with regard to species and individuals. In the *Investigator* collection twenty-nine species are placed in this family, and the Molpadiidæ and Synaptidæ are well represented. The authors have found it necessary to form ten new genera, and a seventh family—the Gephyrothuridæ—has been added to the Aspidochirotæ.

There was a large number of specimens of the genus Pelopatides and its allies in the collection, and the authors were given an opportunity of revising the genus. Five new genera were established to receive forms closely related to Pelopatides. Dendrothuria is peculiar in having dendrochirote tentacles and an enormously developed pharynx. Pseudothuria has no single distinctive characteristic, but all its characters taken together separate it from the neighbouring genera. The genus Allopatides has been formed from a single specimen, and its main difference from Pelopatides appears to be the richly dendritic form of the spicules. It may be doubted whether this difference is of generic value, especially as some species of Pelopatides also possess branched spicules not differing greatly from those in the new genus; the difference appears to be merely one of degree. The genera Perizona and Bathyzona have been formed mainly with regard to the position of the pedicels. Five other new genera are also described.

The new family—Gephyrothuridæ—is founded on two specimens which differ from all other Aspidochirotes in the possession of ambulacral appendages on the bivium only. In external appearance this form somewhat resembles the Molpadiidæ.

The collection includes some forms described by Walsh in 1891; the authors have deemed it necessary to remove all his species to other genera.

With every increase in our knowledge of the deep-sea fauna, it becomes more possible to formulate with some degree of completeness definite ideas as to the distribution and the mode of evolution of the deep-sea forms; and the work under notice is of importance in this respect, suggesting as it does many interesting points in zoological distribution.

Comparing the *Siboga* list of deep-sea Holothurians with that of the *Investigator*, it is surprising to find that in the two collections from adjacent areas there are only six species common to both. The two gatherings are almost entirely dissimilar with regard to the species present, but an examination of the genera shows a close similarity. It is perhaps noteworthy that those species common to both districts are not confined to the eastern portion of the *Investigator* area, as one might expect, but are scattered equally throughout it.

Of the fifteen species previously described, six are Atlantic and five Pacific forms; there are three species in the collection the distribution of which has hitherto been limited to the Atlantic.

The descriptions are clear and not too scanty, as is often the case, and the plates are good. Altogether the authors have made a most valuable contribution to the subject, and they appear to have done extremely well with material that was evidently not in the best state of preservation.

J. P.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The following decrees were approved by Convocation last Tuesday:—The curators of the University Chest were authorised to pay a sum not exceeding 150*l.* to the professor of botany to enable him to provide for the teaching of forest botany, until the appointment of a Sibthorpian professor under the new statutes of St. John's College.

Mr. Henry Balfour, Fellow of Exeter College, was reappointed curator of the Pitt-Rivers museum for seven years at a stipend of 200*l.* a year, and the annual grant of 200*l.* to the museum was renewed for seven years.

An examination will be held next February for a Radcliffe Travelling Fellowship of the annual value of 200*l.*, and tenable for three years. Candidates must have qualified for the degrees of B.A. and M.B., and have been placed in the first class in a university examination, or have gained a university prize. Names should be sent to the Regius professor of medicine.

The following is a list of the probationers for the Indian Forest Department and the Sudan nominated in 1905, with the colleges to which they are now attached:—C. W. Armstrong, scholar of Jesus College, Oxford; G. C. Clarence, Magdalen College, Oxford; T. Clear, science exhibitioner of Balliol College, Oxford; C. G. E. Dawkins, Balliol College, Oxford; C. C. Gaunt, exhibitioner of St. John's College, Oxford; H. S. Gibson, Trinity College, Oxford; H. M. Glover, mathematical demy of Magdalen College, Oxford; J. Gunn, Edinburgh University, now at St. John's College, Oxford; J. K. Hepburn, Queen's College, Oxford; N. W. Jolly, Adelaide University, now at Balliol College, Oxford (Rhodes scholar); W. A. H. Miller, St. John's College, Oxford; A. J. W. Milroy, Christ Church, Oxford; A. A. F. Minchin, Exeter College, Oxford; R. L. Robinson, Adelaide University, now at Magdalen College, Oxford (Rhodes scholar); E. A. Smythies, Christ's College, Cambridge, and Balliol College, Oxford; and G. C. Wilson, Queen's College, Oxford.

The Government of Mysore has sent two forestry students, M. M. Machaya and B. V. Ramaiengar, both of St. John's College, Oxford, and of Madras University.

CAMBRIDGE.—The Forestry Syndicate has now issued its detailed report on the scheme for establishing a diploma of forestry. It is proposed that a committee of the Board of Agricultural Studies be appointed to be called the forestry committee, the duty of which shall be to manage the examinations in forestry and to direct the instruction and training of candidates for the diploma. Details as to the constitution and duties of the committee are printed in this week's *Reporter*.

The general board of studies has appointed Mr. J. G. Leathem, St. John's College, university lecturer in mathematics from Christmas, 1905, until Michaelmas, 1910, and has re-appointed Mr. C. T. R. Wilson, Sidney Sussex College, university lecturer in experimental physics from Christmas, 1905, until Michaelmas, 1910; both these appointments have been confirmed by the special board for physics and chemistry.

Mr. A. C. Seward, of Emmanuel College, has been appointed chairman of the examiners for the natural sciences tripos, 1906.

The late Mr. G. R. Crotch, of St. John's College, some years ago left his collections of insects and his books to the Museum of Zoology, and also after the death of certain relatives his personal estate to the same museum. His brother, Mr. W. D. D. Crotch, who recently died, has left his residuary estate, the value of which is about 8000*l.*, to the same museum.

SIR ALEXANDER R. BINNIE will distribute the prizes at the Merchant Venturers' Technical College, Bristol, on Thursday, December 21.

THE Public Schools Science Masters' Association will meet for the annual conference on January 20, 1906, at Westminster School. The president for the year, Sir Oliver Lodge, will speak on the place of science in general education. Papers will be read upon the army examination and on the possibility of introducing a comprehensive syllabus of science teaching within the time limits of a classical curriculum. After the conference there will be an exhibition of scientific apparatus by various makers in the new science buildings of Westminster School.

THE North of England Education Conference will be held at Newcastle-upon-Tyne on Friday and Saturday, January 5–6, 1906. Among the subjects to be discussed are the following:—The teaching of elementary mathematics, paper by Prof. R. A. Sampson, F.R.S.; openers of discussion, Dr. Jude and Mr. J. H. Kidson. Regulations for secondary and higher elementary schools, papers by Mr. W. Edwards and Mr. W. J. Abel; openers of discussion, Miss M. Moberly and Mr. P. M. Greenwood. Organisation of evening classes, papers by Principal J. H. Reynolds and Mr. J. Crowther; opener of discussion, Mr. A. M. Ellis. Physical Training, papers by Prof. T. Oliver and Captain H. Worsley-Gough; openers of discussion, Dr. Ethel Williams and Captain F. C. Garrett. All com-

municications with reference to the conference should be addressed to the hon. secretaries, Mr. Alfred Goddard and Mr. F. H. Pruen, Education Offices, Northumberland Road, Newcastle.

SEVERAL changes have taken place, we learn from *Science*, in the staff of the research laboratory of physical chemistry of the Massachusetts Institute of Technology. Prof. W. D. Coolidge has accepted a position in the technical research laboratory of the General Electric Company at Schenectady. To Prof. Coolidge has been due in large measure the development of one of the most important lines of work in progress in the research laboratory of the institute—the investigation of the conductivity of aqueous solutions at high temperatures. Mr. Yogoro Kato, who has also been engaged on the conductivity investigation for two years, has accepted a position in the Technical High School of Tokio, where he will have charge of the work in electrochemistry. Dr. Wilhelm Böttger will return as privatdocent to the University of Leipzig, at which he will conduct one of the laboratory courses in analytical chemistry. In place of these retiring members, Messrs. William C. Bray, Guy W. Eastman, Gilbert N. Lewis, and Edward W. Washburn have been appointed to the research staff.

AT the distribution of prizes to the students of the Mechanics' Institute, Crewe, on November 22, Sir Oliver Lodge delivered an address. He emphasised the importance of the study of pure science and the application of its broad principles, whereby it is possible to make discoveries and to ascertain facts which are not known to the human race. After all the ages of the human race there are innumerable facts which we do not know, and it is now and then given to a man here and there to find them out and pass them on as common property never more to be lost. Sir Oliver Lodge went on to say he does not believe that a thing which really exists can go out of existence. There is an infinitude before us, and it behoves us to realise that and see to it that we fit ourselves for what is to come. We are parts of an industrial organism, parts of a much larger organism, the universe, and in the universe there is one great law of evolution, of growth, and development. The universe is not yet perfect; it is our privilege to help in the process of making it more perfect. Things will not be done on this planet unless we help to do them; we are agents for helping in the process of evolution. Errors or mistakes may cause dislocation or calamity in the great scheme. We have the power of causing dislocation or calamity by errors, or by living strenuous self-sacrificing lives we have the power of cooperating in the great scheme of helping towards the fruition, development, growth, and progress of the universe of which we are an infinitesimal part.

THE inaugural address delivered by Dr. B. C. A. Windle, F.R.S., president of Queen's College, Cork, at the opening of the session, is given the first place in the current number of the *University Review*. Dr. Windle deals in an exhaustive manner with the subject of examinations in Ireland and with the university question. Four deadly errors, he maintains, have long affected England and Ireland. These errors are that acquisition of knowledge and education are synonymous terms; that education—as apart from mere knowledge—can be easily, nay, more, can only be tested by examination; that a degree is in itself an object of value; and that a degree means the same however and wherever it may have been acquired. Dr. Windle regards examinations as an evil, but at present a necessary evil, and proceeds to discuss the objects such examinations should have in view. By means of an examination, Dr. Windle explains, an endeavour is made to ascertain whether the candidate has acquired the necessary knowledge of facts to enable him to proceed to a further stage of learning or—at the end of his course—a sufficient knowledge of his profession to be trusted to go out into the world and practise it independently. An examination is intended, moreover, to ascertain whether a student has acquired the proper methods of gaining and applying knowledge. To secure efficient examinations, the article lays it down, every teacher should take a large share in any examination which his students may have to confront, but the judgment of the teacher should be supported or corrected by the assistance of an external examiner. The conclusion of the article is that there is at present in Ireland, for the great majority of its inhabitants, "a university system which almost necessitates a method of examination which is harmful in its effects on education; a method which leads to subterranean complaints and accusations, which, though they may be, and almost invariably are, false, are none the less injurious to education generally; a method for which, indeed, no excuse can be urged except the excuse that the system arises out of the necessities of a position which never ought to have been created."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, Received September 28.—"Researches on Explosives." Part iii. Supplementary Note. By Sir Andrew **Noble,** Bart., K.C.B., F.R.S.

Since communicating to the Royal Society "Researches on Explosives," part iii., the author has succeeded in obtaining the paper (*Preuss. Akad. Wiss. Berlin Sitz. Ber.*, vol. v. p. 175) by Messrs. Holborn and Austin on the "Specific Heat of Gases at High Temperatures."

The attention of these investigators has been specially directed to carbonic anhydride, and their researches show a considerable (but rapidly decreasing) increment in the specific heat of CO_2 with increase of temperature.

If we suppose the same law of increment which appears to rule up to 800° C. to remain unaltered up to 1300° C., the increments at that temperature would vanish, and, if this be so, the author finds that the specific heat of CO_2, at constant volume, should be taken at 0·2111.

He has therefore re-calculated the specific heats given in his recent paper, and as the specific heats of the exploded gases at constant volume are reduced, the temperatures of explosion given in his paper should also be reduced.

The temperatures the author gives have been obtained by two different methods, firstly, by dividing the heats determined by the calorimeter by the specific heats, and, secondly, by using the equation of dilatibility of gases, and determining the temperature from

$$t = p - p_0 / 0{\cdot}00367 p_0 \qquad (1)$$

where p is the pressure in atmospheres obtained from the explosion, and p_0 the pressure in atmospheres when the volume of gases generated is reduced to 0° C. and 760 mm. bar. pressure.

The differences of the results are very remarkable.

Taking, for example, cordite as an illustration, it will be seen that for the four highest densities given the temperatures derived from the two methods are but slightly different. At the higher density (0·5) the temperatures are 5275° C. and 5263° C., the higher being that derived from equation (1); at density 0·45 the temperatures from the two methods are identical, at density 0·40 the temperatures are 4902° C. and 4970° C., the lower temperature being from equation (1), but after density 0·35 the temperatures derived from equation (1) fall very rapidly.

The same general results are observable in the other two explosives experimented with, and it should be noted that in all three explosives, at the highest densities, the temperatures given by equation (1) are greater than those obtained by the second method.

The figures for the three explosives are given below, the temperatures obtained from $\frac{\text{units of heat}}{\text{specific heats}}$ [1] being given in italics.

Cordite.

D=0·50	D=0·45	D=0·40	D=0·35	D=0·30	D=0·25
5275°	5090°	4902°	4710°	4480°	4165°
5263	*5090*	*4970*	*4860*	*4800*	*4770*

D=0·20	D=0·15	D=0·10	D=0·05
3838°	3490°	3140°	2775°
4760	*4760*	*4790*	*4800*

M.D.

D=0·45	D=0·40	D=0·35	D=0·30	D=0 25	D=0·20
4713°	4494°	4200°	3920°	3585°	3240°
4624	*4411*	*4215*	*4070*	*3945*	*3870*

D=0·15	D=0·10	D=0·05
2890°	2530°	2160°
3840	*3830*	*3860*

[1] Water gaseous.