quarters of an hour. From the data published by Coumbary we might infer on the hypothesis of circular motion, that the body, whatever its nature, had moved at a distance of about 415,000 miles from the sun's surface, and as we know from the experience afforded by the great comet of 1843, there is nothing improbable in a comet having so passed. Perhaps when the sun's disc is more systematically and widely watched, a comet may be caught in transit and properly observed. The case of the comet of 1819 is not a satisfactory one, Pastorff's observation at least attributing to it a position upon the sun's disc which it could not have occupied at the time he assigns to his observation.

COMET 1874 (II).—The comet detected by M. Coggia at Marseilles on April 17, 1874, which presented so fine an appearance in our northern heavens in July, was observed at Melbourne, and by Mr. Tebbutt, near Sydney, until the end of the first week in October. Comparing the Melbourne observation on the 6th of this month with the place given by the elliptic elements of Prof. Tietjen, the difference is found to be less than a minute of arc, and the European observations to the middle of July are very accurately represented by these elements. Between April 17th and October 6th the comet traversed an arc of 205° of true anomaly, and the near agreement of Prof. Tietjen's orbit throughout, shows that the comet when it attracted so much attention was really moving in an ellipse of very long period, though no doubt this element may be considerably varied without largely increasing the differences between calculation and observation. The period of revolution in Tietjen's ellipse is nearly 9,000 years. When a similar complete investigation has been made for this comet to that so skilfully performed by Dr. von Asten in the case of Donati's great comet of 1858, some kind of limits may be assigned to the time of revolution, but in all probability it must extend to some thousands of years. We remark that the Melbourne observations of Coggia's comet were made with a telescope of only 4½ inches aperture; no doubt the comet might have been followed some time longer with larger instruments, but it is possible that the Melbourne reflector may have been under preparation for the transit of Venus, and not conveniently available for cometary observations.

PROF. LOOMIS ON THE U.S. WEATHER MAPS*

THIS paper is in continuation of a similar paper published in July last year, in which the American Weather Maps for 1872-73 were discussed. The results then arrived at are compared with the observations of 1874, and the whole is thereafter combined into a three years' average.

The principal conclusions from the three years' observations are these:—

The mean direction of the onward course of storms is N. 81° E., or a little to the north of east, being most southerly in July (E. 7° S.), and most northerly in April and October (N. 72° E. and N. 74° E.). The mean velocity is 26 miles per hour—the maximum monthly velocity, 32 miles, being in February, and the minimum 18·4 miles in August. As regards particular storms, wide deviations from these figures take place, it being found that the actual motion of the storm's centre may have a path in any direction whatever, and the velocity of progress may vary from 15 miles per hour towards the west, to 60 miles per hour towards the east. From the tri-daily observations it is found that the average velocity of storms from 4·35 P.M. to 11 P.M. is about 25 per cent. greater than for the rest of the day, and that while this varies in different months from 14 to 32 per cent., the most rapid progress occurs in every month during this portion of the day. Prof. Loomis suggests that as this is the time of the day when the temperature is falling most rapidly, the fall of rain may be thereby accelerated, and the velocity of the storms' progress be increased by the more rapid extension of the rain-area which would follow. The meteorological system of the States fortunately furnishes the required data for the examination of this important point, and we shall look forward with great interest to discussions of the daily rainfall of the States in this connection.

It would appear that an unusual extension of the rain-area of a storm is generally accompanied by a velocity of progress greater than the mean. The average extent of the rain-area eastward from the centre of the storm is 542 miles; but when the eastern extent of this area is 100 miles greater than the mean, the hourly velocity of the storm's progress is increased 13¾ miles; and when on the other hand, the eastern extent of the rain-area is 100 miles less than the mean, the hourly velocity of progress is diminished 9½ miles. Whilst the extent of the rain-area exercises an important influence on the storm's progress, the inclination of its axis would also appear to influence to some extent the course of the storm. Professor Loomis is of opinion that the direction and velocity of the storm's progress may be predicted with some confidence, in cases when the precise limits of the rain-area are known. It is thus most desirable that rain observations form an integrant part of all weather telegrams.

The influence of areas of high barometer on the velocity and direction of a storm's course is important in connection with the prediction and theory of storms, but further observations are required for its elucidation, among the more important of which are the movements of the upper currents of the atmosphere as disclosed by observations of the cirrus cloud.

The reports of General Myer, Chief Signal Officer, for 1872-73-74 show by the barometric results for Denver and the other elevated stations on the spurs of the Rocky Mountains, that the relative distribution of atmospheric pressure at these great heights is just the reverse in summer and winter of what obtains at lower levels to eastward in these respective seasons. The point is a vitally important one in its bearings on the weather and meteorology of the States. In connection with it, we have examined with much interest the tables at pp. 10 and 11 which give the number of times during 1873 and 1874 on which the daily change of temperature amounted at the different stations to 40° and upwards. This large temperature fluctuation occurs most frequently at Colorado Springs, Denver, and the other high stations in the west. The most remarkable of these changes occured at Denver on the 14th of January 1875, at which place the temperature was below zero all day, and the wind N.E. At 9 P.M., the temperature was 1°.0 and the wind suddenly shifted to S.W.; at 9.15 P.M., the temperature had risen to 20°.0 at 9.20 P.M. to 27°.0; at 9.30 P.M., to 36°.0; and at 9.35 P.M., to 40°.0, after which there was little change till the following morning. At 11.30 A.M. of the 15th, the temperature was 52°.0 and at this time the wind suddenly backed to N.E.; at 12.30 P.M., the temperature had fallen to 4°.0 Thus in the evening of the 14th, the temperature rose 39°.0 at Denver in the short space of 35 minutes, and about noon of the following day fell 48°.0 in one hour.

* Results derived from an examination of the United States Weather Maps for 1872-73-74. By Prof. Elias Loomis, Yale College. From the *American Journal of Science and Arts*, vol. x., July 1875.

ON THE HORIZONTAL PHOTOGRAPHIC TELESCOPE OF LONG FOCUS*

IN what I have now to say in regard to the methods of Photography employed in observing the recent Transit of Venus, I shall confine myself to the subject of

* This paper was read by the late Prof. Wenlock to a private scientific Club in Cambridge, U.S., shortly before his death; it has been forwarded to us for publication, at the request of the Club, by Prof. Asa Gray.