of certain glands pass secretions into the blood-stream. Thus the adrenal gland is capable of producing all the effects that are seen in times of emotional stress. The application of excited blood to an intestinal strip produces perfectly definite reactions due to adrenalin. The same secretion also produces a recovery from fatigue, and influences clotting of the blood.

On Tuesday the papers were mostly from the physical sciences. George E. Hale, of the Mt. Wilson Solar Observatory, presented several papers by himself and his co-workers on "Some Recent Results of Solar Research," with some remarkable photographs of the solar atmosphere made with the spectroheliograph, and of the solar spectrum showing the displacement of lines made by the magnetic effect of the vortices in sunspots, also photographs showing the electrical effect upon spectrum lines in the case of hydrogen and lithium. One of the most surprising results was that of W. S. Adams, who uses an empirical relation between the intensities of different lines in the spectrum of a star to determine its absolute brightness,

and thus by comparison with its apparent brightness, to determine its distance away.

R. W. Wood, of Johns Hopkins University, showed photographs of the moon, Saturn, and Jupiter, taken in invisible light of three wave-lengths, ultra-violet, yellow, and infra-red, which were then combined by a three-color process, giving interesting colored photographs, not as these bodies really look, but as they would look if their light vibrations were slowed down into the visible radiations.

C. G. Abbot and L. B. Aldrich, of the Smithsonian Astrophysical Observatory, presented the pyranometer, an instrument for the measurement of sky radiation, the radiation reaching the observer from all parts of the sky. The radiation is measured by falling on a thin strip of manganin, which it heats, the heat being compared by a thermoelement with a known amount of heat produced in the strip by a measured electrical current. The instrument can also measure the radiation towards the sky at night.

G. C. Comstock, of the University of Wisconsin, in a paper on "Invisible Companions of Binary Stars," suggested a method for the detection of such companions as cannot be found by the displacement of spectroscopic lines by examining the areal velocity of the double star, which, if disturbed from a constant value, indicates the existence of a third body.

C. R. Van Hise, of the University of Wisconsin, communicated the report of the Committee upon the Panama Slides, which was appointed last autumn at the request of President Wilson, and was composed of thirteen persons, nine of whom, including six members of the Academy, visited the Isthmus and studied the geology and physics involved. The slides are due to the inability of the earth or rock to support the weight of overlying material. Much of the material is soft and weak and broken by joints. The penetration of water in the heavy rainfall is a potent cause of weakness, and if this water could be excluded the danger of slides could be greatly decreased. None of the slides are due to earthquakes. About nine million cubic yards will have to be removed, and some sliding will probably continue for a number of years, though in decreasing amounts. As remedial measures are suggested the covering of the slopes with vegetation, closing peripheral cracks, draining of undisturbed and threatened areas, and drainage of the great slides.

H. F. Reid, of Johns Hopkins University, followed with a paper on "The Mechanics of the Panama Slides," in which he showed the distribution of stresses in the hills considered as elastic and plastic bodies, so that the usual theory of angle of repose is insufficient to explain the sliding.

Theodore Lyman, of Harvard University, in a paper on "The Present State of Knowledge of the Extreme Ultra-Violet," showed how he had carried the spectrum far beyond any other observer, by employing a grating, and placing the whole apparatus, including the source of radiation and the photographic plate, inside an exhausted tube, thus diminishing the absorption so that the very short wave-lengths could be photographed.

R. A. Millikan, in a paper on "A Redetermination of  $e$  and  $N$ ," explained an increase in the accuracy of the method of determining the charge on the electron by the drop method, by an improvement in the determination of viscosity, and the employment of drops of several fluids falling in different gases, the

results of which agreed in a remarkable manner, confirming Millikan's previous result for this fundamental electrical constant.

J. W. Fewkes described "Recent Exploration of the Mesa Verde National Park, Colorado," showing an astonishingly well-preserved ruin of considerable size of a type differing from the cliff dwellings near by. Features uncovered show that it was undoubtedly connected with worship of the sun.

Erwin F. Smith, of the Bureau of Plant Industry, although time did not remain for the presentation of his paper, showed a number of extremely interesting slides of cancer in animals and plants, demonstrating what is indicated by the title of his paper: "Further Evidence on the Nature of Crown Gall and Cancer, and that Cancer in Plants Offers Strong Presumptive Evidence both of the Parasitic Origin and of the Essential Unity of the Various Forms of Cancer in Man and Animals."

At the dinner of the Academy on Tuesday evening the medal for eminence in the application of science to the public welfare was presented to Gifford Pinchot for his work in connection with the conservation of natural resources, and to Cleveland Abbe for his work in connection with the foundation of the U. S. Weather Bureau. The Watson medal for astronomical research was presented to Armin O. Leuschner, of the University of California, for his work in the computation of the orbits of the twenty-two Watson asteroids.

The two William Ellery Hale lectures were delivered to a crowded auditory in the National Museum by Henry Fairfield Osborn, president of the American Museum of Natural History, on "The Origin and Evolution of Life on the Earth." ARTHUR GORDON WEBSTER.

## Drama and Music

CLYDE FITCH.

*Plays by Clyde Fitch.* Edited, with an Introduction, by Montrose J. Moses and Virginia Gerson. Boston: Little, Brown & Co. In four volumes. \$1.50 net each.

In the first year of his career as dramatist, 1890, Clyde Fitch produced three plays, one of them being the noted "Beau Brummell." They were followed in the nineteen years succeeding by thirty others, in which Mr. Fitch displayed a variety of talent comparable with that of any of his contemporary playwrights in Europe. His work, in fact, connects easily with the output of Sir A. W. Pinero, by whom he was somewhat influenced. More than any other American he represented the English attitude towards both the public and the stage itself. In days, especially towards the end of his career, when writers with no particular knowledge of theatrical art were coming forward with sporadic successes, there was never any doubt that Fitch was a professional playwright who could be counted upon, like Pinero or Jones, for a business-like product. He was exceedingly adroit in his use of stage devices, and he knew his audience. If some of his efforts resulted in merely potboilers, Fitch retained to the end a pretty faculty for invention, which, though

not of the sort that thoroughly re-creates, at least contributes an imaginative surface glow to the subject-matter. In only one play, "The City," produced after his death, did he yield to a fashion of the day, which, with pretensions to realism, turned its back on traditional standards and made a mere spectacle of contemporary vices.

It is odd that Mr. Fitch should have virtually begun his career with so successful a play as "Beau Brummell." The fact bespeaks both his ready talent and, almost as important, the healthy state of the drama in those days. The time was not yet when a writer presumed to make his debut by trying to solve one of the pressing social or political problems. Clyde Fitch began, as almost every sound playwright had begun, by experimenting with a well-known type of character. The choice was especially fortunate for him. For to depict a bankrupt dandy who could silence creditors by being seen in the company of fashionable friends made demands upon the kind of ingenuity which Mr. Fitch had first indulged as a writer of stories. The play is not quite pure farce, that is, dependent almost solely upon situation; it is farce comedy, a vehicle which allows much freedom to invention while inviting something more than a superficial shading of character. Whatever success was to be achieved with it had to be got through conventional channels. By contrast with the usual dramatist of to-day, Mr. Fitch, except only in "The City," appears to have been singularly free from modern ambitions. From problems, in the sense of urgent, country-wide issue, he turned aside. To abstract themes, such as Truth and Jealousy, he was not averse. But in general it was the human being, of whatever stripe, that most attracted him. In a word, he was a normal product of a sound tradition.

If Mr. Fitch never produced anything of nearly first-rate importance, it was partly owing to a too flexible talent. From the start he was rather too expert in adjusting himself to the qualifications of the actor whom he had in mind for a given part. So he wrote "Beau Brummell" for Richard Mansfield, yielded a point here and there in order to fit the heroine of "Truth" to Clara Bloodgood, and so on through a list which includes Julia Marlowe, Ethel Barrymore, Mary Mannering, Maxine Elliott, and Amelia Bingham. The fault served at least to keep his characters human. For him, also, the limitations of stage properties were not the hindrance they are to most writers; they only stimulated him to display his cunning, which sometimes degenerated into the trickster's art.

Yet even if he had been less a virtuoso, Clyde Fitch would not have attained to anything like first rank. His philosophy lacked depth. With considerable ability to isolate his specimen—notably in "Truth"—he never had his eyes so steadily on a character that he was not willing to interrupt the flow of a given mood by a bit of melodrama. In a play so acclaimed as "The Climbers" there is the following absurd