Meteors.

Date.		Radiant. R. A.	Radiant. Dec.	Character.
May 1-6th	. .	338°	− 2°	Swift; streaks.
11-28th	. .	331°	+27°	Slow; small.
May—June	. .	235°	+ 9	Rather slow.
May—June	. .	280°	+32	Swift.
May—July	. .	252°	−21	Slow; trains.

Planets.

Venus—Is an evening star. It sets 3h. 1m. after sunset.

Saturn—The position of this planet on the 15th May at 8 p.m. will be R.A. 2h. 39m. 17s. Dec. 13° 16′ 14″ N. The time of its rising will be 4h. 20m. a.m. on the 16th May.

Mars—The position of the planet on the 15th May at 8 p.m. will be R.A., 23h. 13m. 12s. Dec. 6° 55′ 26″ S. The time of its rising will be 1h. 29m. a.m. on the 16th May.

Jupiter—The position of the planet on the 15th May at 8 p.m. will be R. A. 14h. 23m. 54s. Dec. 12° 51′ 15″ S. The time of its setting will be 4h. 10m. a.m. on the 16th May.

Eclipse of the Moon.

There will be a penumbral eclipse of the moon on the 12th May 1911.

	D.	H.	M.
First contact with penumbra . .	12	21	15
Mid Eclipse	12	23	36
Last contact with penumbra . .	13	1	37

Extracts from Publications.

Speaking at the meeting of the British Astronomical Association in February last, Dr. Crommelin pointed out an easy method of predicting the approximate time of an approaching perihelion passage of Encke's Comet without complicated calculation. The planet which particularly disturbed the motion of Encke's Comet was Jupiter, whose influence might make a difference of two or three weeks in the time of revolution. The other planets could affect it only by a few hours. Now, 18 revolutions of the comet did not differ much from five of Jupiter, and consequently the Jupiter perturbations nearly repeated themselves after that period. They had now observed Encke's Comet for more than two of these periods of 59 years, and by tabulating the interval in days between each perihelion and the one 59 years later, they could plot the result as a curve. If the plotting was carefully done, and the curve carried on by estimation, they could predict a return within a day or so with a minimum of labour. The interval between the perihelion of 1786 and that of 1845 was 21739·7 days, but between those of 1848 and 1908 it was only 21705·0. The diminution was due to the acceleration in the comet's motion.

The resulting curve was sinuous, and now showed a tendency to turn up again, but he did not expect that the upward movement would be maintained for long. As the comet is due this year, Dr. Commelin estimated from the curve its date of perihelion passage to be August 20th, and he thought it would be right within a day or two.

[*Journal of the British Astronomical Association.*

Much attention was given to Halley's Comet, which was first seen in 1909, November 18th, as an extremely faint object with the equitorial telescope. On November 30th it was a little south of Aldebaran and quite within the glare of that bright star. During December 1909, and January and February 1910, the increase of brightness was very slow, and at the beginning of March the comet was lost on the sunset horizon. It was next seen with a bright nucleus on the morning of April 21st. The retrograde movement continued till April 25th, when it turned a short curve and started on a direct course. On May 2nd it was a splendid telescopic object with a fine tail, down the centre of which was a distinct dark-channel. The nucleus was distinctly circular, and the comet was well visible to the naked eye passing a little north of 31 Piscium. After May 14th the comet came too near the sun for further morning observations, but was just caught with the naked eye on the evening of May 23rd, and was well seen the next night. The finest view was on May 25th, when the tail, though faint, could be traced 10° or 12°. On June 3rd the comet was passing near α Sextantis, and it was last seen much fainter and near the horizon on June 14th, after having been observed for nearly seven months, or more exactly 204 days.

[*Journal of the British Astronomical Association.*

Halley's Comet continues to be observed with powerful instruments. Prof. Barnard is following it assiduously, and has forwarded the following observations :—

G. M. T.					App. R. A.			App. S. Dec.		
	D.	H.	M.	S.	H.	M.	S.	°	′	″
1911 Jan.	22	20	23	59	11	33	24·51	18	20	14·3
,,	22	21	7	5	11	33	22·42	18	20	11·9

We also hear that it was observed at the Cape with a 12-inch refractor on February 5th. It seems likely that it will be followed at least till its next conjunction with the Sun, which will occur about August. Needless to say, it has already beaten its former records for length of period of observation, both before and after perihelion.

[*Journal of the British Astronomical Association.*

The following observations of Nova Lacertæ have been communicated to the British Astronomical Association by Revd. T. E. R. Phillips, M.A., F.R.A.S.:—

Date.	Magnitude of Nova.		Remarks.
	By direct comparison with 12¼inch speculum.	By use of Diaphragm on 2·9 in O. G.	
January 6	7·6	...	Decidedly red. Spectrum shows two bright lines approximately near middle separated by conspicuous dark space. Other bright lines suspected.
,, 7	7·6	...	......
,, 15	7·6	...	Still very red. Estimate of magnitude probably too high.
,, 24	8·1	...	Less red. Additional bright lines glimpsed one towards the violet and another at a greater distance towards the red.
,, 28	8·4	8·6	Redder again.
,, 30	8·4	8·7	Very red. Dark space in spectrum has disappeared ; two very bright lines close together in yellow or orange.
,, 31	8·4	8·6	......

Date.	Magnitude of Nova.		Remarks.
	By direct comparison with 12¼inch speculum.	By use of Diaphragm on 2·9 in O. G.	
February 1	8·6	8·8	......
,, 7	8·6	...	Stars very dim through thin cloud.
,, 15	8·7	...	Stars dim through their cinus.
,, 19	8·8	9·1	Sky very transparent. Nova orange yellow, certainly less red. Spectrum now cut off sharply at red end beyond brilliant line with another less bright line close to it on the more refrangible side. (Perhaps the two lines mentioned under January 30). Then a comparatively **dark** space with indications of other bright lines further towards the violet.

Summary:—

(1) The decline of the Nova, if not quite regular, has been without any of the sharp and rapid fluctuations such as distinguished Nova Persei in 1901.

(2) There have been changes in the depth of colour.

(3) There have been changes in the spectrum.

(4) For some reason the brightness of the Nova appears about a quarter of a magnitude greater in the large reflector than when using a diaphragm on the small refractor. Probably the reason suggested above is the true one, but it is possible that my eye is more sensitive to red than white light in a degree depending on the apparent brightness of the object.

[*Journal of the British Astronomical Association*.

Looking at the sky on a clear night, we see from two to three thousand stars. In trying to tell you something about these three thousand stars, I will endeavour to explain their distance and how it is measured and something about them. Assuming that the Sun is about 93,000,000 miles distant from the earth, and that the earth travels round the Sun in a year, in six months it will be on the other side of the Sun 180,000,000 of miles from its starting point, and we can take that distance as our base line for measuring the distance of the stars. Even with such a base line their distance has proved so enormous that it has not been possible to measure the distance in the roughest possible manner of more than eighty or one hundred stars. Two methods have been adopted—one of measuring the angle directly from each end of the base-line, called the direct method. I think in no case has the angle exceeded half a second, or a space so small as to be almost impossible to get accurately. The other method, called the relative method, consists of selecting two stars close together, and seeing whether every six months there is any difference in the distance between them, as if there is one much further distant than the other, one would be almost stationary, while the closer one would show motion, the amount of that motion enabling its distance to be calculated. So far as known, Alpha Centami is nearest to earth, distant about 25 billions of miles, and light travelling 180,000 miles a second takes more than four years to traverse the distance. Alpha Centami, although to the naked eye a single star, is really the finest double star in the heavens. The two stars of which it consists revolve round their common centre of gravity in a period of 81 years. Knowing their distance from the Sun, their distance apart from one another, and the time in which they make a complete revolution of their complete year, astronomers are enabled to calculate their weight. And the remarkable fact is found that their combined weight is about equal to twice that of our Sun.

[*English Mechanic.*

Let us take a bundle of rays from the Sun and examine them. We will find it to be a most beautiful and wonderful collection, permitting of being arranged like organ-pipes for the hundreds of different kinds of wave lengths, each having its own peculiar property as we interpret it. We recognise and treat generally three large divisions: those rays that give us essentially heat, those that produce the sensation of light, and those that manifest themselves most by their chemical action as shown by the photographic plate. At the moment, we are most interested in those that give us heat. Next let us try and find out what measure of heat the Sun is sending to us. Immediately two considerations present themselves—that of absorption and that of radiation—that is our receiving device must be such that we catch and retain all the heat rays that fall upon it. For this purpose we use therefore a black surface of given dimensions and expose it at right angles or normal to the rays of the Sun to measure how much heat is absorbed. But here a factor comes into play that must not be overlooked. Those rays from the Sun before reaching us pass through our atmosphere, a factor in the life upon our earth that cannot be overestimated. The heat of the surface of the earth is a matter of absorption and radiation. Of the former, fully three-fourths is obtained from the wave lengths that lie between the violet (·4 μ) and ultra red (1·1 μ) of the solar spectrum, while the radiation is by comparatively long wave lengths, the maximum intensity being in the neighbourhood (2 μ). Although of a hot and cold body, we readily say that, relative to each other, the hot body radiates and the cold body absorbs heat; but the ultimate mechanism between absorption and radiation is not known. It is obvious that the solar rays in passing through our atmosphere must suffer some absorption, and selective absorption at that, dependent upon the thickness of the layer, upon its temperature, density and gaseous constitution. The last is the point to which we shall give a little consideration in order to offer a plausible explanation at least of the varying thermal conditions which we know have obtained on the surface of the earth in order to produce these geological epochs as shown by a tropical fauna and flora in higher latitudes, as also by glacial deposits.

At present the composition of the atmosphere is made up mainly of nitrogen and oxygen, there being in volume nearly four times as much of the former as of the latter.

There are traces of other gases besides. Carbonic acid gas or carbon dioxide, which plays so important a part in the earth's history, is represented by about ·03 volume per cent. It must appear obvious that, with the continual changes going on on the earth, the weathering and disintegration of rocks, the deposition of calcareous and other matter at the bottom of the ocean to form new geological beds, the continual cycle of life and death in the animal and vegetable kingdoms, all drawing on the vast reservoir of the atmosphere, there must occur some changes in the relative constitution of our atmosphere, and these latter would necessarily, by selective absorption, modify to some degree the heat of the surface of the earth. From investigation, it appears that a slight change in the quantity of carbonic acid gas in the atmosphere would materially affect the climate: an increase would raise the temperature and a decrease lower it. For instance, it has been computed that an increase from ·03 to ·09 per cent. would raise the temperature from 12° to 16° F. Such a general rise would have far-reaching results—results that would be of a magnitude quite competent to account for the phenomena we are trying to explain. But the question arises, even if we grant the effect of an increase of carbon dioxide, how could an increase of this gas be produced?

Now, it is well known that the active volcanoes emit vast quantities of aqueous vapour and carbonic acid gas. Here, then, we have a factor that may give us the desired data, provided evidence can be adduced that there has been sufficient variability in volcanic activity. When we look over the various geological epochs of the earth's history and their accompanying formations, which are to a great extent a matter of chemical combinations, and the latter are largely dependent upon temperature, it is found that volcanic activity has been variable. From this, then, we seem to be justified in believing that the surface heat of the earth has suffered changes through the varying quantity of carbon dioxide present in the atmosphere, and a change sufficient to produce those long period climatic changes that certainly have existed on our earth, and which have left such indelible evidences of their presence at one time. Granting the modifying heat effects of carbonic acid gas, we may take into consideration the work of man. I allude to the consumption of coal. Two processes take place for combustion—oxygen is withdrawn from the atmosphere, and carbon dioxide is added, the latter stimulating plant assimilation besides raising the general temperature, as we have seen above, and the former assisting in the restoration of the equilibrium of the oxygen in the atmosphere, as we know that plants in general exhale oxygen. To that the depletion of our coal beds is not an unmixed evil, and it might be added that the smouldering of our coal deposits, which have been going on for a long time in the Mackenzie basin, may mitigate the climate there to an appreciable degree. These deductions are qualitatively sound, and they may be so quantitatively.

Before leaving this subject of Solar radiation and absorption, it may be stated that the most recent researches on this subject give, for what is known as the Solar constant; about 2 calories, *i.e.*, the direct rays of the sun after allowing for atmospheric selective absorption, would heat a gramme of water 2° C in one minute.

[*English Mechanic.*

Notices of the Society.

Election of Members.

The attention of members is invited to Bye-law No. 14, regulating the election of persons who desire to join the Society. It is hoped that those who are already members