

'A Simple Modification of the B.O.T. Form of Standard Cell.' In this cell the usual construction is reversed, and the materials are introduced in the inverse order, namely, zinc amalgam, sulphate of zinc crystals, mercurous sulphate paste, platinum wire. The cell is portable and free from diffusion-lag, and is much easier to make and more convenient to use than the H-form. Owing to its shape, which permits of immersion in a water-bath, it is more suitable than the H-form for very accurate work, in which an exact knowledge of the temperature of the cell is required. The same construction is also applied with equal facility to the cadmium cell, but it appears that the latter cells are less consistent than the Clark cells at temperatures between 0° and 10° C.

There was a general consensus of opinion that the meeting had been as well up to the average in the quality and quantity of the work submitted, as it had been thoroughly enjoyable and successful from a social point of view. With so many communications to get through, it is to some extent inevitable that the discussions should be curtailed, but the authors of papers are themselves chiefly to blame in many cases if the discussion appears inadequate. It may be possible in future years to exact more stringently that the author should submit an intelligible abstract in advance, which might be obtainable at an early hour on the day on which the paper is read. In the few cases in which the printed abstracts are available they are frequently allowed to lie on the table, and were of no practical assistance to the discussion, as no one knew of their existence. It is to be hoped that the wide range of the work of Section A will not be allowed to detract from its usefulness, and that the committee appointed to consider the question will succeed in devising some scheme of departmental organization to mitigate the overcrowding of papers in future. HUGH L. CALLENDAR.

THE BOTANY OF THE BRITISH ASSOCIATION.

THERE are few opportunities when it becomes possible for the botanists of America and Europe to exchange views and gain that personal knowledge of co-workers in which lies the real essence of acquaintance among scientific men, beyond those afforded by individual effort. It is true that a large number of American botanists have prosecuted more or less extended studies abroad, both in England and on the continent, and this number appears to be annually increasing. The majority, however, are denied such privileges, and for them it becomes a matter of first importance that occasions should arise when they are able to gain direct acquaintance with those who have been known to them in other ways for years. In 1884 the British Association for the Advancement of Science departed from its time-honored custom and held its first colonial meeting at Montreal. So rare an opportunity was eagerly taken advantage of by a large number of representative botanists from both sides of the Atlantic, and, although it was impossible at that time to fully measure the value of the results to be obtained, it was nevertheless felt that the work accomplished must be productive of great benefit, not only in a general advance of botanical science, but in a far better understanding between the botanists of Europe and America. The lapse of years has fully justified this view, and when it was announced that the British Association intended once more to visit Canada, after a period of thirteen years, the prospect was generally hailed with delight by American botanists, who would gladly see these opportunities for scientific conference become more frequent.

The sixty-seventh annual meeting of the British Association, recently closed at Toronto, will be remembered as a notable one in the history of botanical progress on this side of the Atlantic. The great ac-

tivity and interest which centered in the Botanical Section were largely due to the able and energetic manner in which the President conducted the work in hand. To the botanists of the United States, however, is also due no small credit for their share in this happy result. The determination had evidently been reached on their part to make the botanists of Great Britain feel that, although they were to be within their own domain during the progress of the meeting, there is a brotherhood in science which ignores all geographical and political limitations, and that on these grounds the most cordial sympathy and support should be extended. This was made evident not only in the very fortunate arrangement whereby the Botanical Society of America met at Toronto instead of at Buffalo, and concluded its proceedings as the work of the British Association began, but also in the fact that the majority of the botanists in attendance were Americans, and that a very large proportion—about one-half—of the papers presented were from the same source.

The Section met under the very able presidency of Professor H. Marshall Ward, of Cambridge, England, who was supported by Professor D. P. Penhallow, of McGill University; Dr. W. G. Farlow, of Harvard, and Professor F. O. Bower, of the University of Glasgow, as Vice-Presidents. The attendance was not large, although representative. Of English botanists only eight were present, including, in addition to those already named, Mr. A. C. Seward, of Cambridge; Professor F. Weiss, of Owens College, Manchester; Professor J. B. Farmer, of the Royal College of Science, London; Mr. Harold Wager, of Leeds, and Professor J. R. Green and Miss D. F. M. Berts, of Cambridge.

Among those representing American botany were noted: Dr. W. G. Farlow, Dr. Britton, Dr. Coulter, Professor Barnes, Pro-

fessor Penhallow, Dr. Galloway, Dr. T. J. W. Burgess, Dr. Bessey, Dr. Arthur, Mr. Webber, Professor Green, Mr. Jeffrey and others. Exceptional interest was added to the proceedings by the presence of Professor P. Magnus, of Berlin, who also contributed a valuable paper 'On the Mycelium of a Witches' Broom Fungus' and otherwise assisted in the work of the Section.

There were twenty-one papers in all presented to the Section, representing original research in nearly all the numerous branches of botanical science. These contributions were, in most cases, of a notable character, and drew forth animated and valuable discussions. The report submitted by Professor Farmer, respecting certain investigations on the 'Fertilization of the Phæophyceæ' conducted under his supervision, already indicates that new and important facts bearing upon the relationships of this group have been obtained. The investigations continue for another year under a renewed grant from the British Association.

Mr. Harold Wager gave an account of some recent studies of the yeast plant and other species of *Saccharomyces*, with respect to the presence of a nucleus and its constitution in various stages of development. The nucleus in yeast has been a subject of study for the past six or eight years, and its presence, as demonstrated by some seventeen observers, is abundantly confirmed by the results obtained by Mr. Wager. The author has not been able to reach final conclusions respecting the question which has been for some time in controversy as to whether the nucleus possesses a nucleolus or not, but his researches tend to the belief that certain granular bodies in constant association with the nucleus, and which present very different conditions of aggregation at various stages of growth, may represent the nucleolus. It was further shown that, in the process of budding

the nucleus extends into the neck, where it undergoes direct division, one-half remaining in the mother cell, while the other half enters the bud; and that, in the process of spore formation, the nucleus breaks up into two, and then into four, nuclei by a very simple process of karyokinesis. Some of the phenomena observed appeared to be new in the history of nuclear division and require more extended observation, but the paper as a whole offered an important addition to our knowledge of cell life, and proved to be particularly opportune in connection with the joint discussion on the cell held by the botanists and zoologists.

The efforts originally made by Hartig, and later by Brefeld, to study the development and action of wood-destroying fungi as represented by *Stereum hirsutum*, met with failure either through lack of pure cultures or imperfect methods of treatment. Professor Ward presented an account of his own recent studies of this plant, in which he employed blocks of sterilized wood, whereby he succeeded in securing a perfect fructification and observing the plant in all stages of development. The details of the progressive destruction of the woody tissue were also dealt with, and it was shown that the lignified structure gradually yielded to the action of the fungus and passed into the condition of cellulose-like bodies, giving the characteristic iodine reaction, before final consumption. The paper was illustrated by a series of beautifully prepared lantern slides, from photographs and drawings.

Professor Penhallow contributes the results of recent studies of the species of *Picea* occurring in the eastern United States and Canada, in the course of which he showed that the red spruce which had been abandoned as a distinct species since the time of Pursh, and regarded as a form of the black spruce, must once more be restored to the status of a valid species as maintained by Lawson and later by Brit-

ton. He also pointed out that there is a well defined variety of the white spruce, hitherto unrecognized, the chief characteristics of which are to be found in the strongly glaucous, rigid, often broad and cuspidate leaves, and distinctly fetid odor which has long led lumbermen and others to designate it by the name of 'Cat' or 'Skunk Spruce.' He proposes to distinguish it by the variety name of *fetida*.

Mr. Francis Darwin gave a preliminary account of a new method of investigating the behavior of stomata, in which he details the use of a new form of hygroscope made of thin sheets of specially treated horn or 'Chinese sensitive leaf.' One end of a narrow strip is secured to the lower surface of a block of cork, and the angle to which the free end rises becomes the index of transpiration. In application, if the leaf have stomata on the under surface only, the index of the hygroscope applied to the upper side remains at zero, while on the lower side it instantly rises to an angle varying with the condition of the stomata. If these organs are widely open, the angle will be 30° - 40° to a horizontal line; if the stomata are closed, the reading will be zero on both surfaces of the leaf. With this instrument a number of well known facts in the physiology of the stomata can be easily demonstrated.

Mr. H. J. Webber, of the U. S. Department of Agriculture, detailed the results of recent studies on the spermatozoids of *Zamia*. By means of a series of beautifully prepared sections he demonstrated the occurrence of unusually large spermatozoids, which, together with their flagellæ, may be seen without difficulty with an ordinary pocket lens. The paper throws new light upon our conception of the sexual elements of the Gymnosperms, and will doubtless serve as a powerful incentive to greater activity in the study of this group of plants.

Among other notable features of the meeting were a joint discussion, together with the zoologists, on the Cell; a public lecture on Fossil Plants by Mr. A. C. Seward, who, since the death of Williamson, has been recognized as the leading paleobotanist in Great Britain; and joint action with the Sections of Zoology and Physiology for the establishment of a biological station in the Gulf of St. Lawrence. While it is intended that such a station shall be primarily designed for economic ends in connection with the fisheries, it is hoped that opportunities may be offered for a limited number of students to pursue special investigations relative to both animal and plant life, and thus to supplement the work of larger stations, such as that at Woods Holl.

The special interest of the Section centered in the presidential address, which dealt in a very masterly manner with the progress of botanical science during the latter half of the Victorian reign. The address was a very noteworthy one from several points of view, though chiefly as an important historical summary. While it would be difficult and altogether unsatisfactory to attempt an abstract of a paper so rich in facts, it may be pointed out that it gave the strongest evidence to show the great dependence of important commercial undertakings and economic processes upon data derived from modern scientific botany, as also the very close relations which exist between chemistry and botany as now known. The address will form a useful key to a much wider literature, and deserves the careful perusal of the specialist as well as the general morphologist.

D. P. P.

MARINE BIOLOGICAL LABORATORY.

A STATEMENT TO THE CORPORATION FROM THE TRUSTEES.

THE annual meetings of the Corporation will hereafter be held at Woods Holl in

August instead of at Boston in November, and absent members can now vote by proxy. The Board of Trustees has been enlarged to twenty-seven members, and the new Board, it is believed, fairly represents nearly all sections of this country and Canada. The closer cooperation of all institutions of learning is actively encouraged.

These changes will make possible the attendance of a large number of members, at annual and special meetings, who have been unable to reach Boston during the month of November, and there are already signs of increasing interest in the institution over a much wider area. The members will be glad to learn that, at the recent meeting of the British Association in Toronto, Dr. Dohrn, head of the unrivalled station at Naples, took occasion to speak as from personal knowledge in terms of warm commendation of the work at Woods Holl. The past summer has been highly satisfactory; but the Trustees have been hampered by lack of funds for needed repairs and renewals, and, to some extent, for current expenses. At least \$1,000 should be raised before resuming work next summer, and there remains a debt of about \$4,700 incurred for the erection of new buildings. This debt should be cancelled in order that a clear balance sheet may be shown before undertaking several most desirable extensions of the plant, some of which are urgently needed. Salaries should be increased, and greater inducements offered to the strong corps of instructors and workers whose collaboration has enabled the institution to attain its present position in the scientific world. Moreover, there is no assurance of permanence in an institution of this nature until it shall have acquired a sufficient endowment or maintenance fund, independent of its land, buildings and equipment (which now represent an investment of over \$33,000), to relieve it from danger of extinction by one or more sea-