trust.' His 'Programme of Organisation' was submitted to the Board of Regents in the following year, was adopted as its governing policy, and has been reprinted in full or in part in almost every annual report. If the Institution is now known and praised throughout the world of science and letters, it is fulfilling the will of its founder and the reasonable expectations of the nation which accepted and established the trust, the credit is mainly due to the practical wisdom, and the catholic spirit, and the indomitable perseverance of its first Secretary, to whom the establishing act gave much power of shaping ends, which as rough-hewn by Congress were susceptible of various diversion. Henry took his stand on the broad and ample terms of the bequest, 'for the increase and diffusion of knowledge among men,' and he never narrowed his mind, and to *locality* gave what was meant for mankind. He proposed only one restriction, of wisdom and necessity, that in view of the limited means of the Institution, it ought not to undertake anything which could be done,

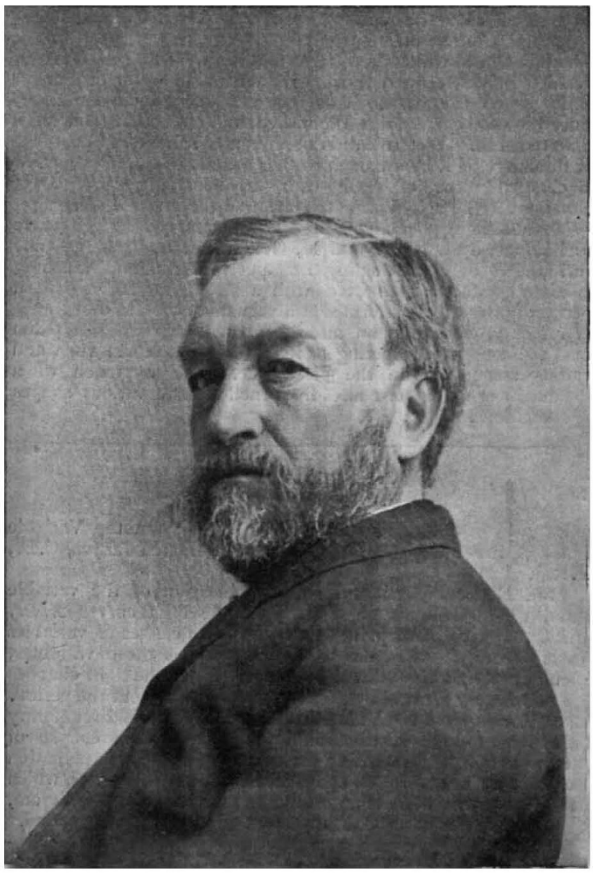

FIG. 5.—Samuel Pierpont Langley, Third Secretary of the Smithsonian Institution.

and well done, by other existing instrumentalities. So as occasion arose he lightened its load and saved its energies by giving over to other agencies some of its cherished work."

His statue, erected by order of Congress, stands in the Smithsonian Park.

Henry was succeeded in the office of Secretary by Prof. Spencer Fullerton Baird, then the leading authority on the mammals, birds, fishes, and reptiles of America, the founder of the U.S. Fish Commission, and of "public fish culture," elected in 1878; and he in his turn, by Samuel Pierpont Langley, pre-eminent as physicist and astronomer, the inventor of the bolometer, the discoverer of a great portion of the infra-red spectrum, and a high authority upon the physics of the atmosphere, elected in 1887.

Each of the three Secretaries, in addition to his general administrative work, has made some feature of the general plan peculiarly his own. Secretary Henry gave especial attention to the publications, the system of international exchanges, and the development of that great system of meteorological observation and weather prediction which has since become the Weather Bureau.

Secretary Baird continued the development of the museum, which had been under his special charge during his twenty-seven years of service as assistant secretary, secured the erection of the new museum building, gave much attention to zoological and ethnological explorations and, in connection with his special work as Commissioner of Fisheries, secured the construction of the exploring ship *Albatross*, and carried on extensive investigations in American waters.

To Secretary Langley is due the establishment of the National Zoological Park and the Astro-physical Observatory, renewed activity in the library and exchange work, and a new system of encouragement of original research in the physical as well as the biological sciences. Under his administration, also, important donations and bequests have been added to the permanent fund of the Institution. The limit of 1,000,000 dols. which may by law be permanently deposited in the United States Treasury at 6 per cent., having nearly been reached, Congress has recognised the authority of the Institution to receive and administer other funds beyond this limit, thus making it possible for it to undertake the administration of financial trusts for any purpose within the scope of its general plan.

(*To be continued.*)

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—A memorial is being circulated for the signature of members of the Senate, asking the Council of the Senate to sanction the formation of a Syndicate to consider on what conditions and with what restrictions, if any, women should be admitted to degrees in the University. It states that "for nearly fifteen years, since February 1881, the University has formally admitted the students of Girton and Newnham to its Honour examinations, and has practically co-operated in their instruction by permitting them to attend the lectures of its teaching staff, and to share the advantages of the University Library and other institutions. At the present time, eight out of the ten universities of Great Britain—viz., the University of London, the Victoria University, the new University of Wales, the four Scottish Universities, and the University of Durham—admit women to degrees. The result is that the women to whom Cambridge now awards only certificates, feel the inferiority of their position in this respect as compared with that of women who pass the examinations of these other Universities. Further, a committee of the Council of the University of Oxford was appointed some months ago to consider the desirability of granting degrees to the women students at Oxford, whose position is now somewhat similar to that of the students of Girton and Newnham. There seems, in short, to be a danger lest Cambridge—which twenty years ago was acting as pioneer in the movement for extending the advantages of academic education to women—should be actually the last to grant them the traditional and customary recognition of their work. The conditions under which degrees should be granted require very careful consideration. It is hoped that the syndicate of which we desire the appointment may be able to frame proposals which will command the assent of all who are interested in the academic education of women."

WE are informed that Mr. N. Busch has not been appointed Director of the Botanic Garden of the University of Dorpat, but assistant to Mr. N. Kuznetzov, formerly Assistant Secretary of the Imperial Russian Geographical Society, who has been also appointed Extraordinary Professor of Botany at the same University, instead of Dr. Russow retired.

DR. G. P. GRIMSBY has been appointed to the chair of Geology and Natural History in Washburn University; Dr. W. B. Rankin and C. F. W. McClure have been appointed to Professorships of Biology in the College of New Jersey; Dr. W. S. Strong has been called to the chair of Geology in Bates College, Lewiston, Maine; and Dr. R. de Girard, privat-docent in Geology at the Zürich Polytechnikum, has been promoted to an Extraordinary Professorship.

AT the annual meeting of the Incorporated Association of Headmasters of Secondary Schools, held on January 8, two resolutions were passed with regard to science teaching, which it is to be hoped may bear fruit in the form of an improved method in many of our schools. At the previous annual meeting a discussion had taken place on the subject; and as a result of this a memorial was sent, in July of last year, to the authorities controlling the Local examinations of Oxford and Cambridge Universities, setting forth the desire that "examining bodies should encourage a more rational method of teaching science" by framing the syllabuses on different lines. A committee was also appointed to consider the subject, and this committee, consisting of men possessed of considerable experience in science teaching in secondary schools, has now presented its report. They agree with all scientific educationists in saying that a large proportion of the time given to science in schools should be occupied by the pupils in performing actual measurements themselves, and that the object should be to impart not only information but chiefly the knowledge of method, and with this object in view, that the instruction should be given in strictly logical order. To serve as a basis of discussion with the University authorities, the committee has put forth an admirable syllabus, which includes the more fundamental portions of physics and chemistry, and (an important point) which indicates what experiments can easily be performed by beginners. The syllabus represents a practical scheme of elementary science which will be appreciated by teachers, and which cannot be too widely adopted. It indicates the manner in which the study of science in schools may be made of true educational value, and in the interests of science it is to be hoped that examining bodies will give it full consideration. Examinations at present dominate our educational system, and it is almost hopeless to attempt to introduce into schools a scheme of instruction that does follow the lines laid down by examiners. But if a syllabus is rational, the teaching which follows it will possess good features. If, therefore, the logical syllabus drawn up by the Committee of the Headmasters' Association be adopted by the Delegacy for Local examinations of Oxford and Cambridge, an important step will have been taken in the advance of scientific education in this country.

SCIENTIFIC SERIALS.

American Journal of Science, December 1895.—How to find the key-note of auditoriums, by E. Cutter. If a speaker uses the key-note of his auditorium, the audience shows by attitude and attention that it hears what is said. The speaker speaks with ease, and feels his voice impinge upon the farthest walls. The key-note may be found by means of a siren, or by singing, and observing which note resounds most powerfully. The paper contains practical hints of some value to public speakers, but is unscientific in tone and substance.—Stratigraphy of the Kansas coal-measures, by Erasmus Haworth. The different formations lie one above the other in regular order, similar to the order found in other parts of the world. The general character of the shales throughout the whole of the coal-measures is such that they must have been deposited, in the main, in shallow water, probably ocean-water, as evidenced by the frequency of ripple-marks and other physical properties. The coastal area must have progressed westward as geological time advanced. The thickness of the Kansas coal-measures cannot be much less than 2500 feet.—Igneous rocks of Yogo Peak, Montana, by W. H. Weed and L. V. Pirsson. Yogo Peak is composed of a core or stock of massive, granular, igneous rock, composed chiefly of augite and orthoclase. The mass shows a progressive differentiation along its east and west axis, with a continual increase in the ferromagnesian elements over the felspathic ones.—A new alkali mineral, by Warren M. Foote. This mineral, named Northupite, after its discoverer, crystallises in regular octahedra, whose diameters rarely reach 1 centimetre. It is brittle, shows uneven fracture, and a hardness of 3·5 to 4. In powdering the mineral a fœtid odour is distinctly perceptible. It is easily fusible before the blowpipe, and its analysis indicates it to be a double chloride and carbonate of sodium and magnesium, with traces of phosphoric acid, silica, iron, calcium, and organic matter. It was found in the neighbourhood of the Borax Lake, California.—On the affinities and classification of the Dinosaurian reptiles, by O. C. Marsh. Twelve restorations of Dinosaurs are given, and a relation is traced between them and the Crocodilians.

Wiedemann's Annalen der Physik und Chemie, No. 12.—On the origin of frictional electricity, by C. Christiansen. Differences of potential created by contact between two metals were investigated by means of "drop electrodes," one terminal of the electrometer being connected with the upper reservoir of mercury, and the other with the lower, in which plates of a different metal were immersed. The gas through which the drops fall is of considerable influence. Platinum becomes more positive in hydrogen, and more negative in oxygen. Other metals become more negative in hydrogen.—Dielectric constants of mixtures and solutions, by Ludwig Silberstein. Given two perfect insulators, like benzol and phenylethylacetate, which mix in all proportions and do not contract in the process, the specific inductive capacity of the mixture may be found by taking the sum of the products of the two separate volumes into their specific inductive capacities and dividing by the total volume. This proposition was experimentally proved by Nernst's method, with induction coil and telephone.—On the passage of electricity through gases, by A. Paalzon and F. Neesen. This is the continuation of a highly-interesting paper on various obscure phenomena connected with discharge tubes. The medium in which the discharge tubes were immersed had a decided influence upon them. Immersion in water or alcohol extinguished the glow. This was not due to condensation, since the total current was diminished, and extinction took some time to set in. Electrification of the outer surface of the tube, or discharge of it by a flame or other means, or the approach of a charged piece of sealing-wax—in short, any motion of electricity in the neighbourhood, favoured the internal discharge.—Movable light phenomena in rarefied gases, caused by electric oscillations, by J. Ebster and H. Geitel. In a discharge tube surrounded by a conducting ring put to earth, and touching another conductor connected with a strong induction coil, a pencil of bluish light is formed at a vacuum of 0·01 to 0·001 mm. of mercury, ending in an intense green phosphorescent patch next the conductor, tapering as it passes through the ring, and ending somewhere in the gas space. The approach of a conductor or a magnet makes the pencil assume various shapes and positions.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 21, 1895.—"On the Variable Stars of the δ Cephei Class." By J. Norman Lockyer, C.B., F.R.S.

Prof. E C. Pickering, in his classification of the variable stars, which is based on a study of the light curves (*Amer. Acad. Proc.*, vol. xvi. p. 17), recognises two classes of variables having short periods. His Class IV. includes those variables, exemplified by δ Cephei and β Lyræ, in which the light changes are not of very great range, and continue throughout the period. Class V. comprises those like Algol in which there is a temporary reduction of light at minimum, produced by the eclipse of the bright star by a relatively dark companion; this explanation has since been established by spectroscopic investigations, which have shown that there is no change in the spectrum at minimum, and that there is an orbital movement of corresponding period.

Excluding β Lyræ, which, as shown in the paper, is spectroscopically different from the others so far examined, it will be convenient to refer to the remaining variables of Pickering's Class IV. as those of the δ Cephei class, and it is with some of these that the present paper is concerned.

The available spectroscopic data with regard to the δ Cephei class were very meagre, and I therefore determined to investigate the spectra photographically, so far as the means at my disposal would permit. Five stars were studied, namely, η Aquilæ, ζ Geminorum, δ Cephei, T Vulpeculæ, and S Sagittæ.

Five very definite results have been arrived at:—

(1) The spectra of the five variables of this class which have been photographed are practically identical.

(2) The five variables in question are stars of increasing temperature.

(3) There is a general weakening of the continuous spectrum as the light of the star decreases.

(4) There are no indications of bright-line radiation at the positions occupied by the lines of hydrogen or helium at any part of the period in the case of these variables.

(5) There is no visible doubling of the lines in any of the photographs.