COMETS 1880, *d* AND *e*.—M. Bigourdan has continued his ephemeris of the comet discovered by Schäberle on April 6, but states from observations made at Paris that the intensity of light has diminished much more rapidly than is due to change of distance from the earth and sun; on September 30 he estimated the comet to be of the same brightness as on May 18; it is still in a favourable position for observation, as will be seen from the following extract from M. Bigourdan's ephemeris for Paris midnight:—

	R.A.	N.P.D.		R.A.	N.P.D.
	h. m. s.	° ′		h. m. s.	° ′
Oct. 22	5 56 3	89 49	Oct. 30	5 34 22	94 55
24	– 50 57	91 4	Nov. 1	5 28 27	96 12
26	– 45 38	92 21	3	5 22 21	97 28
28	– 40 6	93 38	5	5 16 6	98 44

The Astronomer-Royal has notified the discovery of another comet by Mr. Lewis Swift of Rochester, N.Y., on the night of October 11, in R.A. 21h. 30m. and Decl. + 18°.

METEOROLOGICAL NOTES

PROF. LOOMIS, in his thirteenth contribution to meteorology, investigates the question of the great and sudden changes of temperature which are so marked a feature in the climates of a large portion of the United States. Six years' observations of the Signal Service stations have been examined, with the result that there are 118 stations at which there has occurred at least one case of a daily range not less than 40°·0. Limiting the inquiry, however, to stations at which the average number of cases amounted to six annually, it is seen that there are thirty-six such stations. The stations where the great fluctuations of temperature occur most frequently are situated south of lat. 35°, in which region the fluctuations of pressure attending the progress of storms are but little felt; and it is to be noted that these great fluctuations of temperature occur most frequently in the summer months. Thus at Wickenburg (lat. 34°·0, long. 112°·7), which is situated in a desert sandy region, with an annual rainfall of only 4·99 inches, on ten of the nineteen days ending with August 14, 1877, the temperature showed a daily range of at least 62°·0, reaching in one case to 76°·0. These enormous temperature changes are due to the extreme dryness of the air, by which the sand becomes intensely heated by the sun during the day, whereas by night the loss of heat by radiation is as great as perhaps anywhere on the globe. The general result of the inquiry is that the most remarkable cases are merely examples of the ordinary diurnal change of temperature, unaffected by the passage of storms, whilst the remaining cases, which occur in the higher latitudes of the States, are to be ascribed to the influence of storms along with the ordinary diurnal change of temperature. It also appears from a careful investigation that dry air, even when greatly heated, has but little ascensional force, and that the violent uprising of heated air, so frequently witnessed in moist climates, particularly during thunderstorms, is mainly due to the large amount of aqueous vapour with which it is charged. As regards great fluctuations of temperature in winter, Prof. Loomis points out that while, for example, a temperature of – 20°·0 occurs at Denver on the east side of the Rocky Mountains, an average temperature of 30°·0 prevails in the Salt Lake Basin, and remarks that by the movements of the atmosphere attending the progress of a great storm these contiguous masses of air with temperatures so different from each other are brought successively over the same station, and thus bring about a change of temperature amounting on occasions to 50°·0 in a single hour.

PROF. LOOMIS also carefully investigates the storms, with their characteristic low barometers, which cross the Rocky Mountains, and shows that no great barometric disturbances originate in the Salt Lake Basin; that nearly all the great barometric disturbances experienced in the Salt Lake Basin come from the Pacific, and generally from the north-west; and that nearly all these disturbances can be followed to the Atlantic, meeting it near lat. 47°·0, and occupying from two to six days in the passage, or an average of three and a half days, corresponding to an onward movement of about 700 English miles a day. As has been shown to obtain in other regions of the globe, the isobars which define storms are often not so symmetrical over a mountainous region as over a level country. In not a few cases however the isobars show considerable symmetry over the Rocky Mountains, and this feature becomes the more noticeable in very violent storms. From the observations made at Pike's Peak, 14,200 feet high, as well as at Mount Washington, 6,285 feet, it appears that the winds at great elevations circulate about a low barometer, just as they do near the level of the sea; but the position of this centre at great heights sometimes differs considerably from the low centre prevailing at the surface of the earth, and when such deviation does occur it is generally toward the north-west. Of the thirty-six cases examined, the low centre at great elevation was, in twenty-seven cases, vertical over the low centre at lower levels, in five cases to north-west, in one case to north, in another case to west, and in two cases to east. It must however not be lost sight of that this important point in the phenomena of storms cannot be exactly determined but by a multiplication of high-level stations.

DISPLAYS of auroras appear to have been remarkably frequent in America during August last. In Mr. Carpmael's Weather Report of the month for Canada it is stated that the aurora of the 12th was very brilliant, and was seen at nearly every station from Manitoba to the Atlantic. From the United States Monthly Weather Report we learn that auroras were frequent during the month, occurring on no fewer than twenty-one nights, the auroras of the 12th and 13th being of remarkable brilliancy, as well as widespread. On these nights the aurora was seen at about 100 stations from Maine westward, as far as clear skies allowed its being seen. The more prominent features of these auroras as detailed in the Report are of such interest as to suggest that a more detailed account of them, as seen in the northern hemisphere during the night of August 12 and 13, could not fail to contribute data of the greatest importance in this little-understood branch of physics.

IN the *Journal* of the Scottish Meteorological Society, recently published, there is a paper of some interest, by Mr. Buchan, on the diurnal periods of thunderstorms in Scotland. There are two well-marked types of thunderstorms, the one occurring in the summer months, and having its daily maximum frequency from 1 p.m. to 6 p.m., and the other occurring in the winter months, with its maximum from 9 p.m. to 3 a.m. Stations in the eastern division of the country where the annual rainfall is small, or only of moderate amount, have all, or nearly all, their thunderstorms during the summer months; whereas in the west, or where the climate is wet and the rainfall heavy, a very considerable proportion of the thunderstorms occur during the winter months, and these are nearly always of short duration, and are the accompaniments of the winter cyclones of North-Western Europe. In this connection it is interesting to note that the thunderstorms of Stykhisholm in Iceland are phenomena of the winter months and of the nights, only three being recorded as having happened at a time of the day when the sun was above the horizon. The maximum daily period of the summer thunderstorm coincides with the hours when the ascending columns of heated air from the earth's surface are in full activity, and the result is no doubt largely due to the circumstance that these ascending masses of heated air develop a charge of electricity as their moisture condenses into cloud. The period of maximum frequency of the winter thunderstorm occurs some hours before and after midnight, or during those hours of the day when the land surface presented to the vapour-laden winds of the Atlantic approaches to and reaches its diurnal minimum temperature, and when consequently the condensation of the vapour may be expected to reach its daily maximum. On the other hand, the minimum period in summer occurs during the early morning, the absolute minimum being at the hour just before the ascending columns of heated air are set in motion, and the number remains few till about 11 a.m., or till the tops of the heated columns have risen to some height in the atmospheres.

IN the *Journal* of the Meteorological Society for April and July last are given the results of observations made during the first six months of 1880 at about forty "climatological stations" recently established by the society. At these stations observations are taken only once a day, viz., at 9 a.m., and are restricted to temperature, cloud, and rain. An extension of these stations which would include the whole of the English sanataria, and which doubtless will gradually be effected, would furnish data for a correct presentation of the comparative climatologies of the health resorts of England.

BIOLOGICAL NOTES

NEST-BUILDING AMPHIPODS.—Mr. S. J. Smith, in a memoir on some amphipods described by Thomas Say (*Trans.*, Connecticut Acad., July, 1880), states that the tubes which certain