Naturalist. In a brief review of the general characters of the vegetation of the country the peculiarities in distribution are pointed out. The arrangement of the trees referred to is not based on any scientific principle, the Coniferæ being "placed first, as having the greatest importance both from an economic point of view and from the vast extent of country which they cover almost to the exclusion of other trees." Considering the variety of well-known timber trees to be found in British Columbia one is scarcely prepared to find it stated, with regard to the Douglas Fir (*Pseudotsuga Douglasii* or *Abies Douglasii*), that it is the "most important timber tree of British Columbia, and the only one of which the wood has yet become an article of export on a large scale." The best grown specimens of this noble tree are stated to be found near the coast in proximity to the waters of the many bays and inlets which indent it. In these situations the tree frequently exceeds eight feet in diameter at some considerable height from the ground, the height of the tree itself ranging from 200 to over 300 feet. "The wood varies considerably in appearance and strength according to its locality of growth and other circumstances. It is admirably adapted for all ordinary purposes of construction, and of late has obtained favourable notice in shipbuilding, remaining sound in water for a long time. For spars and masts it is unsurpassed, both as to strength, straightness, and length. Masts for export are usually hewn to octagonal shape from 20 to 32 inches in diameter by 120 feet long. Yards are generally hewn out from 12 to 24 inches in diameter and 50 to 102 feet long. Masts and spars are generally sent to Great Britain; other forms of timber to South America, Australia, India, China, and the Sandwich Islands. Of the *Thuja gigantea*, which in favourable situations on the coast reaches a height of 100 to 150 feet, the pale yellowish or reddish wood is stated to be very durable, though not extensively used except for shingles. The large and elegant canoes of the Indians are made of the hollowed trunks, and the fibre of the inner bark is used for ropes and cordage, as well as for paper-making and other purposes. One of the most remarkable uses for a wood is referred to under *Pinus contorta*, where it is said that the cambium layer contains much sugar, and for that reason it is eaten by the natives in the spring of the year, and in some instances large quantities of it are collected and dried for winter use.

THE *Boston Herald* gives the following account of an American experiment made on September 2:—"A novel exhibition of powerful electric lights was made last evening in the vicinity of the Sea Foam-house, Nantucket Beach, and the display was witnessed by quite a crowd of interested spectators. The Northern Electric Light Company have erected three wooden towers, each 100 feet high, and mounted upon each of these a circular row of twelve electric lights of the Weston patent, each light being estimated at 2,500-candle power. As these towers are but 500 feet apart and in a triangle, it will be seen that the light of 90,000 candles was concentrated within a limited territory. The design of the exhibition was to afford a model of the plan contemplated for lighting cities from overhead in vast areas, the estimate being that four towers to a square mile of area, each mounting lights aggregating 90,000-candle power, will suffice to flood the territory about with a light almost equal to midday. Last evening a motive power of thirty-six horses was used in generating the electricity from three Western machines, and the lights, with one single slight flicker, burned steadily and brilliantly all the evening. It is difficult to say whether the experiment proved anything or not. The claim put forward by the company is for an original plan of lighting cities and towns by grouping and elevating electric lights of any kind."

WE have received Part 1 of the *Transactions* of the Epping Forest and Essex Field Club, containing Mr. Henry Walker's interesting lecture on "A Day's Elephant Hunting in Essex."

AT the Leeds Philosophical and Literary Society the following are among the lectures to be given this winter:—October 20, Prof. Silvanus P. Thompson, D.Sc., "Waves of Sound and the Photophone"; November 16, H. Clifton Sorby, LL.D., F.R.S., "The Structure and Origin of Meteorites and Meteoric Iron"; December 7, Dr. Sydney H. Vines, "The Nutrition of Plants"; December 21, Prof. E. Ray Lankester, F.R.S., "Degeneration"; February 15, 1881, Prof. T. E. Thorpe, Ph.D., F.R.S., "The Azores"; March 1, J. W. Swan, "The Electric Light, with Demonstrations."

OUR ASTRONOMICAL COLUMN

THE BINARY STAR δ EQUULEI.—Mr. Burnham publishes a new epoch for this star, which there is now good reason to conclude will prove to be the most rapid revolver amongst the binary systems; on this account it well deserves the attention which Mr. Burnham claims for it at the hands of those observers who are in possession of instruments competent to cope with so close a double-star. The duplicity was detected by M. Otto Struve on August 19, 1852, with the Pulkowa refractor, when definition was unusually good, and the components almost equal in magnitude were "à peine séparées par une ligne noire." In 1853 and 1854 it appeared single in the same instrument. The object was elongated in the summer of 1857, and at the date 1858·59 M. Struve saw the stars separated at moments, and they were again divided in the autumn of 1874. As is pointed out in the Pulkowa Observations, vol. ix., the case is evidently a similar one to that of 42 Comæ Beren., the visual ray coinciding very nearly with the plane of the orbit, so that the companion appears to oscillate backwards and forwards almost in a right line, and that of very small extent. M. Struve has established the period of revolution of 42 Comæ to be only about twenty-five years, but δ Equulei appears to indicate a period of only thirteen or fourteen years. Mr. Burnham finds from five nights' measures with the 18½-inch Chicago refractor,

1880·60, Position 29°·1, Distance 0″·35.

In September, 1870, Dunér remarked of this star: "Oblongue, j'en suis bien sur. Les diamètres sont comme 3 : 5," and the angle was estimated 8°. The only measures except Mr. Burnham's are those of M. Otto Struve. The magnitudes of the components are so nearly equal (the American observer considered there was a difference of only about two or three tenths of a magnitude), that care will be necessary to place the smaller star in its proper quadrant. Mr. Burnham adds: "It seems certain that it is measurable with any good instrument of ten inches aperture and upwards at least one year in every six years," and he believes that it is now near its maximum distance.

FAYE'S COMET.—The following positions are extracted from Dr. Axel-Möller's ephemeris for Berlin midnight:—

	R.A. h. m. s.	N.P.D. ° ′	Log. distance from Earth.	Log. distance from Sun.
Oct. 22	22 48 22	88 50·8	0·0506	0·2892
24	— 48 58	89 9·8	0·0532	
26	— 49 43	89 27·8	0·0561	0·2855
28	— 50 37	89 45·0	0·0591	
30	— 51 39	90 1·2	0·0623	0·2819
Nov. 1	— 52 50	90 16·5	0·0656	
3	— 54 9	90 30·7	0·0691	0·2785
5	— 55 37	90 43·8	0·0727	
7	22 57 2	90 55·9	0·0764	0·2751

The comet remains sensibly at the same intensity of light (not far from the maximum of the present appearance) during this period. On October 26 it will be within 20′ from 1 Piscium (B.A.C. 7985), and on November 3 very close to 3 Piscium (B.A.C. 8012), stars of the sixth magnitude.

HARTWIG'S COMET.—The subjoined places of this comet are from the calculations of Dr. Oppenheim, and are also for Berlin midnight:—

	R.A. h. m. s.	N.P.D. ° ′	Log. distance from Earth.	Log. distance from Sun.
Oct. 22	17 52 1	76 23·8	0·0582	0·0610
24	17 58 30	77 13·0	0·0826	
26	18 4 22	77 57·3	0·1057	0·0883
28	18 9 43	78 37·2	0·1276	
30	18 14 39	79 13·2	0·1483	0·1136
Nov. 1	18 19 13	79 45·7	0·1680	
3	18 23 26	80 15·1	0·1868	0·1370

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