

ence. The comparison of the results of the two methods affords a means of determining relative gravity with more or less accuracy. The results given are preliminary, but, according to Dr. Helmert, they are sufficient to indicate that gravity on the ocean where its depth is profound, between Lisbon and Bahia, is nearly normal. Dr. Helmert states that they furnish splendid confirmation of the hypothesis of Pratt in regard to the isostatic arrangement of the masses of the earth's crust. He states that taken in connection with the results of Nansen's pendulum observations on his North Polar Expedition this hypothesis, from now on, may be reckoned with as a fact at least in the sense of its being a general rule, and he believes that the radial anomalies of the geoid in comparison with the mean ellipsoid will probably not exceed the limits of ± 100 meters previously suggested by him.

O. H. T.

BRYAN DONKIN.

THE English journals announce the death of Mr. Bryan Donkin, a distinguished engineer and man of science to whom much credit is due for extensive and valuable work in the application of scientific methods in the development of the theory and the art of heat-engine design and construction. His research work has been extensive and continuous and his field of work, applied thermodynamics, mainly, afforded full play for all his energies.

Mr. Donkin was born in 1835, coming of a distinguished family of whom his father, John Bryan, his grandfather, Bryan Donkin, and the physician, Dr. Horatio Bryan Donkin, were famous members. He was educated at the University College of London and at the *École Centrale des Arts et Métiers*, in Paris, and later served an apprenticeship in the workshops of his uncle, at Bermondsey. He then went into business and was sent abroad to erect engines and the heavy machinery of paper-mills, and similar construction. He spent much time in Russia.

He was a partner in 1868 and the chairman of the corporation in 1889. About 1870, he became interested in the then rare opportunities of scientifically investigating the efficien-

cies of the heat-engines and presently made himself one of the leaders in promoting the modern scientific method in engineering and in researches relating to the subject. His influence in the promotion of the movement was exceedingly great and correspondingly useful. He was probably the first to make a complete balance-sheet exhibiting the receipts and expenditures of energy, in the operation of the steam-engine, in such manner as to reveal precisely the extent and the method of distribution of the stream of energy entering the system, its separation into the various currents flowing through the engine and its final disposition as useful and as wasted energy, and the resultant efficiency of the system.

He studied the effects of 'cylinder condensation' and of the two correctives of that serious form of wasted energy, superheating and steam-jacketing, and invented the 'revealer' to reveal the then mysterious changes occurring in the interior of the engine-cylinder. He established many important facts and laws of thermodynamic operations and thermal action, and was a very earnest advocate of all really sound movements in the direction of economic progress.

He wrote extensively on the subject which came to be his specialty and some of his papers are regarded as among the classics of that department of literature. He published a treatise on gas-engines which has now gone to a third edition and translated Diesel's 'Theory and Construction of the Rational Heat-Motor,' and, in 1898, issued a treatise on the steam-boiler. He was familiar with the French as with the German, and spent much time on the continent, studying the latest developments in his field, in all countries.

He was a vice-president of the British Institution of Mechanical Engineers, Watt medalist, Telford and Manby premium and prizeman of the Institution of Civil Engineers, a member of the Royal Institution and of a number of European associations and also of the American Society of Mechanical Engineers.

Mr. Donkin was famous for important and admirable professional work, both in construction and in research, was known in all

countries as a great writer and student and scholar, and, among his friends and acquaintances, was recognized as a man of genius and of heart, of perfect frankness and integrity, as well as of delightful personality. He was very extensively acquainted, at home and abroad. His death will be regretted by his numerous acquaintances, and by every one familiar with his work, and will be mourned long and sincerely by all who had the good fortune to be numbered among his personal friends.

R. H. T.

SCIENTIFIC NOTES AND NEWS.

By order of the president, the spring meeting of the Council of the American Association for the Advancement of Science will be held in the Cosmos Club, Washington, D. C., on Thursday, April 17, 1902, at 4:30 P.M.

EDINBURGH UNIVERSITY will confer its LL.D. on President J. G. Schurman, of Cornell University, and on Principal A. W. Rücker, of London University.

DR. JULIUS KUEHN, professor of agriculture at the University at Halle and director of the Agricultural Institute, has been elected a corresponding member of the Paris Academy of Sciences.

THE Russian Geographical Society has awarded its Constantin medal to the geologist, K. J. Bogdanowitsch; the Semenoff medal to Dr. Eduard Suess, professor of geology in the University of Vienna, and the Przewalsky medal to the zoologist, Professor Zarudnyi.

PROFESSOR C. R. BARNES, of the University of Chicago, sailed for Europe March 22, and will spend nine months in visiting the botanical centers.

DR. D. T. MACDOUGAL has returned from Arizona and Sonora with an extensive collection of giant cacti and other large xerophytic plants, which are being installed in the horticultural houses of the New York Botanical Garden. Dr. MacDougal characterizes the recent sensational announcement in the daily press concerning the extermination of the tree cactus (*Cereus giganteus*) as being utterly without foundation.

PROFESSOR TYLOR has given in his resigna-

tion of the office of keeper of the University Museum, Oxford, to which he was nominated on the death of the late Professor Henry Smith, who had succeeded Professor Phillips, the first occupant of the post, on the opening of the museum in 1857. Professor Tylor will continue to hold the readership in anthropology, to which he was appointed in 1884.

DR. EARL LINTNER, professor in the Technical Institute at Munich, has been made director of the scientific station for the study of brewing in the same city.

DR. LOUIS COBBETT and Dr. E. S. St. Barbe Sladen have been appointed by the Royal Commission on Tuberculosis to assist in the experimental work of the commission to be carried out at Stansted. They will reside at the farms and devote the whole of their time to the investigations of the commission.

OWEN'S COLLEGE, Manchester, celebrated its jubilee on March 12 and 13. Among those who presented addresses were Professor Becquerel, representing the Paris Academy of Sciences, and Professor Breymann, representing the Bavarian Academy of Sciences.

MR. CRESWELL SHEARER, of Trinity College, has been nominated to occupy the table at the Zoological Station at Naples, maintained by Cambridge University.

THE Smith prizes at Cambridge University have been adjudged as follows: T. H. Havelock, B.A., St. John's College, for his essay 'On the Distribution of Energy in the Continuous Spectrum'; and J. E. Wright, B.A., Trinity College, for his essay, 'Singular Solutions of Differential Equations with Known Infinitesimal Transformations.'

THE Department of Astronomy of Columbia University announces two lectures open to the public. On April 8 at 3:30 P.M. Mr. Percival Lowell will lecture on 'Modern Mars,' and on April 16 at the same hour, Dr. S. A. Mitchell will lecture on the recent eclipse expedition.

THE Raoult memorial lecture of the Chemical Society, of London, was delivered by Professor van 't Hoff on March 26, in the lecture theater of the Royal Institution.

At a meeting of the members of St.