old trees so that the young growth is not injured. The brush is piled in heaps for burning after the lumber has been removed, in order that the fire menace which foresters say usually follows lumbering may be done away with. The models are on a scale of about one inch to five feet, so that trees approximately 100 feet tall are about 20 inches high in the models. It is the intention of the forest service to have these models set forth certain points in regard to the timber sales conducted by the government. They will demonstrate, in the first place, that the timber on the national forests is for use; placards tell how it is sold to the highest bidder when it is wanted for commercial purposes, and how it may be given away to local settlers and prospectors for developing homesteads or mines. The models themselves indicate that the timber is cut in such a way as to eliminate all avoidable waste of wood and to secure a continuance of the forest crop, not only for timber production but for the protection of the soil. They further show the fundamental principles applicable to many logging operations, that the mature and overmature trees should be removed, that thrifty growing young trees should be left to produce seed and insure a reproduction of the stand, and that the young growth should be protected from damage in lumbering operations. The models are supplemented by a graphic chart, which shows by pictured piles of money and by conventional trees of graded size the increase of timber sales on the national forests from 1905 to 1913, inclusive. In 1905 the timber sold from the national forests aggregated 96,000,000 board feet, which brought the government no more than $85,000. Three years later the amount of timber sold increased to nearly 390,000,000 board feet, and the money received rose to $735,000. In 1911 830,000,000 board feet sold for more than $2,000,000, and in 1913 more than 2,000,000,000 feet brought in contracts amounting to $4,500,000. Not all this money was received in any one year, because national forest timber is sold on contracts which range from one to twenty-five years, and it is paid for as cut.

UNIVERSITY AND EDUCATIONAL NEWS

THE Catholic University of America, Washington, will receive the greater part of the estate of $1,000,000 left by Theodore B. Basselin, of Croghan.

MR. JAMES DEERING, in a letter addressed to the trustees of Northwestern University and of Wesley Hospital, announces a gift of $1,000,000 to the hospital. It is provided that Wesley Hospital shall be a teaching hospital under Northwestern University. The gift is made in honor of the donor's father, the late William Deering, and his sister, Abbie Deering Howe, who died in 1906.

AN anonymous benefactor has given a sum of $1,200,000 to the municipality of Berlin for the foundation of an open-air school for boys. In the course of instruction special attention will be given to modern languages and natural science.

ARTHUR TABER JONES, Ph.D., has been appointed assistant professor of physics at Smith College.

HENRY LAURENS, Ph.D., has been appointed instructor in biology, and George A. Stetson, instructor in mechanical engineering at Yale University.

AT Harvard University, Dr. W. E. Hocking, professor of philosophy at Yale University, has been appointed professor of philosophy, and Dr. R. F. A. Hoernle, of the University of Durham, assistant professor of philosophy. Dr. E. M. East has been promoted to be professor of experimental plant morphology and H. J. Hughes, to be professor of civil engineering. Dr. S. B. Wolbach has been promoted to be associate professor of bacteriology and Dr. C. L. Bouton to be associate professor of mathematics.

THE executive committee of the Massachusetts Institute of Technology has made the following promotions in the instructing staff: From the grade of associate professor to the grade of professor, Warren K. Lewis, in chemical engineering; George B. Haven, in machine design; Samuel C. Prescott, in industrial biology, and Charles B. Breed, in railroad engineering. The following assistant

professors have been advanced to the grade of associate professor: Carroll W. Doten, in economics; A. A. Blanchard, in inorganic chemistry; S. M. Gunn, in sanitary biology and public health; A. T. Robinson, in English; A. G. Woodman, in food analysis. The following instructors have been advanced to the grade of assistant professors in the departments indicated: Charles W. Green, in electrical engineering; Henry H. W. Keith, in naval architecture; John F. Norton, in chemistry of sanitation; Joseph W. Phelan, in inorganic chemistry; George W. Swett, in machine design, Frederick H. Lahee in geology. Assistants advanced to the grade of instructors are: Ralph G. Adams, in mechanical engineering; Arthur E. Bellis and Charles L. Burdick in theoretical chemistry; Edward A. Ingham in biology; Norman Osann in electrical engineering, and DeWitt M. Taylor, in mechanical engineering.

DISCUSSION AND CORRESPONDENCE

INTERPRETATIONS OF THE ANOMALIES OF GRAVITY

UNDER this title Mr. G. K. Gilbert discusses[1] the investigations of Messrs. Hayford and Bowie[2] (of the Coast and Geodetic Survey) relating to terrestrial gravity, and its application to observed earth movements by J. W. Spencer.[3] Any consideration of such important new problems should be welcomed as they tend to confirm previous results, or show their weakness or the lack of information.

Hayford and Bowie have stated that, for the purpose of making computations, the earth's crust is assumed to be in a state of perfect isostacy. They show, contrary to Gilbert's ideas on the subject, that while this is true for the whole area of the United States, there are large areas where the anomalies depart slightly from the perfect balance and smaller areas where the anomalies are considerable. This last is the special feature of Spencer's application of the anomalies of gravity to earth movements. Thus, at Washington, the excess of gravity is equal to 1,200 feet, while the deficiency at Virginia Beach (160 miles distant) is equivalent to a thickness of 1,600 feet of rock.

Hayford and Bowie have found that the topography is all compensated within a depth of 122.2 kilometers below sea-level (although they used 113.7 km. in their gravity computations); that is, the condition of stress at and below the depth of compensation is isostatic, or in other words "any element of the mass is subject to equal pressures from all directions as if it were a perfect fluid." Gilbert has misconstrued their conception of this, for he states "immobility at all depths below that of compensation is either explicitly or implicitly assumed by Hayford and Bowie." He also appears to take the view that even very small areas are completely compensated, and that much of the compensation in the vicinity of the stations, with decided or large anomalies, is located in the nucleus. This view is untenable as shown by such anomalies as those of Washington and Virginia Beach, or still greater ones between Olympia and Seattle. This compensation, located in the nucleus, presupposes very high rigidity, which is contrary to the idea of complete local isostacy, which on the other hand presupposes great plasticity.

Gilbert discusses the causes of the anomalies, favoring the one based upon the local variation of density of the column and heterogeneity of the nucleus with a sub-crustal mobile layer, which accounts for the isostacy. But all materials of the earth's crust are mobile under long-continued stress differences, yet there is sufficient rigidity in the crust to sustain local anomalies.

In his discussion, Gilbert assumes that the nucleus is composed of the same materials as

[1] U. S. Geological Survey, Professional Paper 85-*C*, pp. 29–37.

[2] Hayford, J. F., and Bowie, William, "The Effect of Topography and Isostatic Compensation upon the Intensity of Gravity," U. S. Coast and Geodetic Survey Special Pub. No. 10, Washington, 1912; Bowie, William, "Effect of Topography and Isostatic Compensation upon the Intensity of Gravity," *id.*, Special Pub. No. 12, Washington, 1912.

[3] Spencer, J. W., "Relationship between Terrestrial Gravity and Observed Earth Movements of Eastern America," *Am. Jour. Sci.*, 4th ser., Vol. 35, pp. 561–573, 1913.