results. For instance, it is generally recognised that protoplasm is a colloidal complex, apparently existing both in the hydrosol and hydrogel state, the two states being spontaneously reversible; the process of germination of fungus spores, followed by the dark-ground method, showed the gradual conversion of the gel contents of the spore into a hydrosol on absorption of water, and later a formation of a gel might occur again. The nucleus and chloroplasts are probably specialised parts of the plasma with a hydrogel structure, but only in favourable cases could the nucleus be studied. Particles and vesicular bodies (which the author terms "sap particles") were usually found in the cell-sap and showed a continuous Brownian movement; they usually increased in number with decreasing vitality of the cell.

THE problem of the dolomitisation of limestone has received an interesting contribution from Prof. R. C. Wallace, of the University of Manitoba (*Compte-rendu* of the twelfth International Geological Congress, 1914, p. 875). He regards the concentration of magnesium ions in the solution from which dolomite is precipitated as in many cases the determining factor. This concentration at moderate depths of sea-water may determine whether calcite or dolomite is stable; at a certain concentration of magnesium, calcite goes into solution and dolomite is deposited. In a solution in which calcite is stable, magnesium carbonate may be unstable, and may go into solution until the magnesium ions are sufficiently abundant to produce a precipitation of dolomite. In the case, again, of underground water bringing magnesium into a limestone, a solution may abruptly arise in which calcite is unstable and becomes replaced by dolomite. It will be seen that this view differs from the older one of the mere substitution of magnesium for part of the calcium present in a mass of calcium carbonate.

WE have received from Prof. Eredia a pamphlet entitled "The Organisation of the Service of Weather Predictions in Italy," reprinted from the *Rivista Meteorico-Agraria* (vol. xxxv., 50 pp.). An experimental system of weather telegrams was instituted in the Papal States from July to December, 1855, and the observations were forwarded to Padre Secchi for examination. His report of the experiment was favourable, but practically the commencement of the service dates from April, 1866, when observations were telegraphed to the central office at Florence. After the removal of the latter to Rome the service was frequently improved, under the direction of Prof. Tacchini, and the daily weather report has latterly again been considerably enlarged. The present director is Prof. L. Palazzo, whose name is well known to many of our readers by the interest he takes in geophysics generally. Prof. Eredia also gives a brief sketch of the origin of the weather service in Europe. With reference to this country he remarks that in 1860 the Astronomer Royal informed M. Le Verrier (Paris) of the proposed establishment of a service on our coasts, and requested an exchange of bulletins. This is strictly true, but it might be explained that the communication was in reply to an inquiry by M. Le Verrier, which would naturally have been referred to Admiral FitzRoy before being dealt with. The latter issued daily weather reports to newspapers from September 3, 1860, and storm warnings from February 5, 1861. It may be worth while to direct attention to two apparent slips in the last paragraph but one on p. 7 of Prof. Eredia's laborious and useful compilation (with reference to a storm on December 1–2, 1863): Islanda should read Irlanda, and M. Davy is quoted as director of the English service.

IN a review of Dr. Hobson's "Squaring the Circle" in the Bulletin of the American Mathematical Society for November, Prof. R. C. Archibald directs attention to the early use of the symbol π by William Oughtred (1574–1660) in his "Clavis Mathematica" of 1631 and in his "Theorematum in Libris Archimedes de Spheara et Cylindro Declaratio" (Oxford, 1652). Oughtred employs the symbols $\delta : \pi$ to represent the ratio of the semidiameter to the semiperiphery of the circle, although he does not use the symbol π separately. He states specifically that $\pi R/\delta$ is the semiperiphery of a circle of radius R. Prof. Archibald further directs attention to references to squaring the circle in the Birds of Aristophanes (produced 414 B.C.), lines 1004–5, and in the last canto of Dante's "Paradiso" (canto 33, lines 133–5, in Cary's translation), and he points out that Longfellow, in his translation, gives "to square the circle" as the equivalent of the Italian "Misurar lo cerchio."

IN an article on "The Conic as a Space Element," in the Transactions of the American Mathematical Society, xv., 4, Mr. Roger A. Johnson develops a system of co-ordinates for the conic in three dimension space analogues to the line co-ordinates of Plücker, by treating the conic as a degenerate envelope. It is interesting to note that the problem of the conic in space has been studied for the last sixty years, and that in 1908 the Belgian Royal Academy announced the offer of a prize for a discussion of the subject. It may, however, be pointed out that the problem of the aeroplane in space is at the present time of a far more urgent character, and that the most pressing need is for pure mathematicians who find no difficulty in dealing with cumbersome formulæ as abstract as those which occur in connection with these harmless but unprofitable conics. Still, it is interesting to learn that the totality of conics of a T_4 that touch two fixed planes, the intersection of which does not meet the axis of the T_4, constitute a T_2 of the most general type.

OUR ASTRONOMICAL COLUMN.

THE APPROACHING MAXIMUM OF *o* CETI.—According to prediction, *o* Ceti or Mira will be at its maximum brightness on February 11 next, but it should be noted that both the star's period and brightness are not always the same at each return to its full brilliancy. As the star remains at its maximum brightness (2·0 mag.) for about fourteen days, it will be at a maximum on February 4 (approx.). At the present time it is a conspicuous ruddy object in a 4-in. telescope (mag. about 6·0), and its spectrum discloses the strikingly brilliant flutings and the bright hydrogen

lines. The variable is best situated for observation in the earlier part of the evening, and the following is its position :—

R.A.	Dec.
2h. 15m. 3s. ...	−3° 21′

THE ANTWERP ASTRONOMICAL SOCIETY.—In this column references have been taken from time to time from the *Gazette Astronomique,* which was a monthly bulletin of the Antwerp Astronomical Society. The last issue (No. 81) appeared in the beginning of September, when the investment of Antwerp had already commenced. A certain number of the members of this society have taken refuge in this country, and many of their British friends have suggested the idea of continuing the publication of this bulletin in London. Many of the latter have already made an effort to solve the financial part of the scheme, and it is due to their initiative that General J. Lerissen (president) and M. Felix de Roy (hon. sec.), on behalf of the society, have issued a circular asking others to contribute. If sufficient support is forthcoming it it proposed to issue the bulletin in both French and English. It will contain, besides notes of observations and of scientific articles, ephemeral notes, reviews of publications likely to interest amateurs, and place at their disposal the working data provided by professional astronomers. Those wishing to help may obtain further information from the hon. secretary at 29 Stamford Street, London, S.E.

SOME RESULTS OF THE RECENT ECLIPSE EXPEDITIONS.—Last week reference was made to the results of the Spanish eclipse expedition to the Crimea during August last, and attention was directed to a red coronal radiation at λ 6373·87, which was discovered by M. Carrasco on his photographic plates. This radiation is a new addition to the spectrum of the corona, and, like some other coronal radiations, seems to vary in intensity with the state of solar activity at the time of eclipses. M. Iniguez, the director of the Madrid Observatory, has just forwarded an enlargement (paper) of the region, between $H\alpha$ and D_3, the original of which was taken 13 sec. after second contact, and exposed for 10 sec. This print shows in the first place the sharpness of the images of the arcs, and in the second the clear and prominent arc due to the new coronal radiation. The wave-length is given as 6373·87 ± 0·04 Å. units. In the *Comptes rendus* (vol. clix., No. 23) for December 7 M. Deslandres presents a communication by MM. J. Bosler and H. G. Block with reference to the results of the Meudon eclipse expedition to Strömsund (Sweden). The note is restricted to the results of one part of their programme, namely, the spectrum of the corona. The continuous spectrum of the corona was perfectly regular, and indicated no signs of flutings or Fraunhofer lines, but only gradations due to the sensitiveness of the photographic plate. The well-known green radiation at λ 5303·7 was entirely absent. In the red part of the spectrum a brilliant and intense new radiation appeared. The wave-length is given as 6374·5 Å. units (to 0·2 A.U. nearly), and agrees well with that determined by the Spanish observers.

GEMINID METEORIC SHOWER, 1914.—Mr. Denning writes :—"The weather greatly interfered with observations this year. The sky was, however, favourable on December 8, and a watch was kept at Bristol, but there were few Geminids. These exhibited a well-defined radiant at 106° + 31°. The following nights were cloudy and wet, but on December 12 the sky cleared for a few minutes about 10.35, and six Geminids were noticed. Later, through openings in the clouds, further meteors were recorded, all from the same shower. There were two very distinct radiants, viz., at 109° + 33° and 119° + 32° They appeared to be about equally active. In 1885 and 1892 the same pair of radiants were very rich, and seemed to prove that the shower is a double one. From a comparison of all my observations of the chief system near α Geminorum I conclude the radiant is distinctly a moving one like the Perseids. It seems visible during three weeks from November 25 to December 16, with a maximum on about December 12. This year I believe the display to have been a very rich one on that date, giving nearly forty meteors an hour, and I await observations from places where atmospheric conditions were more favourable than at Bristol. My positions for the radiant are as follow near the maximum :—

Dec. 5	...	102° + 33°	Dec. 11	...	109° + 33°
6	...	104° + 33°	12	...	110° + 32°
7	...	105° + 33°	13	...	112° + 32°
8	...	106° + 33°	14	...	114° + 32°
9	...	107° + 33°	15	...	115° + 32°
10	...	108° + 33°	16	...	116° + 32°

"From my observations in 1885 there is strong evidence that the companion shower at about 119° + 32° also moves eastwards, but more data are required. Our weather is rarely suitable at this period of the year."

KASHMIR AS A SITE FOR A SOLAR OBSERVATORY.—Bulletin No. 42 of the Kodaikanal Observatory contains a very interesting report by Mr. J. Evershed on the seeing condition as studied by him in the valley of Kashmir. It may be remembered that last year he reported very favourably about this valley for solar observations during the months of August and October, and, contrary to all previous experience in other localities, he noticed that the definition of the sun was found to be of the best quality throughout the day and on all days that observations were made, there being apparently no marked variations depending on the height of the sun above the horizon, nor upon the type of weather prevailing. In order to test the conditions in this locality during other months of the year, and to make more critical observations both photographic and visual with larger instruments, an expedition was sanctioned by Government in April of the present year, and this report sums up the results obtained during the months of May, June, and July. A scheme of operations was arranged so that comparisons at Kashmir could be made with the experiences at Kodaikanal. For a detailed account of the results the reader must be referred to Mr. Evershed's report, but the following brief statement of the main result is as follows :—Taking a scale of seeing as very bad definition 1, bad 2, fairly good 3, good 4, and so perfect that no tremors can be perceived in the 8-in. solar image projected on a screen attached to a portable instrument as 5, then it may be stated approximately that the mean seeing at Kodaikanal for the whole year would hardly reach 2, whilst that in Kashmir valley would probably exceed 3·9. The number of days when the seeing ranged between 4 and 5 would be very much larger in Kashmir than in Kodaikanal. The photographic work was found entirely to confirm the visual observation, and, as he states, "indicates the enormous possibilities of progress in the study of solar physics which an observing station in Kashmir Valley would present." As the chief factor in solar research is the quality of the "seeing," the importance of the above conclusion cannot be put aside.