the Norway spruce. The male flowers would mature before the female had advanced far enough to be receptive of the pollen. —— Mr. Meehan also stated that in his garden at Germantown, there were few trees that did not exude sap from wounds made in winter or early spring; but among them all, few bled, as it was termed by horticulturists, more profusely than Cladastris tinctoria. The icicles formed from this exuding sap afforded a good opportunity to frost the saccharine character of the liquid. During congelation by frost, all foreign substances were rejected, and, in the formation of the icicle, the sugar was pushed forward to the extreme point. The end of an icicle of a sugar-maple was its only sweet part, and this was very sweet from the accumulation of the saccharine matter. The end of the icicle from the Cladastris was also sweet, though less so than in any other sugar-bearing tree he had observed.

Philosophical society, Washington.

March 1. — Gen. R. D. Mussey read a paper on the application of physical methods to intellectual science, discussing the extent to which those methods which have been successfully employed in the investigation of the phenomena of nature are applicable to the sciences whose subject-matter is mental operations. —— Mr. I. C. Russell followed with a communication on deposits of volcanic dust in the Great Basin. The sediments of the great quaternary lake of western Nevada, named Lahontan by Mr. Clarence King, include as minor members certain strata of white, unconsolidated, dust-like material closely resembling diatomaceous earth. Microscopic examination shows them to consist of minute shards of glass, and indicates their volcanic origin. Similar strata occur in the deposits of the quaternary lake which occupied the Mono basin, adjacent to the Lahontan; but these are coarser, and include fragments with pumiceous structure. Fragments of pumice are likewise found on the surface of the land in the vicinity of Mono Lake, and the distribution of these indicates their origin in a chain of rhyolitic cones extending southward from Mono Lake. The sub-aerial deposits belong to eruptions which, though prehistoric, must be quite recent. The sub-aqueous deposits were derived from quaternary eruptions. Those of the Mono basin can be referred, without hesitation, to the Mono craters; and those of the Lahontan basin are provisionally referred to the same source. Up to the present time, no other rhyolitic volcanoes of quaternary age have been discovered in the vicinity. Dr. T. Antisell remarked that the source of the volcanic dust should not be sought in existing volcanoes on the land: he regarded pumice as the product of submarine eruption exclusively. —— Mr. L. F. Ward read a paper on some physical and economic features of the upper Missouri system, describing the ancient and modern flood-plains of the Missouri and the Yellowstone where they issue from the mountains, and discussing the method of their formation. These are susceptible of irrigation; but diversion of river-water for that purpose, and its distribution over the land, involve difficult problems in political economy. The matter is a proper subject for governmental control. Discussion followed, in the course of which Prof. C. V. Riley remarked that the final solution of the grasshopper problem lies in the cultivation of the northern plains.

March 15. — Mr. G. K. Gilbert spoke on the diversion of water-courses by the rotation of the earth, maintaining, that, under certain indicated conditions, the deflecting force generally admitted to result from terrestrial rotation should result in observable modifications of valley configuration. —— Mr. G. E. Curtis read a paper on the relations between northers and magnetic disturbances at Havana, discussing the coincidences which had been pointed out, and demonstrating their accidental nature.

NOTES AND NEWS.

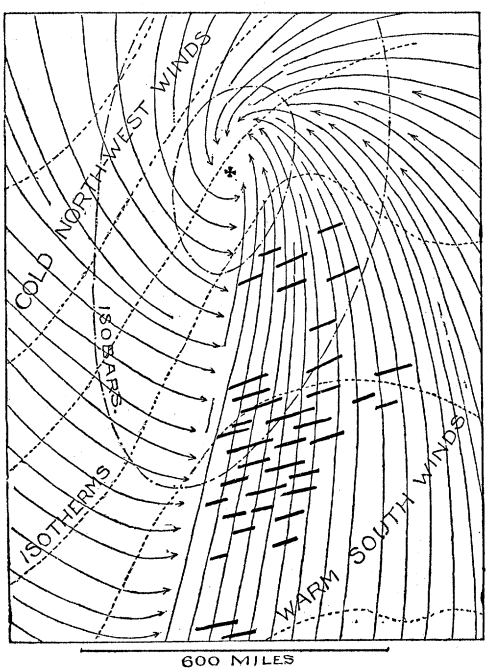
BY invitation of the authorities of the Johns Hopkins university, Sir William Thomson will deliver, in October next, a course of eighteen lectures on molecular dynamics, before the physical section of the Johns Hopkins university, beginning on Wednesday, Oct. 1. These lectures are intended only for students who are interested in advanced work. Professors and students of physics are invited to attend; and arrangements will be made by which they may easily obtain temporary lodgings, provided an early intimation is received of their intention to come. A registration fee of five dollars will be required.

— The Montreal local executive committee of the British association for the advancement of science is prepared to enroll ladies and gentlemen, residents on the continent of America, as members of the association, on the following conditions: 1°. Life members for a single payment of fifty dollars; 2°. Annual members for a payment of ten dollars the first year, and five dollars each consecutive year thereafter; 3°. Associate members for a payment of five dollars. Associates are not eligible to hold office in, nor to serve on any committees of, the association; nor do they receive the annual reports. All other privileges of membership for the year are open to them. No person who is not a member is admitted to any of the meetings of the association. The privilege of reduced fares by the railway and steamboat lines is limited to the life, annual, and associate members. Applications for admission to membership may be addressed to Mr. J. D. Crawford, post-office box 147, Montreal.

— Bliss's classified index to the maps in Petermann's *Geographische mittheilungen*, from 1855 to 1881, has just been issued by Harvard college library in advance of its completion, in the *Bulletin* of the university. It occupies fifty-five small quarto pages, and will be found exceedingly helpful to those using that treasury of excellent charts. The principal division is, of course, geographical; but many titles are conveniently repeated under the miscellaneous head,

including mainly meteorological, seismological, geological, botanical, and zoölogical maps. A reference-list to persons, expeditions, and surveys, is also appended.

— The third series of charts published by the signal-service, to illustrate the studies of tornadoes undertaken this year, represents the storms of March 25. Twenty tornado-tracks are mapped, scattered over the states south and east of Indiana. Their times are all in the afternoon or evening, and their courses, as usual, bear about east-north-east. The results of these disasters are at present counted thus: number of persons killed, 77; wounded, 298; valuation of property destroyed, $950,000. The contrast of the small, local tornado-whirls and the great sweep of the cyclonic circulation is clearly marked; and the attitude of the tornadoes, relative to the cyclone centre



and the warm and cold winds, is seen to be about the same as was shown on the earlier charts for Feb. 19 and March 11. The accompanying diagram is designed to show this relation in a general way, being based on an average of the three sets of charts. The nearly north-and-south elongation of the barometric depression is a departure from the more easterly trend of the major axis of the isobaric curves given in Loomis's averages; and this peculiar form is doubtless to be held in chief part accountable for the significantly abrupt change from the cold north-westerly winds of the western half of the cyclonic area to the warm southerly winds of the eastern half. The contrast of temperature thus produced is exhibited in the oblique trend and close approach of the isothermal lines, which are drawn for ten-degree differences. But most striking is the limitation of the tornado to that part of the warm southerly winds which is immediately overflowed by the cold winds, and the advance of the tornadoes, not with the surface-currents, but parallel to the spiral course of the cold blast overhead, through which the warm lower air ascends. The limitation of tornadoes to certain parts of cyclones, as thus shown, is a most hopeful sign, that, with longer and more detailed study, the smaller storms may, a few years hence, be predicted with a much accuracy as the larger ones are now.

— Prof. George F. Wright has contributed a good article on 'the Niagara gorge as a chronometer' to the April number of the *Bibliotheca sacra*. The conclusion is reached that the entire gorge from Queenstown to the Falls is the result of post-glacial cutting and that the most probable rate of recession of the falls is about three feet a year; thus placing the end of the glacial period here about twelve thousand years ago. This agrees very well with the date determined by Prof. N. H. Winchell from the Falls of St. Anthony. The inconvenience to naturalists of having such an article as this stowed away in a theological magazine may be counterbalanced by the satisfaction they should feel on learning that it could be accepted there at all.

— Arrangements have been completed for holding at the university library, Berkeley, Cal., during the last week of May, a loan exhibition of books illustrative of the history and progress of printing.

— The government of Newfoundland has voted to establish a geological museum at St. Johns. Mr. James P. Howley, the geological surveyor, is now giving his whole time to it, and, before the year is over, the museum will be open to the public and to students. The collections made by Alexander Murray and James P. Howley are especially rich in orthoceratites, trilobites, and fossils of the primordial fauna.

— A cable message received at Harvard college observatory announces the discovery of an asteroid (No. 236) by Palisa, at Vienna. Its position was, April 26, 40.42 Greenwich mean time; right ascension, 13h., 0m., 43.5s.; declination south, 3° 21′ 41″; daily motion in right ascension, 44s.; in denomination, N. 6°. It is of the twelfth magnitude.

— The *Engineer* of March 29 gives a new method of preparing wood-blocks for paving, practised by Mr. Mallet of Moissac. He boils them in a solution of sulphate of copper, sulphate of zinc, and chloride of sodium, mixed with heavy mineral oil, linseed-oil, and tallow, and afterwards compresses them to about one-tenth of their original volume.

— In our last number, p. 503, Dr. Sturtevant's quotation from the *American journal of science*, which he attributes to Professor Asa Gray, is from a reprint of a portion of Dr. Carpenter's article in the *Philosophical transactions*. As Professor Gray's name does not appear in any connection, even in the introduction, and as the whole extract from Dr. Carpenter is within quotation-marks, the mistake seems unaccountable.