

II.—NOTE ON VENUS,—MORNING STAR AND EVENING STAR AT
THE SAME TIME, FEBRUARY, 1894.—BY A. CAMERON,
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(Read 12th March, 1894.)

On Tuesday, February 13th, 1894, I saw Venus as an evening star in the west after sunset, and next morning I saw her in the east before sunrise. I don't know whether such a pair of observations has been made before, and think it may be as well to put them on record.

On both occasions the planet was first found with a field-glass but after being found she was seen quite distinctly with the naked eye. The eye-observation was much easier in the evening than in the morning, because on the former occasion Venus was in a bit of clear sky, while on the latter the sky was streaked with lines of thin cloud. Apart from sky conditions, however, her brilliancy was less on the morning of the 14th because she was nearer inferior conjunction then. Had there been no glass at hand, the eye could easily have found her on the evening of the 13th, but I don't think it could have done so at all—certainly it could not have done it easily—in the gray-and-yellow-streaked sky of next morning.

As the observations were made very near inferior conjunction, the planet's phase was very small, only about one-hundredth of the disc being illuminated. The field-glass used has a magnifying power of four diameters, and in it the thin crescent was well defined and looked very pretty.

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It is as a *pair* that these observations appear to me to be specially worth noting. To see Venus in the evening *after sunset* and to see her again *next morning before sunrise* (the seeing being done with the naked eye or with a low-power field-glass) is a kind of double observation which can not often be made and

which I am inclined to think has not often been made. If any reader of this note knows of another instance of the same kind he will confer a great favor by sending me a report of it.

But even singly they are not altogether without interest, and especially when considered in connection with the papers on eye and opera-glass observations of Venus published in the Transactions of this Institute for 1891-2 and 1892-3.

The time of inferior conjunction this year was February 16th, 5 a. m. (60° W. time). The time of the evening observation on February 13th was 6 p. m. Here then we have an eye-observation of Venus after sunset within two and a half days of inferior conjunction. There is no observation of this kind in either of the papers mentioned which is as good as this one. In point of time it is closer than any previous observation I know of near conjunction, but in point of distance it is not as close as one or two of the best daylight ones recorded in the 1892-3 paper. As a field-glass-observation, of course it can't compare at all with the one made at the very time of conjunction on the afternoon of July 9th, 1892.

The morning observation with the eye supersedes the evening one as the nearest in point of time to conjunction, the interval being less than two days. That is really the chief feature of this observation, but apparently there is another which, if not more important, is much more curious. It is at inferior conjunction that Venus ceases to be "evening star" and begins to be "morning star," according to the technical language of the almanacs. So, this year, Venus did not begin her career as "morning star" until 5 a. m. on February 16th. But she was seen above the eastern horizon before sunrise on the morning of February 14th. That is, she was seen as a genuine morning star—the morning star, indeed, for she was the last of all the stars that morning to faint and die out in the light of the rising sun—two days before she began to be a technical "morning star."

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It seems hardly worth while to tell how such an apparently curious observation came to be made, but this note may fall under the eyes of some who would like most of all to know that very

thing, and it may therefore be not amiss to say a few words about it.

The opportunity for seeing Venus as morning star while she is still both really and technically an evening star can only occur near inferior conjunction. And only then,—to observers in the northern hemisphere,—when her declination is considerably north of the sun's.

Near conjunction, Venus and the sun pass the meridian at nearly the same hour, and of course, this hour is for each of them half-way between the hours of rising and setting. When Venus is north of the sun she is above our horizon for a longer time than he is, and the extra time is divided equally between the two halves of her daily course, the one before meridian passage and the one after. If these two sentences are fully understood, it will be obvious that when the two conditions occur together Venus will both rise earlier and set later than the sun.

She did so this year, in the latitude of Yarmouth, on the twelve days following February 6th. During the first three or four of these days the interval between her rising and sunrise was too short to let one get a sight of her, and the same is true of the interval between sunset and her setting on the last three or four days. And the weather was bad then too; in fact, it was bad observing weather during the whole twelve days, except only from about sunset on the 13th until the forenoon of the 14th. Luckily this just covered the time when the astronomical conditions were most favorable for both the evening and the morning observations. On the evening of the 13th, Venus stayed with us forty minutes after sunset, and she was up next morning nearly as long before sunrise.

It has already been mentioned that the evening observation was easy. It was also unpremeditated and unprepared for. The weather had been so bad for so long that the observing habit had slipped off. An accidental look out—a gap seen in the clouds near where Venus should be—a few seconds' search, first with glass and then with eye, that was all. But such happy-go-lucky methods could not be trusted to for the morning observation. It was long since an observation of any kind had been

made in the morning ; it was far longer since one had been made on Venus ; and my eastern horizon was less favorable for low observations and much less familiar to the observer than the western. But the night of the 13th looked as if it would keep clear until dawn, and it seemed a shame that the promising opportunity should be lost. If only some star could be found with nearly the same declination as Venus, which would rise about 10 or 11 that night, and let itself be seen above the tree-tops in the east, the morning observation would be assured. Such a star was found, and when its position had been observed a note was jotted down that, at a certain hour next morning, looking from a certain window, Venus should be seen at the top of a certain tree. When the hour came I was at the window and Venus was at the top of the tree.