

were obtained in the most favourable conditions for securing the total quantity ejected at a single bite, whereas in actual practice the conditions are less favourable for the insertion of the total available venom into the tissues of the victim.

Reverting now to determinations of the minimum-lethal dose for the lower animals, we find that if the minimum-lethal dose for the cat be adopted as being the same as that for man, the total quantity of dry cobra-venom required to kill a man of ten stones weight would be .317 gramme, which is considerably more than the quantity, judging from the above averages, that a cobra is usually able to eject during a single bite. It would therefore appear necessary to assume that the minimum-lethal dose per kilogramme for man is smaller than for a cat; but, as it is probably greater than for a rabbit, we may for convenience assume that it is twice that dose. In this case, the smallest quantity required to produce death in a man of ten stones would be about .0317 gramme, which, however, seems to be considerably less than the quantity which a fresh cobra has at its disposal. Applying now the facts that have been stated in the series of experiments where the smallest quantity of antivenene required to prevent death when injected thirty minutes after twice the minimum-lethal dose was determined, it will be recollected that that quantity is 5 cc. per kilogramme of animal. Taking this as a basis for the dose of antivenene, in order to prevent death in man from the estimated minimum-lethal dose of cobra-venom, so considerable a quantity as 330 cc., or about 11½ ounces, of antivenene would be required, if the antivenene be injected not much longer than thirty minutes after the bite had been inflicted. This, though a large, is by no means an impossible dose, and it could, without much inconvenience, be introduced under the skin at several parts of the body.

On the other hand, the estimate which I have adopted of the minimum-lethal dose for man may be too high a one, and if it should prove to be nearer that for the rabbit, then the quantity of antivenene required to prevent death, if administered half an hour after the snake-bite, would be reduced to about four ounces. It is also to be recollected that if dry antivenene be used, it may be dissolved in a much smaller quantity of liquid than is required to restore it to its original bulk.

As to the probability, in a fatal snake-bite, of the quantity of venom received by the victim being only about, and not much in excess of, the minimum-lethal dose, it would appear that, in many cases, even so large a dose is not introduced; for general experience indicates that the majority of persons who are bitten actually recover, whatever treatment is adopted. Sir Joseph Fayrer also shows, in his classical "Thanatophidia," that in 64 per cent. of fatal cases of snake-bite in India, the victims survived the infliction of the bite for periods of from three to twenty-four hours; and this duration of life implies that the dose of venom received, could not have been much greater than the minimum-lethal.

It must be admitted, however, that even for the minimum-lethal dose of venom, the quantity of antivenene required to prevent death in man is probably inconveniently large, especially if, in the treatment, reliance is placed solely upon the administration of antivenene, to the exclusion of all or several of the auxiliary measures to which I have referred. It is desirable, also, that the antivenene treatment should be a practical one, not only for doses of venom which do not much exceed the minimum-lethal, but also for the considerably larger doses that are occasionally introduced in snake-bite.

To attain this object, further work is required in order that there may be obtained an antivenene even more powerful than that whose antidotal capabilities I have described.

I am not sanguine that this will be accomplished by carrying to a higher degree the process of artificial protection in animals. A comparison of the antivenene of rabbits which had last received thirty times the minimum-lethal dose of cobra venom with that of other rabbits which had last received fifty times that dose, has shown that the latter has but little antidotal advantage over the former, and has suggested that, in the process of artificial protection, the saturation point of the blood for antivenene is reached before the possible maximum non-fatal dose of venom has been administered.

I would anticipate with more hope the results of endeavours to separate the true antivenomous principles from the inert constituents of the blood-serum with which they are mixed; and although the required chemical manipulations are attended with many difficulties, some success has already been obtained in effecting this separation.

In the foregoing remarks, it has, however, been shown that even with the antivenene whose properties have been described, human life may be saved in a considerable, if not in a large, proportion of the cases of snake-bite, which would otherwise terminate in death. The attainment of this result is a satisfactory one; for the mortality from snake-bite is large, and is not restricted to the 20,000 deaths which annually occur in India, but includes additional thousands in all the tropical and sub-tropical regions of the world. THOMAS R. FRASER.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE Drapers' Company have voted £50 to Mr. Percy Williams, a student at University College, London, towards paying his expenses of post-graduate study. Mr. Williams was placed first in honours in his chosen faculty at the B.Sc. Examination of last year in connection with the London University.

IT is stated that the total subscriptions promised for the new building fund of the University College of South Wales and Monmouthshire amounts to over £16,000. The Treasury has authorised the payment of £10,000 to the building fund, this being half the sum promised by her Majesty's Treasury on condition that £20,000 was collected in South Wales and Monmouthshire by July next.

THE University of Utrecht will celebrate its "260th lustrum" during the month of June next. The occasion will be rendered specially interesting by the *fêtes* which will be given by the students, and which will include their traditional masquerade and an elaborate old world tournament. It is expected that the ancient city will be visited by numerous strangers during the commemoration.

A MUNICIPAL school of science and art was opened at Bideford on Wednesday, April 15. For some time past instruction in science and art has been given with great difficulty in ill-fitted and unsuitable rooms. The cost of the new school will be about £3000, towards which the County Council have contributed £500 (with a promise of £75 towards science apparatus), the Science and Art Department will grant £650, and a penny rate has yielded £700.

WE learn from the *Athenæum* that the Committee of the Aberdeen University Council, which has been considering measures for the extension and better endowment of the university, has issued a report enumerating, "among its more pressing wants," the enlargement of the library, laboratory, and museums, a botanic garden, residential halls for both sexes, seven new professorships, and fifteen lectureships. The report also advises the establishment of an Aberdeen University Association, on the model of the Edinburgh Association.

ON Tuesday, April 14, the Right Hon. Sir William Hart-Dyke visited Bath and opened the northern wing of the new municipal buildings which has been appropriated to the purpose of technical schools. The building, which cost £30,000, was commenced about eighteen months ago, and comprises four floors. The basement consists of workshops and mechanical and electrical laboratories; the ground-floor includes large and small lecture-rooms, and accommodation for the library and lecturers' and directors' rooms. The first-floor constitutes the school of art, while the second-floor contains a domestic department and chemical and physical laboratories.

A CONFERENCE on Secondary Education was opened on Tuesday in the Senate House, Cambridge, under the presidency of the Vice-Chancellor of the University. A resolution generally approving of the scheme set forth in the report of the Royal Commission on Secondary Education, and expressing a hope that legislative measures in accordance with that report would be passed, was carried by 128 to 41 votes. A resolution approving the establishment of local authorities for secondary education was also carried, after considerable discussion. Resolutions were subsequently agreed to in favour of the establishment of a separate central authority for secondary education, and of the preservation of the freedom, variety, and elasticity which have hitherto characterised secondary education in England.

THE following are among recent appointments abroad:—Dr. Paul Czermak, *privat-docent* in Physics in Gratz University, to be extraordinary professor; Mr. James Edwin Lough to be

instructor in experimental psychology in Harvard University; Dr. Charles Palache, instructor in mineralogy, and Mr. R. J. Forsythe in metallurgy and metallurgical chemistry; Baron Eötvös to be full professor of experimental physics in the University at Buda-Pesth; Dr. O. Hildebrand to be extraordinary professor of surgery in Berlin University, and Dr. Oestreich to be *privat-docent* in general and anatomical pathology; Dr. Klecki to be *privat-docent* in general and experimental pathology at Cracow.

THE new Franco-Scottish Society was inaugurated in Paris last week at the Sorbonne. The objects of the Society are to bring the universities of France and Scotland into connection with each other by study in the one and the other of their respective students, to bring about intercourse between their professors and other officers, to promote historical research concerning the ancient relations between the two countries, in general by periodical meetings held in France and Scotland, and all other means, to renew, as far as possible, the bonds of sympathy between them. About forty delegates attended on behalf of the Scottish universities and interest in higher education; and on the French side, the Paris University and Upper Schools were represented by their chief authorities. Among the subjects discussed was the place of political science in higher education. The congress terminated with a banquet, at which M. Jules Simon presided, given to the Scottish guests by their French colleagues on Saturday.

REFERRING to the late Mr. George Holt, whose death we briefly announced a fortnight ago, the *Lancet* remarks that he took the greatest interest in University College, Liverpool—an interest substantially shown by his first subscription of £10,000 which was requisite to complete its equipment for incorporation in the Victoria University. It was in its medical school that he took a special interest, and his benefactions to it have been numerous. The chairs of Physiology and Pathology were endowed by him in the amount of £10,000 each, to which was added a further sum of £10,000, for the maintenance of laboratories in those branches of investigation. In addition to these benefactions he presented its medical faculty in 1886 with the sum of £2000 for distribution during the ten succeeding years in tutorial scholarships of the value of £100 each. He further fitted up in a complete manner Ashton Hall as a pathological and bacteriological laboratory, which is one of the most complete of its kind in this country. This does not exhaust the list of his benefactions; a further sum of £1000 was given as a donation to the college library, to be expended in annual instalments of £100. He was also a generous contributor to the maintenance fund of the college and a warm friend of education in general. Indeed, it is probably as a benefactor of University College that his name will live longest in local memory.

THE Teacher's Registration Act, which was recently introduced in the House of Commons without comment, is a direct outcome of the work of the late Commission on Secondary Education. Though the Registration Council which it is proposed to establish is not exactly that suggested in the Report of the Commissioners, it will prove quite satisfactory to most of those whose interests are concerned. The Council is to consist of eighteen members—six, appointed by Her Majesty with the advice of her Privy Council; six, elected by the Universities, one by each of the following—Oxford, Cambridge, Durham, London, Victoria, and Wales. Two members chosen by registered teachers engaged otherwise than in elementary schools, two chosen by elementary teachers, and two by registered teachers generally. It is provided by the Act that no person shall be admitted to the register unless he possesses (a) "a degree or certificate of general attainments which is granted by some university or other body recognised for that purpose by the Council, and is accepted as satisfactory by the Council; (b) a certificate or diploma of adequate knowledge of the theory and practice of education and of practical efficiency in teaching, which is granted by some university or other body recognised for that purpose by the Council." Teachers in elementary schools are to be admitted to the register on the same terms as those engaged in secondary schools. It is further to be enacted that if any person (a) "wilfully makes or causes to be made any falsification in any matter relating to any register under this Act, or (b) by false representation procures himself to be registered under this Act, or not being so registered fraudulently represents himself as

being so registered, he shall be guilty of misdemeanour, and shall on summary conviction be liable to be imprisoned with or without hard labour for any term not exceeding twelve months." Teachers of proved attainments and competence who are at present engaged in teaching are to be admitted to the first register.

#### SCIENTIFIC SERIALS.

THE numbers of the *Journal of Botany* for March and April are again almost entirely occupied by descriptive papers.—Mr. G. Murray describes a new species of *Caulerpa* from South Africa. A number of new fungi are described by Mr. G. Masee, including a new genus *Clypeum*, with no near affinities.

THE second part of vol. vii. of Cohn's *Beiträge zur Biologie der Pflanzen* contains three papers.—Dr. O. Kirchner describes the root-tubercles of the Soja-bean, which, like those of other plants belonging to the pea-tribe, are caused by a microbe; large quantities are found imbedded in the tissue of the tubercle, and he regards them as belonging to a new species, which he names *Rhizobacterium japonicum*, found in the soil of Japan. As in other cases, the relation of the microbe to the host is a symbiotic one, enabling it to absorb into its tissues the free nitrogen of the atmosphere.—T. Rosen contributes a chapter to his *Beiträge zur Kenntniss der Pflanzenzellen*, in an account of the nuclei and nucleoles in meristematic and sporogenous tissues. It is a very important contribution to our knowledge of the intricate phenomena connected with cell-division, and of the part played by the nucleus and its nucleoles in the process.—Dr. E. Heinricher describes the structure and function of the haustoria of the parasitic genus *Lathraea* or toothwort, especially of the two species *L. squamaria* and *L. clandestina*. From various points of structure he concludes that *Lathraea* is more nearly allied to the typical *Scrophulariaceae* through *Rhinanthus*, than it is to the *Orobanchae*, under which it is usually placed.

#### SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 10.—"Helium: a Gaseous Constituent of Certain Minerals. Part II. Density." By William Ramsay, F.R.S.

The gas obtained from the minerals bröggerite, samarskite, and fergusonite is rich in hydrogen, but contains only an infinitesimal quantity of nitrogen; carbon dioxide and helium are also evolved, but no gas of new spectrum, even in samples not passed through the usual absorbents, soda-lime and phosphoric anhydride. From 1 gram of clèveite, 7.2 c.c. of helium is obtainable; 1 gram of bröggerite yields less than 1 c.c.; 1 gram of samarskite, about 0.6 c.c.; and 1 gram of fergusonite 1.1 c.c.

The density of the samples of gas from these various minerals appears to show small, but real differences. That from clèveite was found to be 2.205 (oxygen = 16), but Langlet found a sample from the same source to possess the density 2. The helium from bröggerite has the density 2.18; that from samarskite 2.12, and that from fergusonite 2.14. These differences are small; but as they are the means of several determinations with different preparations, and as the individual determinations differ less among themselves than the densities of specimens from different minerals, there appears ground for the supposition that helium is a mixture. The possibility of this conclusion is strengthened by the fact that the relative intensity of the lines in the spectrum of the gas from clèveite is different from that of the samples from bröggerite, samarskite, and fergusonite; and this difference, indeed, is visible without the aid of a spectroscope, for the clèveite gas has a richer shade of yellow, tending towards orange, than that from the other minerals; the colour of such samples is a purer yellow. Moreover, there are certain faint lines in the blue-green in the spectrum of the clèveite gas, which have not been observed, even under the most favourable circumstances, with "end-on" tubes, in that of the gas from other sources.

The author is engaged in an attempt to separate the possible constituents of helium.