UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The King of Sweden and Norway was on Monday admitted by the Chancellor to the honorary degree of LL.D. The ceremony was witnessed by a vast assembly, and the King gave much pleasure by his gracious bearing and evident interest in the proceedings.

The General Board are about to appoint a lecturer in experimental physics in succession to Mr. W. N. Shaw. Applications are to be sent to the Vice-Chancellor by May 19.

The Master of Downing and Dr. Barclay-Smith announce a course of instruction in practical histology, to be given during the long vacation, beginning on July 7.

The trustees of the late Miss R. F. Squire have offered the University a sum of about 13,500*l.* for the erection of a law library in connection with the new law school, and adjoining the Sedgwick Memorial Museum. This timely benefaction will probably facilitate the speedy erection of the the Botanical and Medical Schools, plans for which are now under the consideration of the Senate.

The proposal to establish a special examination in the sciences bearing on agriculture, as a qualification for the ordinary B.A. degree, was favourably received in the Senate on May 10, and a grace for its adoption has been sanctioned by the council.

An examination for minor scholarships in Natural Science will be held at Downing College in March 1901. Application for particulars should be made to the tutor.

A VERY satisfactory side of technical education is the work carried on in the lecture-rooms and laboratories of University Colleges, in connection with Technical Instruction Committees. Two short courses of evening lectures to teachers, just arranged by the Technical Instruction Committee of Liverpool with Prof. Oliver Lodge and Prof. Herdman, are instances in point. The lectures deal with some recent developments of physical and natural science, Prof. Lodge taking for his subject "Electric Vibrations," and Prof. Herdman "Oceanography." The lectures are free to teachers who can give evidence that they are able to profit by them.

VISITS to museums, and outdoor lessons, are counted as school attendances by the Board of Education, with the result that they are now given a definite place in the scheme of instruction of many schools. In a similar way, the National Zoological Park at Washington is used to place great object-lessons before the hundreds of thousands of visitors to the national capital from all parts of the United States. The pupils in the public schools of Washington benefit greatly by these opportunities. It has become a part of their routine to visit, under the care of a teacher, the Smithsonian Institution and National Museum buildings, as well as the park; while those outside the city benefit indirectly through the numerous excursions of teachers, and the stimulus and suggestion they may thus receive.

TWO new buildings in connection with the Yorkshire College, Leeds, to be devoted to the development of clothworkers' research and dyeing, &c., were formally opened, on Friday last, by the Master of the Clothworkers' Company, Mr. A. C. Cronin. Principal Bodington, of the Yorkshire College, the professors and students, and mayors of various boroughs, also attended on the occasion. It was explained that it was intended to raise the tone of dyeing, and that the outlay on the extensions is likely to yield a tenfold return. Mr. Cronin, in declaring the new buildings open, expressed a hope that increased knowledge in the industries would be the result of these extensions. At a luncheon which followed, in responding to the toast of "The Clothworkers' Company," he said it was the intention of the Company that the Yorkshire College should become the first and most complete example of a textile and dyeing school not only in Europe, but in the world. There is now hardly any manufacturing town of any size in Yorkshire which has not its technical school or institute, and with which the Clothworkers' Company has not been or is not still connected.

THE medical school of the future was the subject of an address delivered before the fifth triennial Congress of American Physicians and Surgeons, on May 2, by the president, Prof. H. P. Bowditch, of Harvard. According to Prof. Bowditch, we may expect that a medical school of the first rank will, in the immediate future, be organised and administered somewhat as follows:—(1) It will be connected with a university, but will be so far independent of university control that the faculty will practically decide all questions relating to methods of instruction and the personnel of the teaching body. (2) It will offer advanced instruction in every department of medicine, and will therefore necessarily adopt an elective system of some sort, since the amount of instruction provided will be far more than any one student can follow. (3) The laboratory method of instruction will be greatly extended, and students will be trained to get their knowledge, as far as possible, by the direct study of nature, but the didactic lecture, though reduced in importance, will not be displaced from its position as an educational agency. (4) The work of the students will probably be so arranged that their attention will be concentrated upon one principal subject at a time, and these subjects will follow each other in a natural order. (5) Examinations will be so conducted as to afford a test of both the faithfulness with which a student performs his daily work and of his permanent acquisition of medical knowledge fitting him to practise his profession.

THE first official ceremony of the University of London in the new home at South Kensington was the presentation of degrees by the Prince of Wales on Wednesday, May 9. The University has thus entered upon a new phase of its career. As the Chancellor of the University remarked in his address, nothing has been more striking within the last few years than the progress of new universities in different parts of the country. The University of Wales, of which the Prince of Wales is Chancellor, has been founded, and, although very young, it is already making notable progress and will ultimately be a great success. Besides this, there is the Victoria University, of which Lord Spencer is Chancellor, and which has made remarkable progress; and also the completely new University of Birmingham. What does all this mean? It means that the country is stirred up on the subject of education; and among all classes and places there is a greater sense of the importance of it than ever there has been before. As to the University of London, the Chancellor quoted figures to show the great progress which has taken place, and made special reference to the great stimulus to the improvement of the education of women throughout the country arising out of the action of the University in obtaining a supplementary charter to enable women to be admitted to the examinations. Up to the present time the University has been only an examining body. It has by its examinations done a good work for the education of the people, and it has set an example which has had a very important effect upon all the schools throughout the country. But it is now a teaching University, and with its large list of faculties its work will be very widespread. The Prince of Wales then made a few remarks, in the course of which he said: "No one wishes more sincerely than I do happiness and prosperity to this University; and from all that we have heard from the Chancellor I think the University is in a fair way of becoming one of the greatest importance, and one that will hold its own, no doubt, with many of the others which are of more ancient origin. I am glad to think that, as the result of somewhat difficult, and I may say somewhat delicate, negotiations, the London University has now found a home in this large building, better known as the Imperial Institute, in which, as you all know, I take a deep interest. We are very grateful to Her Majesty's Government for all they have done, and for having facilitated the arrangements which I hope are now complete. It only rests with me to express the fervent wish that the London University will not regret having come to a more distant part of London, and that they will find that they have ample room for all their requirements in this University."—Sir Michael Foster, M.P., then addressed those who had received awards at the hands of the Chancellor. He reminded them that the value of the degree was not in the degree itself, but in the labour which had led up to it. The degree might be the guinea stamp, but it was the work and the mental discipline which was the real gold.

SCIENTIFIC SERIALS.

Bulletin of the American Mathematical Society, April.—Prof. F. N. Cole summarises the *Proceedings* of the February meeting of the Society, and abstracts a few of the papers communicated. The bye-laws were revised. By this amendment it is provided that the ex-presidents shall be life-members of the council, and that the presidential term of office shall be

extended to two years.—Prof. J. Pierpont gives an interesting account of the summer meeting of the Deutsche Mathematiker-Vereinigung held at Munich in September of last year.—Some theorems concerning linear differential equations of the second order is an abstract by Prof. M. Bôcher of certain results which he communicated at the February meeting (see *supra*).—A paper by Dr. M. B. Porter, read at the same meeting, is entitled "A note on the enumeration of the roots of the hypergeometric series between zero and one." It is a continuation of a note published in the May (1897) number of the *Bulletin*.—Dr. J. Sommer reviews Hilbert's "Grundlagen der Geometrie," and Prof. E. O. Lovett does the same for Kœnig's "Leçons de Cinématique."—The longer papers read before the Society will, we presume, be printed in the new *Transactions*.—The notes are very full, and there is a fair list of publications.

Bulletin de l'Académie des Sciences de St. Pétersbourg, vol. vii. No. 3.—On the rotation of Jupiter and his spots, by Th. Bredikhin. An analysis of the observations made by the author himself at Moscow, and of some later observations at Pulkova. A comparison of the times of rotation of spots situated in the same latitudes shows that some of them are formed in the lower, and some in the higher strata of Jupiter's atmosphere. Prof. Joukovsky's formulæ hold good as a rule; but a more careful discussion shows that the law of friction must be altered; the latter is proportional to the square or even to a higher degree of velocity. But it would be extremely difficult to make a theoretical discussion if the law be altered in this sense.—The scientific results of the Black Sea expedition, by A. Ostrooumov: iii. Fishes of the Sea of Azov.—Materials for the hydrology of the White Sea and the Murman Sea (Arctic Ocean along the Norman coast), by N. Knipovitch: i. Lists of the Observations.

Vol. vii. No. 4.—The series of Jean Bernoulli, by N. Sonin.—New researches into the spectrum of β Lyræ and η Aquilæ, by A. Belopolsky. These new researches were made with the aid of the 30-in. refractor of Pulkova. The spectroscopic velocities of η Aquilæ showed a periodicity very near to the periodicity of the variations of magnitude, *i.e.* 7 days 4 hours, and it was possible to calculate its orbit. Similarly, as for δ Cephei, it was proved that the changes of brilliancy in η Aquilæ cannot be explained by eclipses of the star. As regards β Lyræ, the former suppositions of the author are now fully confirmed. This star represents a system of two bodies, having at any instant opposite spectroscopic velocities, and one of the two bodies eclipses the other during their revolutions.—Preliminary communication on applications of Rykatschew's method for studying the relations between rainfall and height of water in rivers, by Dr. Harry Gravelius.—The third international balloon ascents of May 1, 1897, by Ed. Stelling.—Observations of the satellites of Mars with the 30 in. refractor at Pulkova, by F. Renz; and on the photographs of Mars, by S. Kostinsky.

Vol. vii. No. 5.—On the changes of pressure under the piston of the air-pump, by Prince Galitzin. Theoretical discussion is compared with direct observation.—Some remarks on the sensibility of the eye, by the same author.—Abstract from the yearly report for 1896 of the Central Physical Observatory, by M. Rykatschew.—On the excretory organs of *Ascaris megalocephala*, by S. Metalnikoff.—On the routes of the cyclones over Russia in 1890-92, preliminary communication, by P. Rybkin.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, May 11.—Prof. O. J. Lodge, F.R.S., President, in the chair.—A discussion of Prof. Lodge's paper on the controversy concerning Volta's contact force was commenced by Prof. Armstrong. Prof. Armstrong expressed his indebtedness to the president for putting forth clearly what we are trying to understand, and said that it was hardly time for chemists to enter the discussion when physicists themselves differed. There has apparently been a change in front since the time when the effect was supposed to be due either to (1) chemical action between the metals, or (2) oxidation. Prof. Lodge's view is intermediate, but approximates to the second. Prof. Armstrong said that from a practical point the existence of the effect was unknown, because sufficient precautions had never been taken to prevent chemical action. He urged the continuance of experiments similar to those carried out by Mr. Spiers, and stated that modern ideas of chemistry were favourable to the view which Prof. Lodge had taken up with regard to the Volta effect.—Mr. Glazebrook made some remarks upon the meaning of the term E which occurs in the expression for the Peltier effect at the junction of two metals. If we confine our attention to an infinitesimal cycle at the junction of two metals at slightly different temperatures, we get the equation for the Peltier effect in which E is the potential difference at the point considered. If then, assuming reversibility, we sum up all the infinitesimal cycles round a circuit and get a finite cycle, the E.M.F. of the circuit is a function of the two temperatures between which it is working. Differentiating with respect to temperature the total E.M.F. of the circuit, we get an equation which applies to the circuit as a whole, and in which E is the total E.M.F. round the circuit. Mr. Price asked if any critical experiment could be suggested to settle the question.—Dr. Lehfeldt called attention to some experiments which had been performed to measure the potential difference between an electrolyte and a gas. The electrolytes considered were chiefly aqueous solutions, and the potential differences observed varied largely. The surface tensions of the liquids were measured, and it was shown that the variations in the potential difference were very similar to those in surface tension. This suggests, in the case of electrolytes, true physical surface effects, and not chemical action.—The chairman remarked that Dr. Lehfeldt evidently looked upon the metal-ether boundary as being the effective one. The experimental evidence is not sufficient to say exactly which is the effective contact, but it seems to show that the metal-ether effect is of the same order of magnitude as the oxygen layer effect. According to Helmholtz they ought to be related, and they apparently are.—The chairman then read a paper, by Mr. J. B. Tayler, on the heat of formation of alloys. Experiments have been made upon alloys of lead with tin, bismuth and zinc, and of zinc with tin and mercury. The method employed consisted in dissolving (1) the alloy, and (2) the corresponding mixture of metals in mercury, and measuring the heat of solution in each case. On the assumption that the solutions obtained are identical, the difference between the heat of solution of the mixture and that of the alloy is the heat of formation of the latter. The calorimeter was a thin glass tube silvered on the outside and supported by a stouter tube silvered on the inside. Suitable arrangements were adopted for the introduction of the metals or alloys, which were used in the form of filings. Solution was often complete in less than a minute, and rarely took more than two minutes and a half. The alloys first experimented upon contained their constituents in equivalent proportions, and the heats of formation were found to be small in comparison with those found for brass by Galt and Baker. It was thought that only a small percentage of the atoms present had entered into definite chemical combination, and that more reliable results would be obtained by dissolving a small quantity of one metal in an excess of the other, and calculating from the experimental results the heat of formation of the gramme-molecular weight of compound upon the supposition that the whole of the small quantity of metal had entered into chemical combination by the exercise of its normal valency. Using the numbers so obtained to find, by Kelvin's theory, the potential difference which should exist between the metals concerned when put in contact, results were arrived at which agreed neither with the Volta effect nor the Peltier effect, but which were considerably nearer the former than the latter. A paper on the want of uniformity in the action of copper-zinc alloys on nitric acid was read by Dr. J. H. Gladstone. Experiments have been made by dissolving copper-zinc alloys in nitric acid, following the method of Dr. Galt, and adopting the precautions mentioned by him. The reaction between nitric acid and these metals or alloys is very complicated, and there is a difference between the products in the case of an alloy and in the case of the equivalent mixed metals. The gases evolved being small in the experiments performed, attention was directed to the determination of the substances remaining in solution, *i.e.* the nitrous acid and ammonia. The alloys gave much more nitrous acid and less ammonia—in fact, two of the alloys employed produced no ammonia. Discrepancies in results may be due to the fact that the zinc and copper in contact form a zinc-copper couple which in the presence of acid sets up a vigorous action and produces a different evolution of heat. Difficulties arise in the investigation because the alloys used may not be definite chemical compounds, but mixtures of two or more alloys with uncombined zinc and copper. The alloy with 38·38 per cent. of copper appears to be fairly uniform. Different observers disagree as to the amount of heat produced by any