As regards the want of practical application in this science, the words of Goethe are no longer true. Elsewhere he says: "There is a flavour of the monk or the old bachelor about crystallography, and therefore it is self-sufficient. Practical application in life it has none; its rarest objects—the crystallised precious stones—have to be cut and polished before we can adorn our ladies with them." But you will remember that crystallography means now much more than the study of external form; what is done by the lapidary is really much what is done by the scientific investigator—the result in both cases is to reveal the inherent but hidden beauty of the crystal.

It is, however, very true that there is a self-sufficiency about the science, and for a reason which I have already indicated: crystals can be considered as things which exist for themselves, since their nature is independent of their surroundings.

The philosophic contemplation of these beautiful and unchanging objects among the fleeting scenes of a restless world, does bring with it a philosophic content. Nowhere is the evidence of the permanent order that prevails in nature written in more lustrous and indelible characters than in the mineral kingdom.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE University of Utrecht has just celebrated its 260th anniversary by a series of brilliant *fêtes*.

MR. JOHN R. FELLOWS, of New York City, has given 5000 dols. to Notre Dame University to found scholarships.

THE University of Virginia, which suffered serious damage by fire last autumn, is being rebuilt on the plans of its founder, Thomas Jefferson, friends having subscribed a fund of 250,000 dols. for that purpose.

DR. FRANK P. GRAVES, of Brooklyn, has been unanimously elected president of the State University of Wyoming, located at Laramie. President Graves was born in 1869, and is probably the youngest college president in America.

THE *Electrical Review* states that the Baden Chamber has voted £30,000 to the Technical High School at Karlsruhe, to build a new electro-technical institute. The whole cost of the building projected, exclusive of the cost of the land, is estimated to be about £25,000. The building is to be commenced immediately, and it is expected to be ready for occupation in two years.

THE following are among recent announcements:—Dr. Paul Eisler to be professor of anatomy in the University of Halle; Dr. L. Joubin to be professor of zoology in the Faculty of Science at Rennes; Dr. H. Prous to be professor of zoology in the Faculty of Science in Lille; Dr. J. A. Wislicenus to be professor at the School of Forestry at Tarandt; Dr. G. Frege to be professor of mathematics at the University of Jena; Dr. H. Klinger to be professor of pharmaceutical chemistry in the University of Königsberg, and Dr. Scholl to be assistant professor of chemistry at Karlsruhe.

FOR the evening exhibitions in science and technology offered for competition by the Technical Education Board of the London County Council in April last, and the awards of which have recently been published, 285 candidates entered as compared with 256 last year. There is a similar increase in the number of awards, there being eighty-eight as compared with seventy-seven last session. The examiners' report: "The most noticeable feature was that the performance of candidates who selected such practical subjects as building construction, machine construction, plumbing, metal plate work, &c., was greatly superior, as a rule, to that of candidates who selected branches of pure or experimental science such as mathematics, physics, chemistry, &c." The second conspicuous fact brought to light is the complete want of ability on the part of most of the industrial candidates to deal with the simplest applications of arithmetic to their own trades. This is an old complaint of teachers of technical subjects, and the pity is that it seems as just now as ever. The children from elementary schools leave off their tuition with no knowledge of the principles of arithmetic, though some of them are experts in working ordinary "rules" as they learn to call them. The majority of the successful candidates consist of men engaged in engineering, building, carpentering and plumbing trades. It is to be hoped that one result of their work during the coming session will be to introduce them to those general principles of science on a knowledge of which a successful career in their various avocations most certainly depends.

A BRIEF history of the City and Guilds of London Institute has been received. A glance through the pamphlet should be enough to make members of the Corporation and Livery Companies of London proud of the part they have played in the advancement of technical education in this country since 1876, when, at a meeting of representatives of Livery Companies, it was resolved: "That it is desirable that the attention of the Livery Companies be directed to the promotion of education not only in the metropolis but throughout the country, and especially to technical education, with the view of educating young artisans and others in the scientific and artistic branches of their trades." It was this resolution which led to the foundation of the Institute in 1878. A few years later the Central Technical College—than which there is no more efficient institution for teaching the relations of science to industrial processes—was established. Other Colleges connected with the Institute are the Technical College, Finsbury, the South London Technical Art School, and the Leather Trades School. A very important part of the Institute's work consists of the technological examinations. These examinations have become a powerful agency in encouraging the establishment of technical schools and classes throughout the country, in assisting County Councils and other bodies in the organisation of their local schools and classes, and in securing the useful expenditure of the grants placed at their disposal under the Local Taxation Act, 1890. In 1881 the number of students in attendance at these classes was only 2500, but last year it reached 24,920. The Institute also takes part in establishing and assisting experimental classes in manual training, wood-work and metal-work, cookery, laundry-work, and housewifery, for boys and girls in elementary schools. For this provision and organisation of technical education in the metropolis and in the provinces, the total amount subscribed by the Livery Companies during the past eighteen years is, in round figures, £480,000, of which £150,000 has been expended on buildings and equipment, and the remainder on maintenance, scholarships, prizes, and grants-in-aid. The splendid work done by the various branches of the Institute more than justifies this expenditure.

ON Friday last the Prince of Wales was installed as Chancellor of the National University of Wales; and a large and brilliant company assembled at Aberystwith to witness this crowning of the movement for which educational pioneers in Wales have worked so zealously. After the installation, honorary degrees were conferred upon the Princess of Wales, Mr. Gladstone, Lord Herschell, and Lord Spencer. The three colleges comprised in the new University—Aberystwith, Cardiff, and Bangor—have all been founded within the last five-and-twenty years, and sums amounting to nearly £200,000 have been subscribed to support them. The Welsh people have from very early times shown a desire for knowledge, and now they have a truly national University they will doubtless take still greater pride in developing their heritage. The Vice-Chancellor, Principal J. Viriamu Jones, F.R.S., told the history of the foundation of the University to the Welsh National Society of Liverpool in November last, and a copy of his address, which is published at the offices of the *Western Mail*, Cardiff, was received a few days ago. The need for the University definitely emerged from a proposal adopted by the Cymmrodorion Section of the National Eisteddfod in 1887, that teachers in elementary schools should be trained at the University Colleges. The need was again felt when the Welsh Intermediate Education Bill became law in 1889, for a question which had to be considered in connection with the Bill was the nature and constitution of the authority to which the work of inspecting and examining the intermediate schools should be committed. For these reasons, and because educational pioneers in Wales felt that the existence of a national University was essential to the vitality of the colleges, the foundation of such a University was urged nine years ago, and now what was then ideal has become a fact. Some remarks by Principal Jones on the functions of a teaching University such as that of Wales are not without interest to those who cherish the hope that a teaching University of London may eventually be established. He says:—"It is certainly part of the ideal of any university institution that its professors should be leaders in the departments of scholarship or science which they profess, and that, as such, they should help to frame the courses of study leading to graduation.

Colleges incorporated in a teaching university have this opportunity. Originality of thought has fuller encouragement, and new educational methods have freer play than can possibly be the case in a college of which the students have no other avenue to a university degree than examination by a wholly external examining body like the University of London, however excellent be the conduct of its examinations. An atmosphere of intellectual independence is of the essence of true academic life. The true scholar must breathe it as his native air. And this is not the language of mere theory. It has its immediate practical application on the scientific side. The trained student of science, for instance, entering on manufacturing pursuits should do so with free inquiring eye, ready to believe that it may have been reserved for him to make a discovery of immense value to the industry to which he is devoting himself. I believe that this freedom of spirit is far more likely to be developed and fostered in a teaching university than in a college bound to teach on certain rigid lines laid down by an authority in which it has no part." The first object of the founders of the University of Wales is to ensure that all students of the University shall receive good teaching and thorough training before proceeding to graduation. By this means the University will be made a real force for the advancement of learning in the Principality.

SCIENTIFIC SERIALS.

Bulletin of the American Mathematical Society, vol. ii. No. 8, May 1896.—"The Arithmetising of Mathematics" is an excellent translation, by Miss Maddison, of Bryn Mawr College, of an address delivered by Prof. Felix Klein, before the public meeting of the Royal Academy of Sciences of Göttingen, on November 2 of last year. In it Prof. Klein explains his position in regard to an important mathematical tendency which he remarks has for its chief exponent Weierstrass, whose eightieth birthday has been lately celebrated. This tendency he calls the *arithmetising* of mathematics. Like all the author's addresses, this one, now rendered easily accessible to English mathematicians, will repay study.—Next follow three carefully drawn-up reviews, viz. by R. A. Roberts, on a second edition of Darboux's classic treatise, "Sur une classe remarquable de Courbes et de surfaces Algébriques et sur la théorie des Imaginaires." It is matter of regret, Mr. Roberts says, that the author has not devoted some more time to a subject which offered him once such a fruitful field for original investigation.—Then Prof. Bôcher examines in detail the "Treatise on Bessel Functions, and their Applications to Physics," by Messrs. Gray and Mathews. He well shows that the writers have by their work filled a real gap in mathematical literature.—In his notice of Miss Scott's "Introductory Account of certain Modern Ideas and Methods in Plane Analytical Geometry," Prof. F. N. Cole states it to be a minor excellence of the book that it is written in the English of English speaking and writing people, *i.e.* there are no abbreviations, and such like, which necessitate constant reference to a "list of signs," &c. He looks upon Miss Scott's performance as a compact, scholarly work on the more accessible principles and methods of modern analytical geometry. "It exhibits to a marked degree that genial breadth of treatment and conciseness which are associated only with mature scholarship and extensive and accurate information." His summing-up of warm approval is that he knows of no introductory work which is better adapted, in the particulars he indicates, for the use of those who desire not merely to learn, but also to master geometry.—Prof. H. B. Newson, in a note on "A Remarkable Covariant of a System of Quantics," calls attention to a covariant of a system of n quantics in n homogeneous variables. He states two important geometric properties of this covariant which, *pro tem.*, he calls the Cremonian. (1) The Cremonian of U, V, and W is the locus of the point (x', y', z') whose first polars with respect to U, V, and W have a common point; the locus of these common points is, of course, the Jacobian. (2) The Cremonian of U, V, and W is also the locus of (x, y, z) the point of intersection of the polar lines of (x', y', z'), with respect to U, V, and W, *i.e.* it is the locus of the point of intersection of the polar lines of the points on the Jacobian. The author gives other results of interest, and hints at an extension of the conception of the Cremonian to spaces of higher dimensions.—Much interesting matter is given in the Notes, and a list of recent publications fills up a big number of 44 pages, in place of the usual 32 pages.

Symons's Monthly Meteorological Magazine, June.—The worst gale of the nineteenth century in the English Midlands (continued). A map is given showing the path of the storm from South Wales to Lincolnshire between 11 a.m. and 4 p.m. on Sunday, March 24, 1895. The average velocity of translation was about sixty miles an hour, and the disturbance appears to have been caused by a subsidiary depression formed over the south of Ireland, during a well-marked cyclone which lay over the northern parts of our islands on the same day. Great disaster was caused along its track, and fourteen deaths were reported. There were also more than a dozen cases of windows and gables being blown *out*, owing to the expansion of air inside the buildings during the passage of diminished atmospheric pressure.—Fog, mist and haze, by a Fellow of the Royal Meteorological Society. This is a continuation of the discussion raised in the preceding number of the *Magazine* (NATURE, June 4, p. 118). The writer agrees generally with the definitions proposed, as a practical scheme, based on a correct view of the phenomena, but he thinks that the difference between fog and mist should not rest upon what can be seen with the naked eye—a test in which two persons would be very apt to disagree.

THE enlarged issue of the *Journal of Botany* still continues to be occupied almost entirely with papers on descriptive botany, and chiefly relating to the flora of the British Isles. In the numbers for May and June, Prof. R. Chodat describes some new species of *Polygala* from South Africa; and Mr. W. H Pearson a new liverwort, *Plagiochila Stableri*, from Rydal.

THE papers in the *Nuovo Giornale Botanico Italiano* for April, and in the *Bulletino della Società Botanica Italiana*, Nos. 2-4, relate almost entirely to the flora of Italy. In the former, Signor S. Sommier describes and figures an interesting hybrid between *Ophrys bombyliflora* and *O. tenthredinifolia*. In the latter is an abstract of an article by Signor B. Longo, on the mucilage of the Cactaceæ.

Bulletin de la Société des Naturalistes de Moscou, 1895, No. 3.—On considerable perturbations of atmospheric pressure in the year 1887, by B. Sresnewskij. A research into the relations between the said perturbations, the movements of cyclones, and the local weather predictions based on the study of the same; as also their relations, both to the groups of areas of minimal pressure and to the distribution of temperature (in German).—Materials for the Amphibia and Reptile fauna of the Orenburg region, by N. Zarudnyi. List of eleven species of the former, and fifteen species of the latter (Russian).—*Aquila Glitchii*, Severtsoff, a biological sketch, by P. Suschkin, in German, with two plates.—Note on *Posidonomya buchi* of the Balaclava schists in Crimea, by M. D. Stremoouchow, with a plate.—On Russian Zoocecidiæ and their makers, by. Ew. H. Rübsaamen, based on a collection made by Madame Olga Fedchenko and her son Boris Fedchenko. No less than 120 galls and their occupants from various parts of Russia and Caucasia are described.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 11.—"On the Relations between the Viscosity (Internal Friction) of Liquids and their Chemical Nature. Part II." By Dr. T. E. Thorpe, F.R.S., and J. W. Rodger.

In the Bakerian Lecture for 1894 the authors gave an account of their work on the viscosity of some seventy liquids, and they discussed the interdependence of viscosity and chemical composition. In order to render their investigation more complete, they have now made measurements of the viscosity of (1) a number of esters or ethereal salts, and (2) of ethers, simple and compound—groups of liquids, which with the exception of a single member, ethyl ether, have not hitherto been studied by them. The physicochemical relationships previously established made such determinations of special interest, for it was shown that one of the most striking of the various connections traced between chemical constitution and viscosity was the influence exerted by oxygen according to the different modes in which it was assumed to be associated with other atoms in the molecule. The influence which could be ascribed to hydroxyl-oxygen differs to a most marked extent from that of carbonyl-oxygen, and it appeared that ether-oxygen, or oxygen linked to two carbon atoms, had also a value which differed considerably from oxygen in other conditions.