THE ROYAL INTERNATIONAL HORTICULTURAL EXHIBITION.

THE Royal International Horticultural Exhibition which has just been held in the grounds of the Royal Hospital, Chelsea, possessed considerable scientific and educational interest. In the first place, a whole tent was devoted to scientific exhibits contributed by Prof. Bateson, Prof. Keeble, Prof. Balfour, the director of the Rothamsted Experimental Station, the Board of Agriculture and Fisheries, the Wye Agricultural College, Messrs. James Veitch and Sons, Mr. Backhouse, of the Innes Horticultural Station, Mr. William Cuthbertson, and others, whilst a most excellent exhibit of specimens of injurious insects, contributed by Mr. Georges Truffaut, of Versailles, was staged in the tent specially reserved for French exhibits.

Then there were two conferences held under the presidency of the Rt. Hon. A. H. Dyke Acland, one on Thursday, May 23, on horticultural education, and another on the following day on the subject of legislation in connection with insect pests. At the education conference the papers included one from Prof. L. H. Bailey, Cornell University, U.S.A., on horticultural education in America; Herr K. Weinhausen, Berlin, on horticultural education in Germany; Mr. W. Hales, on the education of a gardener; and Prof. A. Buyssens, of the School of Horticulture, Vilvorde, Belgium, on horticultural education in Belgium.

At Friday's conference Prof. Ritzema Bos, Holland, contributed a paper on the value of importation regulations as a means of preventing the introduction of plant pests from abroad; A. G. L. Rogers (Board of Agriculture), on the aim of legislation in Great Britain; H. Maxwell Lefroy, imperial entomologist for India, on legislation in connection with insect pests; H. J. Gussow, botanist to the Canadian Government, on legislation in connection with fungus diseases; and A. W. Sutton, Reading, on import dues and regulations.

Both conferences were fairly well attended, and the second one particularly appeared to excite much interest. The committee intend to get all the information possible on both subjects, and their report, together with the papers contributed to the conferences and the discussion, will be printed in the official report.

The exhibition will also be famous for the notable speech delivered by the Rt. Hon. Walter Runciman, President of the Board of Agriculture, at the jurors' luncheon. Mr. Runciman spoke very sympathetically respecting the proposed national diploma for gardeners, and though not pledging the Government to any particular line of action, he said that "whatever is best in the interests of horticulture in the allotting, organising, and examining for diplomas shall receive full assistance from the department over which I preside." Mr. Runciman then proceeded to make an even more notable announcement, namely, that he had created a horticultural branch of the Board of Agriculture, the interests of which will be devoted exclusively to horticulture, and near the head of that branch it was proposed to appoint one of the best entomologists the country can furnish.

AN EARLY CRETACEOUS FLORA.[1]

THE coastal plain of Maryland, a region forming part of the Atlantic slope which extends from the crest of the Alleghanies to the sea, consists of Mesozoic and Tertiary strata deposited in orderly sequence since the dawn of the Cretaceous epoch. It is with the estuarine and fluviatile beds of the Lower Cretaceous, or Potomac, group that this important volume is primarily concerned. With the exception of a few Reptilia and Mollusca, described respectively by Mr. R. S. Lull and Mr. W. Bullock Clark, the life of the period is represented by a rich flora, which has been entrusted to Mr. E. W. Berry. As stated in the preface, "The necessity of some sort of systematic treatment of the maze of described forms in the literature of the Potomac which would enable the geologist or botanist to obtain some idea of the flora has long been felt." This want is satisfactorily met by the publication of the reports included in the fourth volume of a series dealing with the stratigraphy and palæontology of Maryland.

The determination of fragmentary fossil plants affords ample scope not only for the imagination, but also for differences of opinion. Some of Mr. Berry's conclusions are open to criticism; but this is of minor importance, and reluctance to agree with a few of his determinations does not necessarily imply ability to do better. He has treated the subject from a broad point of view, and the result is a monograph of permanent value. The introductory section, by W. B. Clark, A. B. Bibbins, and E. W. Berry, includes a concise account of the Potomac group, with a bibliography and historical review, followed by a general discussion on the stratigraphical and palæontological features of the beds. In the two lower subdivisions of the Potomac group (the Patuxent and Arundel), ferns, cycads, and conifers are abundant, but the genera Rogersia, Proteæphyllum, and Ficophyllum are wisely distrusted by Mr. Berry as records of flowering plants. In the uppermost, or Patapsco, formation Angiosperms are abundant.

In a letter to Hooker in 1879 Darwin wrote:—"The rapid development as far as we can judge of all the higher plants within recent geological times is an abominable mystery." It is because this mystery is still unsolved that any additions to our knowledge of floras in which the earliest examples of flowering plants occur is particularly welcome. Mr. Berry expresses the opinion that the evolution of the Angiosperms was accomplished, if not inaugurated, in the Lower Cretaceous period. There can, however, be very little doubt that the angiospermous type had been evolved some time before the close of the preceding Jurassic epoch, though it was not until the later phase of the Cretaceous period that the remarkable success of the new type became apparent. Unfortunately, the Potomac Angiosperms are represented almost entirely by impressions of leaves, fossils which it is so easy to name but in many cases almost impossible to identify with confidence.

The concise summary by Mr. Berry of the literature on the Lower Cretaceous floras of the world is a welcome contribution both to geologists and to the student of ancient phytogeography. The descriptions by the same author of the Maryland plants, accompanied by good illustrations and some useful maps, mark a considerable advance on the less critical accounts of the Potomac flora previously published. Several new genera are instituted, though it is questionable whether they all rest on a satisfactory foundation. Some fronds of a "pseudo-dichotomous" habit are referred to Knowltonella, a genus assigned with hesitation to the Matonineæ on unconvincing evidence. The genus Dicksoniopsis is founded on pieces of fern fronds which afford no satisfactory indication of close relationship to Dicksonia rather than to other members of the Cyatheaceæ, and might well be included in the old genus Coniopteris. Similarly the generic name Dryopteris suggests an affinity to Dryopteris, which is not established.

In coining new names implying near relationship

[1] "Maryland Geological Survey.—Lower Cretaceous." Pp. 622+xcvii plates. (Baltimore: Johns Hopkins Press, 1911.)

to recent genera, authors run considerable risk of misleading students who fail to appreciate the slender grounds on which such supposed affinity rests.

The volume issued by the Johns Hopkins Press is the best account of the Potomac flora so far produced, and the careful work of Mr. Berry, who is responsible for the greater share of the monograph, is deserving of warm praise. A. C. SEWARD.

THE LUMINOUS ORGANS OF CERTAIN INSECTS.

IN *The Canadian Entomologist* (1911, p. 399), Mr. F. A. Macdermott describes a number of interesting observations which afford strong confirmation of the view that the photogenic function in the Photinini is primarily a secondary sexual character; in at least four species in two of the genera, Lecontea and Photinus, the photogenic function serves undoubtedly as a mating adaptation. Direct observation showed that the female of, for example, *Photinus pyralis* responded by an answering flash to the flash of the flying male, which then dropped down, flashed again, and after her second answer alighted a few inches away from her, crawled towards her, flashing at intervals—to each of which flashes she responded—and finally located her.

It is interesting that in many cases it was possible to deceive the females in an open field by igniting a safety match and swinging it in an arc, so as to imitate the dipping flight and flash of the male *pyralis*. In each instance the flash of light from the match was answered within two to five seconds by the flashes of females of *pyralis* in the surrounding grass and weeds. By the use of a very small electric lamp it was found quite as easy to deceive the male *pyralis*. When a male flashed within about 2 or 3 ft. of the lamp, the circuit was closed two or three seconds afterwards by means of a push-button, so as to imitate as nearly as possible the intensity and time of flash of the female.

No definite instance was observed of a flying male mistaking the flash of a creeping male for that of a female and dropping to it. Observation on a single female of *pyralis* showed that she would not respond to the flash of a female *Photuris pennsylvanica*, Deg., made to flash above her, nor to a male of *Photinus consanguineus*, Lec., although the same female readily responded to a match. In the case of *consanguineus*, the female would answer a double flash of the lamp while some 20 or 30 ft. away, but on close approach seemed to recognise the difference and ceased to respond. *Scintillans* female also responds to the flash of the male *consanguineus* flying above her, but the latter appears to pay no attention to her.

In a second paper, in the Journal of the American Chemical Society (vol. xxxiii., p. 1791), Mr. McDermott deals with the chemical nature of the photogenic material, and shows that if the luminous organs of Photinus be dried *in vacuo* with a residual atmosphere of hydrogen, the tissue will retain its photogenic power and exhibit it when moistened eighteen months after preparation. If the dried tissue be moistened with 3 per cent. hydrogen peroxide a brighter light is produced than if water alone is used and the hydrogen peroxide is actively decomposed. If air is admitted to the sealed tubes containing the dried organs they rapidly lose their photogenic activity. When a living lampyrid was dropped into a test-tube immersed in liquid air it flashed rapidly for a few seconds, then fell back into the tube frozen stiff; meanwhile, the photogenic organ began to shine brilliantly, but the brilliancy rapidly diminished, the diminution being accompanied by a change in the colour of the light, which became reddish. The light finally disappeared, or very nearly so, but on warming to the room temperature it reappeared The insect was dead, but the tissue continued to glow for some time.

The probable chemical nature of the photogenic substance is discussed, and although there is very little real evidence as to its nature, the hypothesis is put forward that it is probably an albuminous lipoid (phosphatide) which fairly readily undergoes oxidation.

NATIONAL TEACHING OF SCIENCE SUBJECTS.

IN consequence of the issue by the Board of Education of Circular No. 776, which abolished examinations in the biological sciences, without providing any alternative scheme, the Physiological Society recently sent to the Board a memorandum directing attention to this action as a step gravely affecting national education in science. It was pointed out by the society that the cessation of the examinations in question, by withdrawing central guidance and inspiration, rendered it probable that unprofitable, inaccurate, and trivial courses of lessons would be given, and that in many cases it will lead to the abandonment of instruction in biological subjects in small centres. Moreover, it was insisted upon that development of the national teaching of science subjects, including biological subjects, necessitated an inquiry into the reorganisation of education in physics and chemistry.

With regard to the training of teachers, the memorandum dealt with the indispensable necessity of physics and chemistry as preliminary to physiology and with this science in turn as necessary for the rational understanding of hygiene, a subject which is already a part of the teacher's training, although no adequate provision for training in the necessary fundamental preliminary sciences is made.

Further, attention was directed to the fact that no teacher can possess a correct appreciation of psychology, or its application to national health and education, unless its study has been founded on a basis of physiology.

The Physiological Society, therefore, suggested to the Board of Education the desirability of suspending the operation of Circular No. 776 in order that reconsideration of its effects may be made by the Board, and especially directed attention to the necessity of reform in the scientific education of teachers and of the continuation of (reformed) examination in biological subjects (especially in physiology and hygiene) until a better method of ensuring adequate training in these sciences is established.

In forwarding this memorandum, the society requested that a deputation of its members should be received by the Board of Education. Accordingly, the President of the Board agreed to receive such a deputation on May 16. This deputation consisted of Sir Victor Horsley, Prof. Sherrington, Dr. Edkins, Prof. Starling, Dr. Waller, Dr. Myers, and Prof. Bayliss (hon. sec. of the society), and was introduced by Dr. Addison, M.P.

Sir Victor Horsley spoke chiefly on the absolute necessity of physics and chemistry as preliminary to hygiene. The training colleges were not teaching science in this way, but were beginning with biological nature-study. The training in science should be given to all teachers, and by them in turn to their pupils in the elementary schools.

Prof. Sherrington, who has had much experience