

methods of working in high and low relief attracted much attention.

What is the outcome of it all, thought the visitor, as he left with his mind whirling with slotting machines, scalar quantities, secchometers, and sugar analysis? Has original research been prosecuted as foreshadowed by Lord Selborne? Where are the some 200 students that have been awarded the diploma of Associateship of the Institute, and all the other special students who have passed through courses at the Central Technical College? The seventy papers communicated by the students, and the staff, to the proceedings of various scientific societies answer the first question, while the reports issued yearly by the Dean give information on the second point; some of the past students are the Principals, and some have charge of departments at technical schools; some are the chief engineers and some assistant engineers at electric light central stations in England; some hold postin chemical works, and some are railway engineers, and others telegraph engineers in India, but practically all appear to be employed. And what is a little remarkable—in view of the vast number of people who have been attracted to follow engineering pursuits during the past few years—we understand that nearly all the students who have passed through the Central Technical College are in receipt of pay for the services they are rendering, and are not paying premiums to employers for the privilege of being allowed to do hard work.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The following is the speech delivered by the Public Orator, Dr. Sandys, in presenting for the honorary degree of Doctor in Science Prof. Newcomb, of Johns Hopkins University, Superintendent of the American Nautical Almanac.

Si Thales ille Milesius, "rerum naturae certissimus explorator et astrorum peritissimus contemplator," sapiens propterea nominatus est, quod solem lunae oppositu solere deficere primus omnium vidisse fertur, etiam hunc virum sapientiae laude non indignum arbitramur, qui solis et lunae defectus omnes antiquitus observatos cum astronomiae legibus hodiernis accuratissime comparavit. Idem quanto ingenii acumine aliorum de lunae motu placita correxit; quam admirabili studiorum caelestium cognatione cum Neptuni inventore nostro consociatus est; quam infinita denique cura fratribus nostris transmarinis trans aequora navigantibus siderum cursus litterarum monumentis mandatos explicavit. Talium virorum de genere humano merita dum contemplamur, non iam miramur ipsum Vergilium a Musis esse precatum, ut sibi ante omnia

"caelique vias et sidera monstrant,
defectus solis varios lunaeque labores."

Duco ad vos astronomum illustrem, SIMONEM NEWCOMB.

At the annual election, on June 22, at St. John's College, the Hutchinson Studentship was awarded to A. S. Hemmy, double first in Natural Sciences, for research in Physical Chemistry. Foundation Scholarships, varying in value from £100 to £50 a year, were given to the following Science Students:—K. C. Browning, D. J. Morgan, J. S. White, N. B. Harman, J. H. Howitt; and Exhibitions in Natural Science to J. A. Glover, R. F. C. Ward, A. C. Ingram, Jehu, and Yapp. In Mechanical Sciences and Engineering, Foundation Scholarships were for the first time awarded to W. S. La Trobe (£80) and A. Chapple (£50). It is noteworthy that Messrs. Hemmy, La Trobe, and Chapple, who have thus carried off the chief scientific honours, are all colonial graduates, from the Universities of Melbourne, New Zealand, and Adelaide, respectively. Mr. J. E. de Villiers, of this College, who takes the highest honours in Law, being senior in his Tripos Part I., is a graduate of the Cape of Good Hope.

The Harkness Scholarship in Geology and Palaeontology is awarded to J. H. Gray, Scholar of King's College.

In Part I. of the Natural Sciences Tripos, thirty men are placed in the first class; in Part II. eleven men attain this distinction. No woman gains a first class in either part.

SESQUICENTENNIAL gifts continue to pour in upon Princeton University. An unnamed benefactor has given funds for a new library building.

THE following are among recent appointments:—Dr. Theodor Des Coudres to be Extraordinary Professor of Physics in Göttingen University, and Dr. Otto Bürger to be Extra-

ordinary Professor of Zoology; Mr. A. A. Heller to be Instructor in Plant Taxonomy at the University of Minnesota, and Curator of the University Herbarium.

THE fitness of Convocation of the University of London to deal with such subjects as a Teaching University may be estimated from the result of the meeting held on Tuesday. The chief business was the election of a Fellow of the University, and the following gentlemen had been nominated:—Sir Joseph Lister, Mr. Walter Rivington, and Mr. Richard Mosey Stephenson. The election was one in which voting papers were permissible, and the result of the counting of the votes was that Mr. Rivington obtained 963, and Sir Joseph Lister only 846 votes.

THE report of the Technical Education Committee which was adopted at the meeting of the Devonshire County Council, held at Exeter on the 11th inst., shows that the work done on the agricultural side of Ashburton Grammar School is of so satisfactory a nature that an additional grant has been awarded to the school; also that 175 continuation schools have been maintained throughout the year. At the same meeting the following resolution was passed by a substantial majority:— "That this Council, while offering at present no opinion as to the advisability or otherwise of placing secondary education under the control of the local education authority, strongly deprecates the proposal to transfer to them any duties connected with elementary education."

A SPECIAL Committee, appointed by the West Riding County Council to watch the Education Bill, have passed the following resolution:—"That in view of the amendment to the Education Bill, 1896, whereby every non-county borough with a population of 20,000 is to appoint an Education Committee, amendments should be introduced by way of limiting the duties of the education authority of such a borough to such defined matters as may be least hurtful to the administrative county, and the cause of education."

A MEETING of the Executive Council of the County Councils Association was held on Friday morning last, at the Guildhall, Westminster. Lord Thring having briefly explained the circumstances under which the meeting had been convened, it was proposed by Lord E. Fitzmaurice, and seconded by Sir J. E. Dorington, Bart., M.P., and resolved:—"That this Council, considering the changes which have been introduced into the constitution of the education authority by the exclusion from the administrative county of non-county boroughs with a population of 20,000, is of opinion that the above change strikes a serious blow at the administration of the Technical Education Acts, and of county administration generally." It was also resolved that the Parliamentary Committee be authorised to arrange for the presentation of the foregoing resolution to the Right Hon. A. J. Balfour, M.P., and His Grace the Duke of Devonshire.

THE Education Bill has been abandoned by the Government, and the eleven days of Parliamentary time spent in discussing it have been sacrificed. It is proposed to bring up the subject afresh next January, but there is little possibility that the measure which will then be brought forward will be of the very contentious character of the one just withdrawn.

THE National Home Reading Union aims mainly to make high-class reading attractive, and to give advice with regard to courses of reading in romance, travel, biography, economics, ancient and modern history, English and foreign literatures, science and art. Once a year it is the custom of the Union to hold a summer assembly at some interesting centre, when lectures are given in connection with the courses of study which have been pursued during the past winter. This year Chester has been chosen, and the assembly takes place there between June 27 and July 6. But not only will the subjects recently studied claim attention, for there will be several lectures on the botany, geology, and architecture of the district, besides a lecture by Mr. St. John Hope on "The Arrangements of Mediaeval Monasteries," with special reference to Chester. A number of interesting excursions and social gatherings have been arranged, including a visit to Northwich to descend a salt mine.

THE Technical Education Board of the London County Council next month will appoint not more than five Senior County Scholars. Each scholarship will be tenable for three years, and of the annual value of £60, together with free instruction in a college of university rank, provided that the fees

do not exceed £30 a year. In the case of scholars proceeding to the old universities a contribution of £30 per annum is made by the Board towards the college and university tuition fees. Candidates must be resident within the administrative County of London, and must send in applications to the Secretary of the Board, at 13 Spring Gardens, on or before Monday, June 29, on forms which can be obtained on application. Last year the Board awarded several exhibitions of smaller value to specially deserving candidates in addition to appointing five County Scholars. Hitherto the selection of the scholars has been based upon the record of their past achievements and testimonials received from their teachers or others qualified to judge of their capabilities. These scholarships are restricted to candidates whose parents are in receipt of not more than £400 per annum.

THE Hartley Institution at Southampton has not developed so much as it might have done since it was established, owing to a divided management and limited finances, but it has now entered upon a brighter part of its career, and we confidently expect to learn of rapid and vigorous growth in the near future. The Secretary of the Institution has retired on a pension, and the Town Council of Southampton have decided to grant a farthing rate for one year to the Hartley Council. The action of the Borough Council in giving rate aid in support of technical and scientific education, in addition to the whole of the residue under the Customs and Excise Act, shows that the friends of educational advancement upon the Council are strong enough to make headway in spite of contrary breezes. Dr. R. W. Stewart, the Principal, is now free to develop his well-laid schemes for extending and improving the work of the Hartley Institution, and there is every reason for believing that under his whole management, and with the increased resources now available, the Institution will extend in the right direction, while at the same time the position of Southampton as an educational centre will be advanced. The objects of the proposed reorganisation are, first, the extension of the evening technical classes, and, second, a complete change in the work of the day classes. The extension of the evening classes will take place mainly in improving and extending the trade and commercial classes, and in providing classes for teachers. It was to make these changes that a farthing rate was solicited. The help was asked not to relieve the Hartley Council of any present financial embarrassment, but to enable them to carry out a scheme of educational reform which must ultimately be of the greatest benefit to the town and neighbourhood. A few of the reasons which showed the necessity for reorganising the educational work of the Institution may be specified. The Institution is already provided with buildings, and during the last five years the accommodation and equipment had been greatly improved by the provision of new lecture-rooms, a chemical laboratory, a physical laboratory, and engineering and other workshops. All this would be practically wasted and lost to the town unless supplemented by the appointment of a properly qualified teaching staff, able to utilise and develop the resources of the Institution to the utmost. The income of the Institution—about £2750—was not quite enough to meet the general working expenses and to provide a staff of this kind; but with the grant now made by the Town Council a much more efficient return will be obtained. The development of the Institution on the lines suggested will enable students to obtain an education of university rank, and to proceed to a degree in arts, or science, or law, at the University of London, by attending a three years' course at the day classes of the Institution in their own town. Lecturers are to be appointed in mathematics, biology and geology, English and classics, French and German, at a salary of £150 per annum each. This is something for Southampton to be proud of, and we trust that the policy which has inaugurated the new epoch in the educational history of the town will permanently represent the feeling of the Borough Council.

SCIENTIFIC SERIALS.

American Journal of Science, June.—On the colour relations of atoms, ions, and molecules, by M. Carey Lea. Part II. If a coloured substance be formed by the union of a colourless kation with a colourless anion, the colour belongs to the molecule only. Consequently, if we find a solvent which, like water, is capable of separating the ions, the resultant solution when dilute must be colourless, no matter how intense the colour of the com-

pound. Experiments confirm this law without exception. Antimony pentasulphide, a strongly coloured compound, is a case in point. When dissolved in an alkaline sulphide, the ions of antimony and sulphur, themselves colourless, separate sufficiently to no longer change each other's vibration periods. They still, however, remain within the sphere of mutual influence. The union of coloured and colourless ions gives rise to the most surprising changes of colour. Two similar coloured ions may unite to form a colourless element. Two similar colourless ions may unite to form a strongly-coloured element. No black ion is known. There is absolutely no relation traceable between the colour of an ion and that of the element which it aids to form.—The gravimetric determination of selenium, by A. W. Peirce. The usual method used in the gravimetric determination of selenious acid, that of precipitating the selenium with sulphurous acid in presence of hydrochloric acid, is slow and incomplete. The author substitutes potassium iodide for the sulphurous acid. To avoid obtaining the selenium in the pasty condition when large quantities are present, the potassium iodide should be considerably in excess of the amount necessary for precipitation.—The extinct *Felida* of North America, by G. I. Adams. This is an attempt to give a general account of this family, to summarise the literature on the subject, and to work out a comprehensive classification. The paper is accompanied by three admirable plates.—The age of the igneous rocks of the Yellowstone National Park, by Arnold Hague. The pouring out of igneous rocks began with the post-Laramie uplift, or closely followed it, and from the time of the first appearance of these rocks, volcanic eruptions continued throughout Tertiary time.—Researches on the Röntgen rays, by Alfred M. Mayer. Herapathite, an iodosulphate of quinine, the most powerfully polarising substance known, is incapable of polarising X-rays. The actinic effect of X-rays varies inversely as the square of the distance of the sensitive plate from the radiant source.—On the *Pithecanthropus erectus*, from the Tertiary of Java, by O. C. Marsh. It may be taken as established that the remains of this "missing link" at present known are of Pliocene age. The tooth, skull, and femur found belonged to the same individual. This individual was not human, but represented a form intermediate between man and the higher apes.

Wiedemann's Annalen der Physik und Chemie, No. 5.—Anomalous electric dispersion of liquids, by P. Drude. Short electric waves (of 70 cm. wave-length in air) are more strongly damped in alcohol, and especially in glycerine, than in water or in aqueous solutions. Theoretically, the damping should increase with the conductivity. But these badly conducting bodies are found to damp electric waves as effectually as a 5 per cent. solution of copper sulphate, which is 6000 times more conducting. This is not the only anomaly exhibited by ethyl and amyl alcohol, glycerine, and acetic acid. They also show anomalous dispersion for rapid electric oscillations, *i.e.* a decrease of the electric index of refraction with increasing frequency. Further, the specific inductive capacities are greater than the squares of the electric indices of refraction. Water, methyl alcohol, and benzol show no such anomalies, and ether only shows anomalous absorption.—Thermo-couples of amalgams and electrolytes, by A. Hagenbach. These were prepared by connecting two beakers filled with an amalgam by means of an M-shaped siphon filled with an aqueous solution of a salt of the same metal, the ends of the siphon being closed by a membrane. The amalgams were enclosed in water baths, and could be heated simultaneously or alternately. The only metals suitable for accurate measurements were cadmium and lead. Theory demands that as the salt solutions are diluted the thermo-electric forces shall increase. This law was found to fail with the divalent elements named. A couple, consisting of cadmium amalgam and cadmium chloride or nitrate, showed a steady diminution of the thermo-electric force as dilution increased from 0.1 to 0.0001 of the normal.—Contributions to the knowledge of fluorescence, by G. C. Schmidt. The author maintains that all bodies are capable of fluorescence if dissolved in suitable solvents. The most favourable form in which a substance may occur is that of a "solid solution." Aniline dyes may be made to fluoresce by solution in sugar, gelatine, hippuric acid, quinine bisulphate, and other substances. The colour of fluorescence is often nearly independent of the solvent.—Theoretical investigations concerning light, by P. Glan. The author calculates the absorption of various substances for a certain kind of ultra-violet light from their thermal conductivities and refractive indices, and shows that muscle, horn, wood, bone, cork, paper,