and it is considered that this shelf, at the 140 fathoms level, marks the downward limit of the coral formation.

Exceptionally dry weather has been experienced, which has somewhat delayed the boring, on account of the temporary failure of the water-hole from which the water supplies were being drawn. Foreman Symons, however, who is in charge of the drill, had, by extending the line of suction pipes, been able to tap a second water-hole, from which water was being pumped to the boiler. Mr. Finckh's experiments on the rate of growth of the various reef-forming animals and plants were progressing satisfactorily. It was hoped that the bore would, in about eight weeks' time, reach the total depth of 1200 feet, which is the maximum depth contemplated. Further information may be expected shortly upon the return from Funafuti of H.M.S. *Porpoise*, which will convey all the core hitherto obtained from Funafuti, and tranship it to Sydney; and until the core has been subjected to thorough microscopic and chemical examination it would, of course, be premature to attempt to forecast the exact trend of the evidence. The results so far obtained are very satisfactory.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Dr. Langley, F.R.S., has been elected a member of the Council of the Senate in the place of Principal Glazebrook, now of Liverpool University College.

Lord Wolsingham, the High Steward, has generously offered a second (bronze) medal for specially meritorious essays in biology which do not succeed in winning the Wolsingham gold medal.

At the matriculation on October 21 last, 897 students joined the University. These included 19 "advanced students" admitted to post-graduate research or other advanced work. The total entry for the year 1898 is thus brought up to 944, which is the highest since 1890.

An animated discussion on the proposed Sedgwick Memorial Museum took place in the Arts School on October 22. Two plans, a larger and a smaller, were before the Senate. The geological staff strongly pressed that the larger should be adopted, though it appeared that it would cost some 44,000*l*. Of this the Memorial Fund would contribute 27,000*l*.

Mr. R. S. Morrell, who was placed in the first class in both parts of the Natural Sciences Tripos in 1888-90, and Mr. J. S. Gardiner, who was similarly placed in 1893-95, have been elected to Fellowships at Gonville and Caius College.

ON Wednesday, October 26, Sir William Harcourt opened the new central block of Aberystwith University College, erected at a cost of about 20,000*l*., towards which sum he, when Chancellor of the Exchequer, gave a grant of 10,000*l*. Speaking subsequently at a luncheon, Sir William Harcourt referred to the unsatisfactory state of secondary or intermediate education in England, and said that what was required was a system of intermediate education similar to that which has been established in Wales, to connect the elementary schools with the universities.

SPEAKING at University College, Liverpool, on Friday last, Sir J. Gorst, Vice-President of the Committee of Council on Education, said that at the present time there was a strong desire on the part of all interested in education that a great step forward should be made in commercial and technical instruction. The necessity arose from industrial competition in foreign countries. Undoubtedly our higher and elementary education for industrial purposes was vastly inferior to that of many of our rivals, and no time was to be lost in setting to work to effect an improvement. To this forward step there were two essential conditions. In the first place, elementary education must be improved, for it was no use to attempt to organise a system of higher schools without having a sound elementary basis upon which to build. Moreover, it was essential that higher education should be perfectly organised, and that in each educational area there should be one clear and definite plan of education suitable to the particular conditions of the place.

THE report on the work of the Examinations Department of the City and Guilds of London Institute for the session 1897-98 has been published. From it we learn that the number of technical classes throughout the country registered by the Institute shows a marked increase, and the instruction is in closer touch with industrial requirements. The recognition by the Post Office of the Institute's certificate in telegraphy as qualifying the holder of it for increased remuneration has had the effect of nearly doubling the number of candidates for examination in that subject, and shows the influence, which employers generally might exercise, in encouraging attendance at technical classes, by giving some kind of reward to such of their employés as succeed in passing the Institute's examinations. County Councils have during the past year further availed themselves of the services of the Institute in connection with the technical classes under their control. Several important additions and alterations have been made in the programme of Technological Examinations.

THE Calendar of the University College of North Wales (which is a constituent College of the University of Wales) for the year 1898-99, has been published. The syllabus of classes shows that students are educated as well as instructed at the College, and the questions set in the science subjects in which candidates for entrance scholarships have been examined, give evidences that no credit is gained by perfunctory work or for information derived entirely from books. The College offers a course of training to those who intend to become teachers in secondary or intermediate schools, and in this, as in other subjects, the course involves practical as well as theoretical work. Among the subjects to be dealt with in the lectures are the psychology of the growing mind, and physiology and hygiene in their relation to school life. The agricultural department, and the College Farm, have recently been referred to (p. 611). After following a course of study at the College extending over three years, students may take the degree of Bachelor of Science of the University of Wales in the group "Agriculture and Rural Economy."

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, October 24.—M. Wolf in the chair.—On double integrals of the second species in the theory of algebraic surfaces, by M. Émile Picard.—Properties of calcium, by M. Moissan. The pure crystallised calcium whose properties are given in this paper, was prepared by the method already described in NATURE. The melting point, determined by a thermo-couple, was found to be 760° C. The metal can be cut, but it is much less malleable than sodium or potassium, as it can be broken, and shows a crystalline fracture. When totally free from nitride, its colour is brilliantly white, recalling that of silver. The density was found to be about 1·85; and it is hard enough to scratch lead, but not calcium carbonate. Neither chlorine, bromine, nor iodine attacks calcium in the cold, although the corresponding haloid salts are formed at higher temperatures. Calcium burns brilliantly in oxygen, the temperature resulting from the combustion being so high that a part of the quicklime produced is melted and volatilised. When burnt in air, the calcium combines with both constituents together, nitride and oxide being simultaneously formed. At a dull red heat the metal also combines with carbon with great energy, forming CaC_2. At high temperatures the reducing power of calcium is remarkable, oxygen being readily removed from sulphur dioxide, phosphoric anhydride, boron trioxide, silica, and the oxides of carbon.—On the decomposition by aluminium chloride, of a straight-chain saturated hydrocarbon, by MM. C. Friedel and A. Gorgeu. The reactions have been studied arising between aluminium chloride and the normal paraffins from methane to hexane. The latter, when heated to its boiling point with dry $AlCl_3$ gave rise to pentane and butane, the pentane predominating.—On a peculiar mode of formation of the pollen in *Magnolia*, by M. L. Guignard. As regards the mode of formation of the partitions in the pollen mother-cell, the *Magnolia* present a condition quite unknown in other plants. They are intermediate between Monocotyledons and Dicotyledons, resembling rather the former than the latter.—Extension of No. 162 of the "Disquisitiones Arithmeticae" of Gauss, by M. de Jonquières.—Remarks by M. Hatt on the new portion of the hydrographic map of the coasts of Corsica.—Observations of the new Brooks' comet (October 20, 1898), made at the Observatory of Paris, by M. G. Bigourdan.—On the intermediate integrals of equations of the second order, by

M. E. Goursat.—On singular points situated on the circle of convergence, and on the summation of divergent series, by M. Leau.—Measurement of the velocity of sound, by M. Frot. The experiments were made near Bourges, at a temperature near 0° C., the time being measured automatically by electric chronographs. Two sets of experiments gave for the velocity in air at 0° mean results of 330·6 and 330·9 metres per second.—On the tones of vibrating strings, by M. A. Guillemin. By suitably fixing any portion of a vibrating string any desired overtone can be produced; but this does not in any way prove that this note really existed as a partial tone in the original note given by the string.—On the atomic weight of tellurium, in relation to the multiple proportions of the atomic weights of other simple bodies, by M. H. Wilde.—On the positions of tellurium and iodine in periodic systems of the elements, by M. H. Wilde. Remarks on the recent determination by Metzner of the atomic weight of tellurium (128) as invalidating the periodic arrangements of Mendélejeff, Crookes and others.—On calcium amalgam, by M. J. Ferée.—Action of metallic sulphates on potassium paratungstate, by M. L. A. Hallopeau.—On the amines and amido-derivatives of the aldehydes, by M. Marcel Delépine. A thermochemical paper.—On the changes in composition which take place in fatty seeds in the course of germination, by M. L. Maquenne. The oily materials in the seeds of the earth-nut and castor-oil plant undergo a rapid diminution during germination, the latter being especially marked in this respect, the change being accompanied by an increase in carbohydrates.—Contribution to the biology of wine yeasts, by M. J. A. Cordier. The appearance of *Saccharomyces* upon fruit, especially the grape, at the period of ripening, has hitherto been described as due to the action of insects, but it would appear from the experiments quoted that the air is really the principal factor in the transport of these yeasts.—The specific characters of *Endomyces albicans*, by M. Paul Viullemin.—On the place of the Phoronidiae in the classification of animals, and on their relations with the vertebrates, by M. Louis Roule.—On the respiratory apparatus of the larvae of entomophagous Hymenoptera, by M. L. G. Seurat. It is shown that the respiratory apparatus of the different larvae of entomophagous Hymenoptera, although all built on the same fundamental plan, present differences in the number and arrangement of some of their parts, sufficient to establish distinctive characters of the several families. There is not yet sufficient knowledge, however, to draw any general conclusions.—On an organ, not previously described, which closes the poison reservoir in ants, and on the method of stinging in the same, by M. Charles Janet.—New observations on the cave and subterranean river of Hansur-Lesse (Belgium), by M. Martet. The paper is accompanied by a plan and section of the cave and stream. The unknown part of its course is now only two kilometres.

DIARY OF SOCIETIES.

THURSDAY, NOVEMBER 3.

CHEMICAL SOCIETY, at 8.—A Determination of the Equivalent of Cyanogen: George Dean.—Note on the Action of Light on Platinum, Gold, and Silver Chlorides: E. Sonstadt.—Methanetrisulphonic Acid; E. H. Bagnall.—A Composite Sodium Chlorate Crystal in which the Twin Law is not followed: W. J. Pope.—On the Composition of American Petroleum: Dr. Sydney Young, F.R.S.—(1) On the Separation of Normal and Iso-heptane from American Petroleum; (2) On the Action of Fuming Nitric Acid on the Paraffins and other Hydrocarbons: Dr. F. E. Francis and Dr. Sydney Young, F.R.S.—On the Boiling Points and Specific Gravities of Mixtures of Benzene and Normal Hexane: D. H. Jackson and Dr. Sydney Young, F.R.S.

LINNEAN SOCIETY, at 8.30.—On *Craterostigma pumilum*, Hochst.: Prof. H. Marshall Ward, F.R.S., and Miss Dale.—Amphipoda from the Copenhagen Museum and other Sources, Part II.: Rev. T. R. Stebbing, F.R.S.—Exhibitions: Embryos of *Hatteria*: Prof. Howes, F.R.S.—Photographs of Chicken with Foster-Parent a Common Buzzard: Alan F. Crossman.—*Nitella hyalina*, Ag., a New British Plant: H. and J. Groves.

FRIDAY, NOVEMBER 4.

GEOLOGISTS' ASSOCIATION, at 8.—Conversazione and Exhibition of Specimens.

QUEKETT MICROSCOPICAL CLUB, at 8.

TUESDAY, NOVEMBER 8.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Extraction of Nickel from its Ores by the Mond Process: Prof. W. C. Roberts-Austen, C.B., F.R.S.

ANTHROPOLOGICAL INSTITUTE, at 8.30.—The Tribes inhabiting the Mouth of the Wanigela River, New Guinea: R. E. Guise.

WEDNESDAY, NOVEMBER 9.

GEOLOGICAL SOCIETY, at 8.—On the Palæozoic Radiolarian Rocks of New South Wales: Prof. T. W. Edgeworth David and E. F. Pittman.—On the Radiolaria in the Devonian Rocks of New South Wales: Dr. G. J. Hinde, F.R.S.

THURSDAY, NOVEMBER 10.

MATHEMATICAL SOCIETY, at 8.—Some Secondary Needs and Opportunities of English Mathematicians: Presidential Address.—The Structure of certain Linear Groups with Quadratic Invariants: Dr. L. E. Dickson.—Multiform Solutions of certain Differential Equations of Physical Mathematics and their Applications: H. S. Carslaw.—A Discovery in the Theory of Compound Partitions: Major Macmahon, R.A., F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Rotatory Converters Prof. Silvanus P. Thompson, F.R.S.

FRIDAY, NOVEMBER 11.

ROYAL ASTRONOMICAL SOCIETY, at 8.

PHYSICAL SOCIETY, at 5.—Discussion on Mr. A. Campbell's Paper on the Magnetic Fluxes in Meters and other Electrical Instruments, to be opened by Prof. W. E. Ayrton, F.R.S.—On the Propagation of Damped Electrical Oscillations along Parallel Wires: Prof. W. B. Morton.—On the Properties of Liquid Mixtures: R. A. Lehfeldt.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Domestic Hygiene: Dr. A. W. Williams (Bell).—A Manual of the Grasses of New South Wales: J. H. Maiden (Sydney, Gullick).—Manual of Bacteriological Technique and Special Bacteriology: T. Bowhill (Edinburgh, Oliver).—The Teacher's Manual of Object Lessons in Domestic Economy: V. T. Murché, Vol. 2 (Macmillan).—Electricity made Easy: Drs. Houston and Kennelly (Sonnenschein).—Algebra made Easy: Drs. Houston and Kennelly (Sonnenschein).—The Interpretation of Mathematical Formulae: Drs. Houston and Kennelly (Sonnenschein).—A Pocket Dictionary of Electrical Words, Terms, and Phrases: Dr. E. J. Houston (Sonnenschein).—Organic Evolution Cross-Examined: Duke of Argyll (Murray).—The Groundwork of Science: Dr. St. Geo. Mivart (Murray).—The Natural History of Digestion: Dr. A. L. Gillespie (W. Scott).—Graham-Otto's Ausführliches Lehrbuch der Chemie, Erster Band, Dritte Abthg. (Braunschweig, Vieweg).—University College, Nottingham, Calendar 1898–99 (Nottingham, Sands).—An Introduction to Practical Physics: D. Rintoul (Macmillan).—The Egyptian Soudan: its Loss and Recovery: Lieuts. Alford and Sword (Macmillan).—L'Art de Découvrir les Sources et de les Capter (Paris, Baillière).—Marvels of Ant Life: W. F. Kirby (Partridge).

PAMPHLETS.—Lessons in Domestic Science: E. R. Lush, Part 2 (Macmillan).—Ein Ausflug auf den Aetna: A. Belar (Laibach, Kleinmayr).

SERIALS.—Longman's Magazine, November (Longmans).—Good Words, November (Isbister).—Sunday Magazine, November (Isbister).—Journal of the Royal Statistical Society, September (Stanford).—Transactions of the Institution of Engineers and Shipbuilders in Scotland, October (Glasgow).—Record of Technical and Secondary Education, October (Macmillan).—Chambers's Journal, November (Chambers).—Century Magazine, November (Macmillan).—Humanitarian, November (Duckworth).—National Geographic Magazine, October (Washington).—Physical Review, August (Macmillan).—Contemporary Review, November (Isbister).—Journal of the Royal Microscopical Society, October (20 Hanover Square).

CONTENTS.

	PAGE
Analytical Chemistry. By Prof. Arthur Smithells	1
Researches on Medusae. By W. A. H.	4
Our Book Shelf:—	
"Special Report on the Beet-Sugar Industry in the United States"	4
Weber: "Traité d'Algèbre Supérieure."—G. B. M.	4
Maiden: "A Manual of the Grasses of New South Wales"	5
Blim and De l'Isle: "Manuel de l'Explorateur"	5
Letters to the Editor:—	
Heredity and Fertility.—F. Howard Collins	5
"A Short History of Scientific Education."—Father A. L. Cortie	6
Organic Variations and their Interpretation.—J. T. Cunningham	7
Scientific Education in Rural Districts. By The Countess of Warwick and Prof. Raphael Meldola, F.R.S.	7
In the Forbidden Land. (*Illustrated.*) By T. H. H.	9
Bode's Law and Witt's Planet DQ. (*Illustrated.*) By Dr. William J. S. Lockyer	11
Notes	14
Our Astronomical Column:—	
New Algol Variable	17
Comet Brooks	17
The Orbit of Castor	17
The International Conference on Terrestrial Magnetism	18
Applications of Electricity. By W. H. Preece, C.B., F.R.S.	19
Recent Coral Boring Operations at Funafuti	22
University and Educational Intelligence	23
Societies and Academies	23
Diary of Societies	24
Books, Pamphlets, and Serials Received	24