

TRANSACTIONS

OF THE

Astronomical and Physical Society of Toronto,

FOR THE YEAR 1893,

INCLUDING FOURTH ANNUAL REPORT.



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recent binding of the reports received from the Royal and other Societies. In reply to a question, Mr. Elvins stated that many years ago, in the course of a long series of solar observations, he came to the conclusion that there was some relationship between the frequency of sun-spots and the rainfall, and he undertook to predict the rainfall for each of the years 1870 and 1871 ; the results were that he was out only about one-quarter of an inch in 1870, and less than an inch in 1871.

Miss A. A. Gray read from *Popular Astronomy* a most interesting article by Professor E. E. Barnard, of Lick Observatory, descriptive of the very peculiar appearances presented on the mornings of October 21st, 22nd, and 23rd, by Brooks' Comet (d 1893), and shown by photographic plates taken by a long-focus Willard lens in a camera strapped to the 12-inch telescope. On the dates mentioned, the comet's tail, previously a straight and graceful one, appeared on the negatives to be shattered, distorted and deflected by some agency at present not understood. The comet had evidently collided with some resisting medium, though probably of "extreme unsubstantiality," the detection of which was, in Mr. Barnard's opinion, of great importance. As these phenomena were wholly invisible in powerful telescopes, this was but another hint of the greater disclosures to come from the systematic application of photography, "revealing to us wonders of a startling nature where the unaided eye looks upon blank space." Mr. J. A. Copland also contributed a paper on the same subject, founded upon a special communication sent by Mr. Barnard to Mr. E. W. Maunder, F.R.A.S., of Greenwich Observatory, who published it, with observations of his own and copies of Mr. Barnard's negatives, in *The London Daily Graphic*. Mr. Copland's terse paper was illustrated by these plates.

THE FOURTH ANNUAL MEETING

was, on the 9th of January, 1894, held in the Society's Rooms, 19 McGill street, Mr. John A. Paterson, M.A., Vice-President, presiding. The attendance was unusually large, and included many ladies. Mr. F. H. Young, M.A., of Belleville, was elected an Associate-Member,

In pursuance of notice given at the previous meeting, Mr. Thomas Lindsay, seconded by Mr. D. Geo. Ross, moved, That whereas much of

this Society's prosperity during the past year has been due to the deep interest taken by its officers in all branches of its work, and whereas, some of the excellent measures for enlarging the Society's field of usefulness are still under consideration, therefore, be it Resolved that the best interests of the Society will be served by making no change in the list of Officers and Members of Council for 1894, and that the Recording Secretary be requested to prepare one nomination paper containing the names as they stand now upon the Roll, and that the election of these Officers be made unanimous. Carried, amid applause. Mr. Sparling thereupon cast a ballot, and the following

OFFICERS AND MEMBERS OF COUNCIL FOR 1894

were declared to have been duly elected :—Honourary President, the Honourable G. W. Ross, LL.D., Minister of Education for Ontario ; President, Mr. Charles Carpmael, M.A., F.R.A.S., F.R.S.C., Director of the Toronto Observatory ; Vice-Presidents, Mr. Larratt W. Smith, D.C.L, Q.C., and Mr. John A. Paterson, M.A. ; Treasurer, Mr. James Todhunter ; Corresponding Secretary, Mr. G. E. Lumsden; Recording Secretary, Mr. Charles P. Sparling ; Librarian, Mr. G. G. Pursey ; Council, the Executive Officers and Messrs. E. A. Meredith, LL.D., A. Elvins, A. F. Miller, A. Harvey, and D. J. Howell. Miss Sarah L. Taylor, was re-elected Assistant-Treasurer ; Miss A. A. Gray, Assistant-Recording Secretary ; Miss Jeane Pursey, Assistant-Librarian ; and Mr. John A. Copland, British and Foreign Correspondent.

NEW HONOURARY AND CORRESPONDING MEMBERS.

The Corresponding Secretary stated that in compliance with instructions received at a meeting of Council held in December, he had communicated with certain well known scientific men with a view to ascertaining whether they would be willing to accept the relationship to the Society of Honourary and Corresponding Members, to which positions it was thought fitting they should be elected. In every instance, nomination had been gracefully accepted and in terms highly complimentary to the Society, a matter for great satisfaction as it indicated that the Society had succeeded in making for itself a reputation of which, it was to be hoped, it was not entirely unworthy, and which, now that further illustrious names were to be inscribed on its Rolls, it should do

all in its power to deserve and to sustain. For instance, Sir Robert Ball, of Cambridge University, the well known writer and lecturer, had replied, "I shall, indeed, be proud to accept the very honourable distinction you propose to confer upon me. I esteem it a very high compliment, and I only wish I felt more worthy of it." Professor G. H. Darwin, F.R.S., also of Cambridge, author of several important works, wrote "I shall have much pleasure in accepting the Honourary Membership of the Toronto Astronomical and Physical Society if my nomination is accepted by the Society. I beg leave to thank the Society in advance for the honour which they propose to confer on me." Professor S. P. Langley, Secretary of the Smithsonian Institution, wrote, "I have pleasure in acknowledging the receipt of your communication in which you pay me the compliment of asking me to accept Honourary Membership in The Astronomical and Physical Society of Toronto. I beg to assure you of my sincere appreciation of the action of the Society in this connection and of my gratification in accepting the honour thus shown me." Professor E. C. Pickering, of Harvard, who had always taken a kindly interest in the Society and had laid it under obligations not only by donating the publications of his great Observatory but by promptly answering various questions submitted to him, said "Your letter asking if I should be willing to accept Honourary Membership in The Astronomical and Physical Society of Toronto is duly received. In reply, if I should be elected, I should accept with pleasure. With regards and pleasant reminiscences for Mr. Carpmael, I remain yours faithfully," and, later, after notice of election, "Please convey to the Society my sincere thanks for this honour." In his reply, the venerable M. Otto Struve, of St. Petersburg, wrote, "Only yesterday, I received your communication that The Astronomical and Physical Society of Toronto will honour me by nomination as Honourary Member. Probably my answer will come too late for the annual meeting ; however, I will not let pass a single day without expressing my thanks to the Society for the intended honour. In fact, I shall feel proud to be made an Honourary Member in company of those men you named in your letter. Though, at my age, I can hardly expect to make myself essentially useful to the aims of the Society, I shall certainly do it if an occasion presents itself, and with the greatest of pleasure. With respectful compliments and thanks to Mr. Carpmael, very truly yours." Professor Doctor H. C. Vogel, of Potsdam, the celebrated spectroscopist, said, "I beg you to

accept my very best thanks for the communication you kindly made me in your letter. The great honour The Astronomical and Physical Society is willing to afford me by a nomination to the Honourary Membership is to be estimated most highly and I shall be very glad to accept this honour. I beg you to transmit my very best compliments to Mr. Carpmael." The Reverend T. E. Espin, F.R.A.S., of Tow Law, Darlington, a frequent correspondent, said, "Your communication in which you inform me that The Astronomical and Physical Society of Toronto intend to do me the honour of making me a Corresponding Member, has just reached me. In accepting, may I ask you to convey to the members of the Society my sincere thanks and wishes that what I shall soon hope to call our Society may be as flourishing in the future as in the past. I have watched with great interest its progress and the increasing value to Science of its publications." Professor G. E. Hale, Director of the Kenwood Physical Observatory, wrote from Berlin, Germany: "Thank you for your very kind letter, which has just reached me *via* Chicago. Please convey to the Society my thanks for its offer to elect me a Corresponding Member. I highly appreciate the honour thus shown me, and shall take pleasure in accepting the relationship in case the election is made." M. Paul Henry, of the Paris Observatory, one of the justly celebrated photographers of celestial objects, wrote, "C'est avec la plus grande reconnaissance, quoique en etant bien indigne, que j'accepte la grande faveur que vous voulez bien me faire en me proposant de me nommer Membre Correspondant de votre Soci  t  . C'est un bien grand honneur pour moi de voir mon nom aupr  s des noms illustres de Miss A. Clerke, Messieurs Gore, Denning, S. W. Burnham, etc. Je vous prie, cher Monsieur, d'agr  er, avec tous mes remerciements, l'expression de mes sentiments tr  s distingu  s." Professor James E. Keeler, of Allegheny Observatory, the spectroscopist and discoverer at the Lick Observatory of motion of nebulae in the line of sight, said, "I beg to thank you very sincerely for your letter. It will give me great pleasure to become a Corresponding Member of your Society, the good work of which is known to me. I feel, however, this hesitation, that I am a member now of more Societies than I can do justice to, and my correspondence must be limited, but if you can overlook an apparent lack of interest due to this cause, I shall be glad to have my name enrolled in your list." In a later letter, the Professor, in returning thanks for election, expressed

the hope that he would shortly be able to contribute a paper as a result of some discussions of matters relating to the theory of the telescope. (Applause). Mr. Edward W. Maunder, F.R.A.S., First Physical Assistant at Greenwich Observatory, said, "Please assure The Astronomical and Physical Society of Toronto of my sense of the honour they have done me in nominating me as a Corresponding Member and convey to them my grateful acceptance of the position. I fear my somewhat numerous duties will but seldom allow me to contribute to their proceedings, but should I be able, I shall endeavour to do so. The diffusion of a love for Astronomy and the organization of astronomical workers are objects I have much at heart, and I most sincerely congratulate the Toronto Society on the success they have already attained in these fields." Professor C. H. McLeod, of McGill College, Montreal, a well known Canadian Astronomer, wrote, "Please convey to the Society my sincere thanks for the offer to place me on its list of Corresponding Members. I need not say that I appreciate the compliment highly, and shall be glad to accept the position. The knowledge that the nomination comes at the instance of your President, Mr. Carpmael, with whom, I have, for many years, had such pleasant relations and for whose great ability I have the highest respect, very much enhances my pleasure in accepting." Professor W. H. Pickering, of Arequipa, Peru, writing from Cambridge, Mass., said, "I may say it will give me great pleasure to become a Corresponding Member of your Society. Thanking you for the honour done me." Professor William A. Rogers, of Colby University, Waterville, Me., who has taken a deep interest in Canadian scientific matters, said, "I should highly appreciate an election to your Society as a Corresponding Member." The reading of these letters was followed by loud applause. Each of the candidates was formally proposed by motion, duly seconded, movers and seconders introducing their motions with remarks of a character complimentary to their nominees and their work. Each motion was carried unanimously. After the elections were over, the Chairman reminded the Society that with such illustrious names on its Honour Rolls, it must strive harder than ever to sustain the reputation which had largely been instrumental in inducing the new members to accept the invitations which had been sent to them.

On motion of Mr. Robert Dewar, seconded by Mr. G. G. Pursey, the cordial thanks of the Society were directed to be tendered to the editors of *The Globe*, *The Mail* and *The Empire* for their unvarying cour-

tesy and for enabling the Society, by a generous use of their columns, to reach the general public and, by means of reports of meetings, articles and notices, to awaken a wide interest in Astronomy and Astro-Physics. Two non-members presented plates, suitable for framing ; the one showing the Yerkes telescope as it was to be seen at Chicago, the other showing the Lick telescope in its dome at Mount Hamilton.

Mr. Pursey laid on the table various publications, including the last reports of The British Astronomical Association and The Astronomical Society of the Pacific, as well as a presentation and advance copy of the first volume of the new edition of Webb's "Celestial Objects for Common Telescopes," published by, and received from, Messrs. Longmans, Green & Co., of London. In addition to the compliment thus paid by the publishers, Rev. T. E. Espin, F.R.A.S., the editor of the new edition, in his preface, credited the Society with having suggested valuable features to be introduced into the book, which is invaluable to the amateur astronomer. The first volume deals entirely with the solar system; the second with the stars.

Mr. Todhunter, the Treasurer, presented an encouraging annual report showing that the assets of the Society, including telescopes, globes, books, etc., etc., had been valued at nearly \$1,100, that on the 31st of December there were 105 Active Members, 22 Life, Honourary, and Corresponding Members, and 17 Associate-Members, and that, after meeting all engagements, there was a small balance in bank. He pointed out that in the public interest, as well as in that of the Society, a larger revenue could be expended, partly for the purpose of paving the way towards procuring additional astronomical and physical apparatus, and ultimately for the establishment of a popular Observatory, where the interested public, under suitable guidance, might have opportunities to see, and even to study, the Sun, Moon, planets and stars under the best auspices. Mr. Sparling reported that during 1893, twenty-five regular meetings had been held, with an average attendance that indicated a well-sustained interest, summer and winter, in the work of the Society. On motion of the Treasurer, the annual fee for active lady members was placed at \$1, and the Life Membership fee for a lady member, at \$10.

Miss A. A. Gray read a list of phenomena predicted for the ensuing two weeks, special reference being made to Jupiter and to Saturn. A gyroscope was presented to the Society by Mr. A. Aronsberg, who,

also, explained the means by which simple lenses could be made by any one.

A Special Committee, consisting of Messrs. G. E. Lumsden, A. F. Miller, A. Aronsberg and C. A. Chant, B.A., was appointed to consider and report upon the propriety of petitioning the Dominion Parliament to reduce or remove the duty upon astronomical apparatus not made in Canada.

A very interesting display of the aurora at 6.10 p.m., January 3rd., was described by Messrs. J. A. Copland, Pursey, Elvins, J. Hollingworth, of Beatrice, Miss Wilkes and Dr. Larratt Smith. Mr. Copland said when he first noticed the aurora all the streamers were deep crimson in colour, and seemed to roll into each other and then shoot towards the zenith. At 6.20, the deep red colour seemed to be rent in two places by white bars ; white and red then kept interchanging, with crimson predominating, until 6.30, after which the display gradually died away. It was decided that the following meeting should be devoted to short popular papers upon Jupiter, the object being to elicit the interest of some of the younger members.

THE PROPOSED CHANGE IN RECKONING THE ASTRONOMICAL DAY

Was the subject of a short paper by Miss A. A. Gray, who had assisted in compiling the answers received from astronomers in various parts of the world.

Miss Gray said the Secretaries were still in receipt of an occasional reply to the Circular-letters sent out in May last for the purpose of eliciting the views of scientific men interested, to whom the following question had been put, "Is it desirable, all interests considered, that on and after the first day of January, 1901, the Astronomical Day should everywhere begin at Mean Midnight?" At time date of compilation, 170 answers had come in. These had been tabulated in a manner which would readily show the various opinions held. On the return to Canada of Dr. Sandford Fleming, C.M.G., the Joint Committee would, no doubt, take steps to issue an Official Statement. In the meantime, without detracting in any important degree either from the value of or the interest attaching to the Statement, it might be mentioned that while most of the replies were simply in the affirmative, or in the negative, there were many which were qualified in some respect. In some instances, reasons were given ; in others the answer was accom-