mean density of the earth. The attraction of the mountain was computed from contour maps and from information as to its density furnished by Mr. Whitman Cross of the U. S. Geological Survey. A set of quarter-second pendulums designed by Dr. Mendenhall was tested at four of the stations with satisfactory results. This is the smallest apparatus yet made for the purpose, weighing but 106 pounds with packing boxes.

HERBERT G. OGDEN.

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THE ASTRONOMICAL AND PHYSICAL SOCIETY OF TORONTO.

THIS Society, now very widely known, was originally formed in 1884 by a few gentlemen who, while actively engaged in business pursuits, were kindred spirits in their love for scientific study and met at intervals more or less regular at their respective residences for recreative reading, observation and experimentation. The membership gradually increasing, it was finally decided to secure incorporation under a general Act permitting the acquiring and holding of real and personal property, etc., and in 1890 the Society became a corporate body. The first president of the new association was the late Mr. Chas. Carpmael, M. A., F. R. A. S., the Director of the Toronto Magnetic Observatory; the vice-president was Mr. Andrew Elvins, who had indeed been the first to gather together the few friends who had formed the original nucleus, and who is still highly esteemed and honored as the father of amateur astronomy in Toronto. A constitution modeled upon that of the Astronomical Society of the Pacific having been framed and by-laws adopted, a circular was addressed to many scientific societies and distinguished astronomers and physicists throughout the world. Several of the latter became corresponding members, while various scientific bodies contributed many volumes of reports, etc., which formed the beginning of what is now a very valuable library. Without this very material aid the progress of the Toronto Society would have been very slow indeed, but as, at meeting after meeting, the secretary's and librarian's reports were read, it became soon apparent that the heartiest sympathy and support were being extended, without exception, by all who had been addressed.

The first annual report of the Society was an unpretentious little volume of 40 pages, containing abstracts of papers read during the year 1890, and records of the more important work done at the telescope by the various members who were particularly interested in observation. The frontispiece was a drawing of sun-spots and also of hydrogen flames, by Mr. A. F. Miller, who has always taken a keen interest in solar physics. Mr. T. S. H. Shearmen contributed a paper on 'Coronal Photography, in the Absence of Eclipse.' In common with many other enthusiastic observers, Mr. Shearmen is still engaged upon this work. Referring to the objection raised regarding the impossibility of photographing the corona in full sunshine on account of the very slight difference between the intensities of the two lights, Mr. Shearmen cites observations of the inferior planets seen projected on the corona.

The appendix to this volume contains a list of the presents donated by the various observatories and scientific bodies in the United States, and by Mr. John Goldie, of Galt, Ont., a life member of the Society. The list of the Society's exchanges increased very rapidly after the publication of the first report. The volume for 1891 contained papers by Dr. J. Morrison, Mr. J. Ellard Gore and Mr. W. F. Denning. An opera-glass section had been formed which met during the weeks alternating with the regular fortnightly meetings of the Society, and much interest

began to be taken in active telescopic work. An essay by Mr. G. E. Lumsden, entitled a 'Plea for the Common Telescope' (subsequently reprinted in the *Scientific American Supplement*), was the means of creating a very general desire for the possession of instruments of moderate aperture, and there are now a great many telescopes ranging to 5-inch among the members of the Society. Mr. Lumsden's own telescope is a $10\frac{1}{4}$-inch, With-Browning reflector. It was with this that he made an observation of a double shadow of Sat. I in transit across the disc of Jupiter, on the night of September 20, 1891. The particulars of the observation and comments upon theories accounting for the possible cause of the phenomenon, which has been seen but three or four times, appeared subsequently in *L'Astronomie*. A drawing of Jupiter made on the night of the observation forms the frontispiece to the volume of Transactions of the Society for 1891.

During this year the Society lost a sincere friend and earnest worker by the death of the Hon. Sir Adam Wilson, Chief-Justice of Ontario. This distinguished jurist, one of the most eminent of Canada's public men, had actively interested himself in scientific matters after retiring from the Chief-Justiceship, and had erected and equipped an observatory at his residence. Shortly after Sir Adam's decease, which was quite sudden, Lady Wilson donated to the Society his telescope, a six-inch reflector, together with other apparatus and many works on science. Sir Adam had intimated that he wished these to pass to the Society at his death. The reflector is now mounted at the residence of Mr. John A. Paterson, M. A., vice-president, and is used by the members in regular observation.

In 1892 McElvins resigned the office of vice-president, in order to have more time at his disposal during which to take up active work on special lines, notably meteorology. The constitution was amended to admit of election of two vice-presidents, and Dr. Larratt W. Smith, Q. C., and Mr. John A. Paterson, M. A., were appointed. During this year also the Hon. G. W. Ross, LL. D., Minister of Education, became Honorary President. The Society was now becoming very extensively known, and its list of correspondents rapidly increasing. The meetings were particularly well attended, and the Toronto press was most courteous and obliging in publishing reports of the Society's work from time to time. Meetings were frequently held at the Toronto observatory, where practical use was made of the large equatorial and other instruments of the equipment. The great magnetic storm of February 13, 1892, was charted by Mr. F. L. Blake, of the observing staff, and a photographic reproduction accompanied the volume for that year. Towards the close of 1892 a committee was appointed to act conjointly with a committee from the Canadian Institute with a view to moving in the matter of a change in astronomical time reckoning. The report of the committee was presented on April 21, 1893, and adopted. It is now widely known that the great majority of astronomers are in favor of reckoning the astronomical as the civil day, from midnight to midnight, and it remains for the Government of the United States to decide whether the ephemeris shall be changed accordingly. The Admiralty in England has expressed a desire to meet the views of other nations.

During 1893 the Society was enabled to further the object always kept in view, the popularizing of science, by the kindness of the University authorities, who gave the use of the physical lecture room for popular lectures, illustrated by experiment. Mr. C. A. Chant, B. A., and Mr. G. F. Hull, B. A., have taken charge of this department of the Society's work with eminent success. A very liberal interpretation of the physics

relating to astronomy having been made, there has resulted a keen interest in experimental science; so that he is a welcome addition to the membership who takes interest in any branch of what was formerly styled natural philosophy.

During the years 1893 and 1894 the subject of magnetism and electricity engaged a large portion of the time spent at the regular meetings. Spectroscopy, quite apart from its bearing upon astronomy, has also been a subject of interest. A valuable note, by Mr. A. F. Miller, on the spectrum of the light emitted by insects, appeared in the volume of Transactions for 1893.

In the earlier years of the Society's existence the meetings were held at the residences of members, but it was ultimately found that one central place of meeting would be preferable, and for some time past the regular meetings have been held in the rooms of the Young Women's Christian Guild building. Here the library is kept and the secretary has his office. The Society suffered another loss in October, 1894, by the death of the president, Mr. Carpmael, whose health had been impaired for some time previously. A short sketch of Mr. Carpmael's very active life is appended to the Transactions for 1894.

Dr. Larratt W. Smith, Q. C., succeeded Mr. Carpmael in the presidential chair, and the office vacated by the former is now ably filled by Dr. E. A. Meredith, formerly Deputy Minister of the Interior, and the predecessor of Sir Wm. Dawson in the presidential chair of McGill University, Montreal. The great work always before the Astronomical and Physical Society of Toronto is the founding of a popular observatory, in the true sense of the term; not being too sanguine, it is still hoped that steps will soon be taken to this end. It is a matter of regret that there is no astronomical equipment in Canada able to meet all the requirements of modern astronomy.

Two of the members of the Society, Messrs. Z. M. and J. R. Collins, have been very successful in making silver-on-glass specula, and have figured several of eight-inch; having recently fitted up apparatus for the work, it is confidently expected that they will soon be able to undertake the construction of very large reflectors. It is not too much to hope that they will be able to execute the telescope when the public spirit of the Toronto people demands a great observatory, and this may be in the near future, for, in regard to popularizing science, the Toronto Society has been eminently successful. A branch of the association at Meaford, Ont., has recently been formed, and other similar societies are already spoken of.

THOMAS LINDSAY.

CORRESPONDENCE.

THE RIVERS OF EDEN.

TO THE EDITOR OF SCIENCE: Referring to a note on the 'Garden of Eden' in SCIENCE (May 3, 1895), I desire to point out that in a series of articles, under the heading 'Gold, Bedolach and Shoham Stone,' in the 'Expositor' (London, 1887), I showed that the only possible scientific explanation of the geography of Eden in Genesis is that based on the geological explorations of Loftus, and now advocated by Prof. Haupt, namely, that the four rivers are the Kherkhat, Karun, Tigris and Euphrates. Farther I showed that the geography and geology of this ancient author are more accurate than those of modern maps and popular statements until within a very recent time, and that the local standpoint of the original writer was on the Euphrates, and his date not long after that of the historical deluge, whatever views may be held by critics as to the ultimate editing of the book. Delitsch and others have been misled by their want of knowledge of the condition of the district in the earliest human (Palanthropic) age, whereas this was evidently known