tance as the second law of motion, and not a mere verbal definition. Experience thus gives a dynamical measure of work as well as of force.

The law of equivalence of work and energy then establishes work as a dynamical measure of energy.

The laws of motion, combined with this law of energy, establish the result that kinetic energy is proportional to the product of momentum and velocity, and thus furnish a dynamical method of measuring energy in its kinetic form. This is the sole contribution of the laws of motion to the science of energy.

It is only in the case of bodies whose internal forces and motions are known, or determinable from assumed data, in other words, imaginary bodies, that the laws of energy, as far as they are considered in dynamics, are included in the laws of motion and therefore become unnecessary, except for the purpose of convenience in mathematical analysis, or economy of thought. Even in such cases the expressions for work and energy retain a flavor of their original meaning and do not altogether degenerate into mere mathematical symbols.

The science of dynamics, as it is understood at the present day, includes among its fundamental principles, in addition to laws of motion, the principle of the equivalence of work and energy, and the principle of the conservation of energy; energy being measured, however, only in terms of force and displacement, or momentum and velocity.

The only actions known in dynamics are force and its integrals, impulse and work. To identify with these all other actions involving the transfer and transformation of energy, such as the conduction of heat, chemical reactions, induction of electric currents, etc., forms to-day the severest task of mathematical physics.

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MATHEMATICS AND PHYSICS AT THE BRITISH ASSOCIATION.

MEETING this year at Toronto in the week immediately succeeding the meeting of the American Association at Detroit, the British Association had the advantage of securing the attendance of a number of distinguished American scientists, who added greatly to the strength and interest of the proceedings. Taking Section A alone, it is sufficient to mention the names of Dr. Hill, Professors Michelson and Newcomb, as Vice-Presidents; and of Professors Barker, Carl Barus, Bedell, Carhart, Merritt, Nichols, Rosa, and many others who attended the meetings and assisted at the discussions in the work of the Section.

It is generally conceded, even by the rival sections, that A is not only the first but also the most strongly represented section, if not always in the number of its rank and file, at least in the distinction of its leaders and in the vigor and extent of its work. This year, in spite of the distance from home, formed no exception to the rule. Although some familiar faces were absent, the section formed a very strong and representative gathering of mathematicians and physicists. There were no less than fifty names on the committee, but it would have been easy to add to this number without going beyond the list of those attending the meeting whose work was already known.

In many ways, the extremely varied interests which the Section A represents are doubtless a great element of strength, but there are certain drawbacks in its excessive vitality. It brings together men from a number of different but closely allied departments of knowledge, who, if they did not possess some such common meeting ground, would be less able to keep in touch with each other, and to assist in the general advancement of science. At the same time it cannot be denied that the section is somewhat overburdened with an excess of communications which are too good to refuse, and that in consequence of the press of work and of the extremely mixed character of the audience, the discussions on the various papers, which should be the most valuable and interesting part of the proceedings, are generally of a very perfunctory and almost casual order. Similar considerations lead to the curtailment of the papers as well as of the discussion. Many of the authors are influenced by an undue regard for the feelings of the more popular part of the audience, and are thus impelled to omit technical details of the highest interest and importance for the due appreciation of their work by those competent to judge.

Upwards of 60 communications, out of many more that were sent in, were accepted and read in the course of the five days on which the section met. In order to get through this program, it was necessary to sit till 3 p. m., on many of the days, without any intermission for lunch. On two of the days the section divided into two departments, Mathematics and Meteorology on Monday, Electricity and General Physics on Tuesday. This plan has been found to work well in previous years, but is not without its defects. Professor Rosa, for instance, was engaged in reading a paper in one department at a time when another of his communications was due in the other. He was thus compelled to miss the reading and discussion of a number of papers closely allied to the subject of his second communication, and those present in the electrical department were compelled to miss the description of his most ingenious and complete electrical calorimeter as applied to the verification of the law of conservation of energy in the human body. Under any system of subdivision, it is probable that similar difficulties must occasionally arise, but the question is now under the consideration of a special committee, and it is hoped that some more perfect arrangement may be evolved in time for the next meeting.

An audience of over four hundred assembled in the Chemical Lecture Theatre to hear the address of the President, Professor A. R. Forsyth, who succeeded Cayley in the chair of pure mathematics at Cambridge. His address was an eloquent and convincing vindication of the importance of studying mathematics for its own sake with the single aim of increasing knowledge, and not, as some would have it, from a utilitarian point of view, as an instrument for the use of the engineer, the physicist or the astronomer. The path of practical utility, as he justly remarked, is too narrow and irregular, not often leading far. It is evident from the demeanor of the audience that they were all thoroughly interested and engrossed in the subject of the address, which, it is to be hoped, may do something to moderate the utilitarian and technical spirit, and to check its inroads upon the sanctuaries of university education.

The ventilation of the Chemical Lecture Theatre appears to have been overlooked in its construction; but, in spite of a somewhat asphyxiating atmosphere, the larger, and, we may also say, the wiser part of the audience, remained behind to hear the presidential address of Professor Ramsay to the Chemical Section, on 'An Undiscovered Gas.' Professor Ramsay is a physicist no less than a chemist, and his search for the undiscovered member of the triad of which helium and argon are the extremes, raised many questions of the widest general interest to the physicist as well as to the chemist. The methods which he was compelled to adopt in treating these substances, which have no chemical properties, were also physical rather than chemical, depending on differences of density, refractivity, and rate of diffusion. Helium appears to be unique among elements in possessing an extremely low refractivity in proportion to its density. The physical methods of diffusion, and of measuring and comparing the refractivities of different gases and mixtures of gases, appear to have been carried to the highest degree of refinement which has yet been obtained, in this nominally chemical research.

After adjourning to the Physical Lecture Theatre, the section took up the ordinary business of the meeting. A paper was read by J. A. Paterson, 'On the Unification or Time,' a question of considerable interest to Canadians. In the discussion, it was pointed out by Professor Rucker that, for the present, international agreement was hopeless. The question had recently been considered by an influential committee of the Royal Society, who had decided that the present was not a suitable time for action. A committee was subsequently appointed by Section A to consider what action could be taken in the matter.

Professor Rucker, assisted by Forsyth and Sowter, showed some photographic records which had been obtained of objective Combination Tones, which were of great interest in connection with certain disputed points in the theory of such tones.

The report of the Committee on Seismological Observations was read by the Secretary, Mr. J. Milne. Among the points specially discussed were the greater frequency of sub-oceanic disturbances as compared with land-quakes, the large number of such movements originating in Tuscarora Deep being taken as a special example. It had also been shown by means of observations of earthquakes taking place in various parts of the earth, and registered by means of one of Milne's horizontal recording pendulums for unfelt earth-movements, that the velocity of propagation of such movements was much higher through the lower strata. The nearer the path to the center of the earth, the higher the velocity. By means of several of these instruments, which are now being set up in different parts of the globe, it is hoped to obtain important information with the regard to the interior constitution of the earth. Such records have also been proved to be of great practical utility in connection with the breaking of submarine cables, and other effects of suboceanic disturbances.

On Friday a paper was read by Dr. N. E. Dorsey, 'On the Determination of Surface Tension by the Method of Ripples.' Dr. Dorsey had applied the method used by Lord Rayleigh with great refinement to the measurement of the surface tension of water and of dilute aqueous solutions. He found that the surface tension was approximately a linear function of the concentration.

Professor H. L. Callendar and H. T. Barnes, of McGill College, Montreal, described their new method of determining the 'Specific Heat of a Liquid in terms of the International Electrical Units.' The practical details of the method have already been completely worked out, and several sets of observations have been taken in the case of water and mercury. The method consists in passing an electric current through a current of liquid flowing in a fine glass tube enclosed in a glass vacuum jacket, which is exhausted as perfectly as possible, and then hermetically sealed. The electric energy is measured by the potentiometer method in terms of the Clark cell and the Standard Ohm. The heat generated is measured by observing the flow of liquid and the steady difference of temperature between the ends of the fine tube. The time of flow is automatically recorded on an electric chronograph on which a standard clock is marking seconds. The difference of temperature is given by a single reading on a pair of differential platinum thermometers.

The method was primarily devised for the purpose of investigating the question of the rate of variation of specific heat with temperature, which could be determined independently of the absolute value of the Clark cells used in the work. It is also of special interest in connection with the recent proposal of the Electrical Standards Committee of Section A to adopt the Joule or Watt-Second as the absolute unit of heat. According to the most recent reductions, the result of Rowland by the mechanical method, and of Griffiths and Schuster by the electrical method, for the specific heat of water differ by about one part in 400. This discrepancy is possibly due to an error in the value assumed for the Clark cell, but it is interesting to verify the comparison by a totally different method of calorimetry, to avoid any possible errors which may have remained unsuspected in the ordinary method, in which a known mass of water is heated through a certain range of temperature. In the method of Callendar and Barnes the temperature conditions are extremely steady, and observations can be taken under the most favorable conditions. The external loss of heat is reduced to a minimum by means of a vacuum jacket, and can be very accurately measured by varying the electric current and the flow of liquid in a suitable manner. Since there is practically no change of temperature, the correction for thermal capacity of the calorimeter is negligible.

A crowded audience assembled to hear Lord Kelvin on the 'Fuel and Air Supply of the World.' The address, which lasted about half an hour, was very characteristic, especially in the humorous attack on the English system of measures. Assuming that the earth was originally at a high temperature, and that there was at first no free oxygen in the atmosphere, it may be concluded with a high degree of probability that the present store of oxygen has been evolved by the action of sunlight on vegetation. To every three tons of oxygen there corresponds on the average one ton of coal or of fuel derived from vegetation. As there are at present two tons of oxygen to every square meter of the earth's surface, the total oxygen supply may be estimated at about one thousand million million tons, and the total fuel supply at 340 million million tons. According to the estimates of the Coal Supply Commission of 1831, it appears that England, with an area equal to one two-thousandth part of the earth's surface, possesses more than its share of fuel, the greater part of which is available for working. As the coal is used up, if it were not for increasing vegetation, we should be more likely to die from want of air than from want of coal.

Dr. Alexander Johnson, of McGill College, followed with a plea for an Imperial Hydrographic Survey. A committee of the British Association appointed at his suggestion in 1884 had succeeded in inducing the Canadian government to make a grant for the promotion of tidal observations. This grant has recently been reduced, and there was some risk that it might be discontinued altogether at a time when such observations were of special importance. At Professor Johnson's request an influential committee was again appointed to seek the cooperation of the Admiralty in establishing a permanent department.

Professors Ewing and Dunkerley, of Cambridge, England, contributed a paper on the 'Specific Heat of Superheated Steam.' They adopted the method of the throttling calorimeter, which is not so well known in England as in America, but instead of determining the wetness of the steam in terms of the degree of superheating observed they used a separator, and assuming the steam to be dry, deduced the value of the specific heat. A roll of silk was used, following Thomson and Joule, instead of an aperture for throttling the steam.

Professors Runge and Paschen contributed a note in continuation of their well-known spectroscopic investigations. They find that the spectrum of oxygen consists of six series of lines, two principal groups each with two subordinate groups, having harmonic relations to each other. The spectrum of oxygen is thus analogous to that of helium. At one time it was supposed that this character of the spectrum might indicate that the substance examined was really a mixture of two different elements closely resembling each other in properties. Many elements, such as sodium and lithium, give only one series of lines. This hypothesis has, however, been recently abandoned.

W. J. Humphreys next read a paper on 'Changes in the Wave-Lengths of the Lines of Emission Spectra of Elements.' The changes examined were caused by increasing the pressure of the air surrounding the electric arc up to six or twelve atmospheres, which was found to produce a shift of the line towards the red end of the spectrum, the amount of the shift being nearly in direct proportion to the pressure, and never exceeding a tenth of an Angstrom unit for the pressure employed. The shifts were in general proportional to the wave-length, but different series of lines were differently shifted. Shifts of similar lines of different elements are said to be inversely as the absolute temperatures of the melting points of the substances, proportional approximately to the products of the coefficients of linear expansion of the solid and the cube root of the atomic volume. The effect is, therefore, like the atomic volume, a periodic function of the atomic weight. It is considered that some of these relations may be accidental, as most of the time was spent in measuring the lines and not in hunting after empirical relations.

In making the measurements, the best spectroscopic equipment of the Johns Hopkins laboratory was used. Besides a number of eye observations, several hundred photographs were taken, and almost every known metallic element examined. The shifts due to pressure may be distinguished from those due to the Doppler effect, because different lines of the same element are differently shifted, and the direction of the shift is always to the red. The largest shift observed would correspond to a velocity of recession of some four miles a second.

A communication from Professor Schuster, 'On the Constitution of the Electric Spark,' described measurements of the velocity of translation of metallic particles in the spark. The velocity found was from 400 to 2,000 metres per second.

Professor S. P. Thompson showed some experiments on varieties of cathode rays, which he classified according to their powers of exciting X-rays, of producing fluorescence, and of being deflected or not by a magnet. The ordinary cathode rays after reflection from the anticathode were found to be still fluorescifiant and deflectable, but to have lost their power of exciting X-rays. A third variety was produced by passing the cathode rays through a negatively electrified spiral or sieve, which changed the nature of the fluorescence and rendered them non-deflectable. A fourth variety was found in the funnels of a Holtz tube. Under the hurried conditions of the section meeting, it was not very easy to follow and observe these several effects.

Among the other papers on Friday were two by Professor S. P. Thompson, on a 'Tangent Photometer,' and on an 'Experiment with a Bundle of Glass Plates.' There were also two important contributions from John Hopkins on the comparison of the thermometers used by Rowland in his determination of the mechanical equivalent of heat (1) with the Paris Hydrogen Scale, and (2) with the scale of one of Callendar and Griffiths' platinum thermometers. The results of these experiments were to show that, when reduced to the same thermometric scale, the results of Rowland for the rate of variation of the specific heat of water were in agreement with those of Griffiths, but there was a difference of about one part in 400 in the absolute value at any point. This point was particularly referred to in the Report of the Electrical Standards Committee, and it was suggested that the discrepancy might be due to an error of 0.1 % in the assumed value of the electrochemical equivalent of silver.

The last paper read was by Professor H. L. Callendar and N. N. Evans, 'On the Behavior of Argon in X-Ray Tubes.' The authors had expected to find that pure argon, in consequence of its inertness and its supposed monatomic character, would give a very constant vacuum in such tubes. They found, however, that if the gas were very carefully dried, the resistance of the tube increased very suddenly, and the electrodes were melted or spattered over the walls as the vacuum approached the X-ray stage. The presence of residual hydrogen appeared to be necessary to enable the discharge to pass from the cathode to the gas. These effects were substantiated by experiments with other gases.

On Saturday the majority of the members dispersed on excursions to Niagara and various other places of interest, and with the exception of the Geological Section there were no meetings.

On Monday the section divided into two departments, Meteorology and Mathematics, and those specially interested in electrical work repaired to Section G, which devoted itself on this day to electrical questions. In the meteorological department papers were read by John Hopkinson 'On Monthly and Annual Rainfalls at Ten Stations in the British Empire, 1877 to 1896.' It appears doubtful, however, whether so listed a series of observations can be taken as representative of the pluviology of the Empire. By Dr. Van Rijckevorsel 'On the Temperature of Europe.' From certain peculiar maxima and minima exhibited by the curves of daily temperature, he considers that the continent may be divided into two regions in which a different type of weather prevails. R. F. Stupart, the Director of the Meteorological Service of Canada, contributed a paper on the 'Climatology of Canada.' F. Napier Denison, from a comparison of simultaneous records of changes of level in the Great Lakes and of smaller undulations in the atmospheric pressure by by means of a sensitive barograph, concludes that the larger differences are due to difference of atmospheric pressure over the extremities of the lake, but may be greatly augmented by the action of the wind on the surface of the water. The smaller undulations appear to be due to atmospheric waves caused by currents in different strata traveling in opposite directions, as shown by Helmholtz. Papers were also contributed by Rotch and Marvin 'On the Exploration of the Air by Kites,' showing how it was possible by means of recording instruments, sent up to great elevations attached to a kite to obtain information with regard to the temperature and hygrometric condition of the air, which would be of use in forecasting. It would appear, however, that there is still much to be done in improving the recording hygrometer.

In the department of mathematics there were several papers of esoteric interest. Alexander Macfarlane made an application of hyperbolic analysis to the solution of the cubic equation. Dr. Harris Hancock discussed the history of the Abelian Functions. Professor O. Henrici proposed a convenient notation in Vector Analysis, upon which it would be difficult to express an opinion without extended use by different workers and authorities in the subject. Professor Michelson and A. W. Stratton described some new Harmonic Analyses, in which they had succeeded in carrying the process as far as 80 terms. Papers were also contributed by Major MacMahon on 'Partitions of Numbers;' by J. C. Glashan on the 'Quinquisection of the Cyclotomic Equation,' and by Dr. Larmor on 'Jacobi's Last Multiplier.'

On Tuesday the section divided along the lines of Electricity and General Physics, and many members regretted that they were unable to be present in both sections simultaneously. In the electrical department there were a number of papers on electrical waves and oscillations of different forms. Professor Braun showed how, by the action of a magnet on a small pencil of cathode rays directed on to a fluorescent screen, it was possible to demonstrate the form of the wave, either by developing the oscillating line of light into a curve with the aid of a revolving mirror or by using a second magnet to give the corresponding Lissajou figure. The frequency of the coil used was not, however, suitable to show the effects in a sufficiently clear manner to an audience. Professor Rosa exhibited an extremely ingenious mechanism for automatically plotting the form of an alternate current wave by the periodic contact method. At each point of the cycle the instantaneous difference of potential to be measured was found by shifting a contact point on a potentiometer wire till the galvanometer indicated a balance. On depressing a key the point so found was recorded on a cylinder, which was moved forward automatically in step with the periodic contact brush on releasing the key. By this means from twenty to thirty points could be recorded in a minute. The curves exhibited showed in a very remarkable manner small waves due to armature teeth and commutator segments, which could not be obtained with any slower method, owing to the necessarily limited number of points. Taking special precautions to secure very steady running of the machines, he had been able to analyze these curves with great accuracy as far as the fifteenth term of the harmonic series.

W. D. B. Duddell exhibited an instrument of a totally different character which could be applied to secure instantaneous photographs of the forms of these curves even under conditions of rapid change such as occur in studying the alternate current arc. He had succeeded in so reducing the period and adjusting the damping of a galvanometer with a pair of strips stretched between the poles of an electro-magnet and immersed in oil, on the plan suggested by Ayrton and Mather, that he was able to obtain very beautiful records of current and potential simultaneously at the ordinary rates of alteration on a falling plate. So far as could be judged from an inspection of the numerous specimens shown, the effect of inertia was practically eliminated. It would not, of course, be possible to measure the these curves with the same degree of accuracy as those obtained by the point-to-point method, but instantaneous photographs can be secured in cases where the slower method would be totally inapplicable.

After the reading of the Report of the Committee on Electrical Standards, to which reference has already been made, Professor J. V. Jones explained a method of calculating the coefficient of mutual induction of a circle and co-axial helix, by which the labor may be considerably shortened. This calculation is required in the Lorenz method of determining the ohm. Professor Ayrton next gave an account of the experiments in which he had been engaged with Professor Jones in redetermining the ohm by means of the Lorenz apparatus constructed for Professor Callendar, of McGill University. This apparatus has been made by Nalder Brothers, under the personal supervision of Professor Jones, and is considered to be the most perfect apparatus of its kind. The value found for the ohm was nearly one part in 2,000 smaller than that usually accepted, but the uncertainty of the measurements was due rather to discrepancies in the comparisons of the standard coils than to want of consistency in the readings given by the instrument.

Professor Ayrton also communicated a paper by Mrs. Ayrton on the 'Relations between Arc Curves and Crater Ratios with Cored Positive Carbons,' which is being published elsewhere. Mrs. Ayrton is well-known as an authority on these subjects, but the paper is one which cannot be adequately explained without the curves by which it was illustrated. Papers were also contributed by Cerew and Basquin, 'On the Arc;' by Willard E. Case, on 'Gas Batteries,' and Professor J. C. MacGregor, on the 'State of Ionization of Solutions.'

In the department of general physics, there were a number of interesting papers on acoustics and on astronomical and magnetic observations, but the writer was unable to obtain any adequate abstracts or reports.

On Wednesday, Professor Ramsay read a paper on the refractivity of mixtures of gases. According to his observations, the refractivity of a mixture could not be deduced by the usual mixture formula. The discrepancy between theory and observation in the case of a mixture of hydrogen and helium amounted in some proportions to as much as 3%, with oxygen and nitrogen to 0.35%. These differences were systematic, and appeared to be too large to be due to observational errors. They indicate that the refractivity is not accurately proportional to the partial pressure, but that there is a deviation analogous to the deviations from Boyle's law, and apparently in a similar direction. It must be remembered, however, that the refractivity of helium is so phenomenally low as to make these measurements extremely difficult.

Professor O. Lodge introduced a discussion on 'Zeeman's Discovery of the Effects of Magnetism on Spectral Lines.' These effects have been recently described in a communication by Professor O. Lodge to the Royal Society of London, but it would appear from the discussion which took place in Section A, that the effects are so small even in the strongest fields, and are so difficult of study, that the physical explanation of the effect is still a matter of speculation.

Professor Ayrton communicated three papers by himself and J. Mather, on the use and sensibility of galvanometers, a subject upon which they are universally recognized as leading authorities. He explained the principle of the constant total current shunt, as applied to ballistic galvanometers, proposed a standard method of measuring the sensibility, and discussed the question of short versus long-period galvanometers for very sensitive zero-tests. He also exhibited a very simple and sensitive galvanometer of the D'Arsonval type, with a coil resistance of only 1.9 ohms, time of complete oscillation 7.5 secs., which gave a deflection of 36 millimetres at 2 metres for one microvolt.

A paper on the comparison of certain Thermocouples with the platinum resistance pyrometer was read by Mr. H. M. Tory, of McGill College. He showed that the parabolic formula could be regarded only as a rough approximation to the law of variation of the E.M.F. of a thermocouple. Using a platinum-rhodium couple enclosed in the same tube as the platinum pyrometer, he obtained very consistent results up to 1,000° C., showing deviations from the parabola of the same type as with the copper-iron couple at low temperatures. He showed that the assumption of a straight-line formula for the platinum-rhodium couple, which is often taken as sufficiently correct, may lead to errors of the order of 100° C.

Professor Callendar read a paper by himself and H. T. Barnes, of McGill College, on

'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-