

which allows us to know the exact amount of the store of energy so tantalizingly hidden within the atom.

There was a feeling that this theory of relativity for uniform motion must be a particular case of something more general; but observational knowledge seemed to oppose a decisive negative to any extension. It was Einstein again who found the way to the generalization by bringing gravitation into his scheme.

Einstein's general theory of relativity is remarkable alike for the brilliance of conception and the mastery of the mathematical implement required to develop it. The new law of gravitation must be reckoned the first fundamental advance in the subject since the time of Newton. It involves an interaction between gravitation and light, which had indeed been suspected by Newton and almost taken for granted by Laplace, though it dropped out of scientific speculation when the corpuscular theory of light gave way to the undulatory theory. The three crucial astronomical tests of Einstein's theory have all been verified—the motion of perihelion of Mercury, the deflection of light, and the red-shift of the spectral lines. The last-named proved the most difficult to test, but there is now general agreement that it is present in the solar spectrum. More recently Einstein's theory of gravitation has appealed to astronomers not merely as something which they are asked to test, but as a direct aid to the advancement of astronomical research. Invoked to decide the truth of a suspicion of transcendently high density in the "white dwarf" stars, it has decided that in the companion of Sirius matter is compressed to the almost incredible density of a ton to the cubic inch.

The other direction in which modern physical theory has broken away altogether from the ideas of the nineteenth century is in the quantum theory. Probably no one would claim that he really understands the quantum theory. For such illumination as we do possess we are in great measure indebted to Professor Einstein. In 1905, almost at the same time as he published his first work on relativity, he put forward the famous law of the photoelectric effect, according to which the energy of a single quantum is employed in separating an electron from an atom and endowing it with kinetic energy. This was, perhaps, the first recognition that the development of the new quantum mechanics was not to be tied to classical mechanics by pictures of quasi-mechanical oscillators or other intermediate conceptions, but was to proceed independently on radically different principles. Noteworthy contributions followed on the theory of ionization of material, and on the problem of the specific heats of solids. In 1917 Einstein reached another fundamental result—namely, the general equation connecting absorption and emission coefficients of all kinds. This gives deep insight into the origin of Planck's law of radiation, besides providing new formulae with the widest practical applications.

THE AWARD OF GOLD MEDALS BY THE AMERICAN GEOGRAPHICAL SOCIETY

THE American Geographical Society has awarded the David Livingstone Centenary Medal for 1925 for

"scientific achievement in the field of geography of the southern hemisphere" to Luis Riso Patrón, director of the Oficina de Límites of Chile in recognition of his contributions to Chilean cartography. Senor Patrón headed the first Chilean Commission to make a precise survey of the Cordillera of the Andes. He represented Chile in the Argentine-Chilean boundary arbitration (1902) and edited the maps of the Chilean boundary surveys. As director of the Oficina de Mensura de Tierras he was responsible for the great map of Chile on a scale of 1:500,000. His intimate knowledge of the geography of his country is revealed in the recently published "Diccionario Jeográfico de Chile" (1924).

Award of the David Livingstone Centenary Medal for 1926 is made to Erich von Drygalski, of the University of Munich, for his work in the South Polar regions. Dr. von Drygalski had already carried out notable glaciological investigations in the Arctic as leader of the Greenland Expedition of the Berlin Geographical Society (1891–1893) when he undertook the German Antarctic Expedition of 1900–1903. The latter expedition, which discovered a part of the Antarctic continent about the 90th meridian east, was characterized by an intensive study of all branches of natural science in the field of exploration. The important scientific results in 18 folio volumes appeared between 1905 and 1921.

The Charles P. Daly Medal for 1925 is awarded to Brigadier-General David L. Brainard in recognition of his notable achievements on the Lady Franklin Bay Expedition under Greely in 1881–1884. General (then Sergeant) Brainard took a leading part in the exploratory work of the expedition. In particular his name is associated with Lieutenant Lockwood's in the discoveries along the north coast of Greenland when the farthest north of the time, 83° 24', was reached, a position only a few minutes of latitude from the northernmost point of Greenland.

The Charles P. Daly Medal for 1925 is awarded to Captain Robert A. Bartlett for his services to Arctic exploration. As commander of the *Roosevelt* (1905–1909) he took a leading part in Peary's expedition to the Pole. With a sledge party he himself reached a latitude of 87° 47' N.—the highest latitude attained in the Arctic next to that of Peary himself. On the Canadian Arctic Expedition of 1913–1918 he commanded the *Karluk* and in the face of grave difficulties accomplished the rescue of the survivors from Wrangel Island, whither they had proceeded after the *Karluk* was crushed by ice. In 1917 under his able seamanship the Third Crocker Land Relief Expedition achieved success in the face of serious and exceptional ice conditions.

The Cullum Geographical Medal for 1925 is

awarded to Pedro C. Sanchez, director of the Central Mexican Bureau of Geography and Climatology in recognition of his contributions to Mexican cartography. Senor Sanchez has been in charge of the geodetic service of Mexico since 1912. He is responsible for the topographic survey of the Federal District on the scale of 1:100,000; the map of the state of Vera Cruz, 1:400,000 (1918), and the Atlas Geográfico de la República de México (1920). He has also conducted explorations in little-known parts of his country.

The Cullum Geographical Medal for 1925 is awarded to Harvey C. Hayes, research physicist of the United States Navy, for his invention of the Sonic Depth Finder. This instrument designed in the interests of navigation has put into the hands of science a practical means of mapping the ocean floor in detail and of furnishing data for more effective study of continent building and of the general problem of isostasy.

The Cullum Geographical Medal for 1925 is awarded to Lucien Gallois, of the University of Paris, for his work in the advancement of geography. His earlier studies established his reputation in the field of historical geography. His later work, embracing both physical and human aspects and finding expression in regional studies, furnishes an admirable exposition of the broad modern concept of geography. By his efforts as teacher, as collaborator and editor of the *Annales de Géographie*, and as president of the Association de Géographes Français, and especially by the spirit and method of his writings, his influence has carried far afield.

REVISION OF EDUCATIONAL METHODS IN THE YALE SCHOOL OF MEDICINE

A THOROUGHGOING revision of its educational methods with a view to placing less emphasis on routine class work and more on independent thought and research is planned by the Yale School of Medicine, according to an announcement made by Dean Milton C. Winternitz.

The faculty is considering the abolition of the year system of study and the resultant division of the student body into classes. This program will also involve the abolition of the system of examinations at the end of the different courses. The student will be allowed to select the sequence of his studies in the subjects which at present comprise the first two years of the medical curriculum, and then after qualifying for the clinical subjects, he will again be allowed liberty of choice. Their arrangement and his completion of them in any period of time will be largely a matter of his choice and ability. Admission to a course will depend on his fitness for the work as

determined by the instructor in charge of it. This is the reverse of the present practice. A teacher now has no voice in determining what students shall enter his classes. He determines only whether they shall proceed into other classes. Thus, the student often thinks only of the examination which he is to take at the end of the year, and misses the application of the knowledge he is being offered.

Dean Winternitz made the following statement regarding the plan:

These changes may seem radical but they are in accord with adopted systems of graduate education, and medical education is graduate education.

There must, of course, be some check on the students' accomplishments; group examinations, as well as the graduating thesis, will serve this purpose. For the convenience of the faculty such examinations may be given at fixed times, but within reasonable limits the student may determine when he will present himself for such a test.

Aside from other advantages, such a system will be equally valuable to the student who acquires knowledge rapidly and to his slower colleague. It is hoped that by the elimination of the class system, the pupil who acquires knowledge less rapidly will be less reluctant to spend more time in preparation, while the more brilliant scholar will be more willing to spend longer periods in investigation and specialization.

THE 1926 MEETING OF THE PACIFIC DIVISION OF THE AMERICAN ASSOCIATION

THE 1926 annual meeting of the Pacific Division of the American Association for the Advancement of Science will be held at Mills College, California, from June 16 to 19. Mills College is delightfully situated in the foothills near Oakland, California, and is easily accessible from all points of the San Francisco bay region. Established in 1852 it has played an important part in the intellectual life and development of the Pacific Coast and now stands unique as the only accredited college for women west of the Mississippi. With a campus of 150 acres, beautifully designed landscape and buildings, it will prove a most attractive and commodious meeting place for the annual meeting. As there is a large membership of the Pacific Division in this vicinity a very successful meeting is assured.

Preparations for the meeting are already in progress. A research conference, under the direction of President Aurelia Henry Reinhardt, will be arranged on the relation of the college to research. A symposium on the constitution of matter or a kindred subject will be arranged, with physicists of note participating, and one or more public addresses will be given by visiting European scientists.

It is likely that the greater portion of the 27