

# Ongoing News

concerning the  
long suspected new primary planet  
of our Solar-System.

AUGUST, 1801.

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Since Prof. Piazzi only pursued his newly discovered star until the 11th of February, and had not given other Astronomers earlier notice of its appearance: for this reason nothing further than his own observations is to be expected. However, he also seems to not have been particularly liberal in his communication of them. At first he only sent a few, and indeed, erroneous, observations to Oriani and Bode, whereby both of these Astronomers, as well as Dr. Olbers and myself, (as our reader has already learned in the preceding issue,<sup>1</sup> were misguided and necessarily led to somewhat erroneous elements. He sent his complete observations to La Lande in Paris afterwards, but with the stipulation not to make them known publicly. Dr. Burckhardt thus calculated an orbit for his already communicated<sup>2</sup> elliptical elements- he fostered some doubts, however, concerning the accuracy and precision of these observations. He thinks, for example, that from the differences of the updated observations, it can be concluded that the right ascension of this star on January 30th must be decreased by 2 minutes and 30 seconds, and that Piazzi had mistaken or miswritten the hour in his observations on this day by about 10 seconds. The differences between the 11th and 13th, and between the 14th and 17th of January do not agree particularly well either. Later on, P. forwarded his observations with the same stipulations to Prof. Bode, who had the friendship to report the following:

“As I returned from the country today, I found a third letter from Piazzi, dated from May, and saw there, at last, the long awaited observations of his new star, 21 in number, from January 1st through February 11th. But with the express request not to make them public before him; I owe to his friendship to fulfill my given word, and since I may hope that you will likewise understand, I thus impart the following observations to you confidentially...” Although we have obtained three positions from Piazzi’s transmitted observations, the request not to make them publicly known takes precedence over everything else [*so geschah*

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<sup>1</sup>July Edition pg. 61

<sup>2</sup>July Edition pg. 62

*es doch überall*]; therefore, we may also not impart them to the readers of the *M. C.* at this time. Meanwhile, we can assert this much assurance to him into whose hands these observations also fall- that our three, obtained from very different locations of the transcript, are all identical; except that the observations from the 1st of Feb. are noted as questionable in this transcript; therefore apparently no written errors occur therein, and they can be taken as all the more accurate and authentic, since two copies of this transcript have come from Palermo itself.

Also, Prof. Bode directly remarked that the deviation of the first observation was given as around a half a degree smaller than Piazzi had written in his former letter; however the inclination of the orbit thereby increases almost up to  $12^\circ$ . “Such a hitherto unheard of inclination for a planet, (Bode writes) should soon cause my belief in its existence to waver; except that I wish to present my hypothesis, that due to the large geocentric latitude which follows from the same, and that it sometimes exceeds the bounds of the zodiac, a reason is given why it has remained hidden to astronomers for so long, who have always only had the opportunity of comparing planets in the proximity of the ecliptic to the fixed stars. Piazzi writes in his letter: *I am also struck by the appearance of this comet, but it seems difficult for me to imagine that it is a planet. Upon an inspection of the observations, you will perhaps be of my opinion. However, I ask that you not publish your results before me.* What do you say to that? How could Piazzi already declare the new star to be a planet in his first letter to Oriani from Jan. 24th? I have therefore asked him...”

Admittedly, Piazzi had already considered his new star to possibly be a planet before Jan. 24th; he supported this opinion with reasons which our readers have already heard in the June issue of the *M.C.* pg 608. He wrote *expressly* to Oriani that he had indeed *initially* only announced this star as a *comet*, but that since he had observed it *entirely without a coma*, and with a very *slow motion*, he had come to the thought and speculation that it could very well be a planet *many times*. Apparently Piazzi had wished to change his opinion *later on*, and has now *returned* again to the opinion of a comet. How he was able to conclude this view, however, solely from inspection of the observations (*à l’inspection des observations*) concerning the nature of this celestial body [*Weltkörper*], we have not quite grasped, since La Place himself, and indeed according to Burckhardt’s calculation of elliptical elements, ventured nothing decisive thereof, and whose opinion it is, that yet further observations are to be awaited.<sup>3</sup> Meanwhile, Oriani, Bode, Olbers, Burckhardt, Prosperin, and Fuss have come to the same *conjecture*, that this new star could very well be a planet, and all observations up until now conform to an elliptical orbit as well.

From a later writing of Senator La Place’s from July 19th, which we just obtained from this corrector of the current arc, this great geometer expounds upon this star more definitively still, and ensures us, that he were not averse to considering it to be a planet, [and also that] the objection of some astronomers to this, because the inclination of the orbit is too large, appears to him to be only a trifling objection. Since the opinion of this scholar is of the greatest

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<sup>3</sup>See current issue, pg. 139

importance, we here include the entire section from his letter. “*You are indeed correct in what you have written me concerning Piazzi, it is quite upsetting that he had not informed other astronomers in time; for there will be considerable difficulty in finding this star again. Its inclination being greater than that of other planets, could make for a slight difficulty for those who believe it to be a planet, but it has still less eccentricity than that of Mercury. I am not, therefore, at all opposed to considering this star to be a planet, and I strongly urge you to look for it as soon as it is away from the rays of the sun.*” And further on in the same letter, where the *Senator* gives me news regarding his immortal work, *Celestial Mechanics*, the third volume now prepared to go to print, he uses this occasion to again expound upon this remarkable star thus: “*The new star observed by Piazzi, cannot, considering its extremely small size, have a sensible influence upon planetary movements, but, if it is a planet, one can hope that between now and next winter, its orbit will be sufficiently well known for me to be able to include in my work the perturbations that it experiences.*” Only Prof. Klügel, as Prof. Bode informs us, does not wish to know anything of this new planet; his reasons are unknown to us.

At this time no astronomer has entirely *confirmed* that Piazzi’s new star is a planet, at least not to our knowledge; all those things which have been said, disputed, and calculated up until now, are *speculations upon a possibility*; *everything* has therefore been ventured only as plausible *hypotheses*, and any doubts against them retained, *all* being of the opinion that further observations after the return of this star from the Sun must be awaited, and that time alone will be able to give us any certain instruction thereof. Should Prof. Bode, as with Uranus previously, meet with the luck that he also locates this star in some star catalogues: then all of our doubts could soon be solved, and a great light would be shed upon this matter. That is what he writes to us that he would like to try, at any rate. Also, La Lande does not despair of locating this new celestial body in his immense catalogue of 50 thousand stars, if it is anything other than a star which remains visible. This much is certain: that Piazzi had come upon this star through the making of his star catalogue, and through the search for and determination of very small stars in the meridian, as we had already quite rightly surmised in our first article (June edition, pg. 612). Indeed, a writing or printing error appears to have actually induced this important discovery. Piazzi forfeited this new star, as Oriani reported to us from Mailand on the 17th of June, because he wanted to look for Mayer’s 87 stars according to *Wollaston’s General Astronomical Catalogue* (London, 1789), and this one was not found in Mayer’s star catalogue. The error came from Wollaston, who had mistakenly attributed the determination of these stars to Tob. Mayer instead of La Caille, to whom they belonged. These stars are also contained in De La Caille’s Zodiacal Star-Catalogue (*Ephemer. des mouvemens cèléstes* 1765-1775, pg. XVII), in Bode’s complete star catalogue to his edition of Flamsteed’s Atlas of the Heavens (Berlin, 1782) pg. 18, sub. no. 243, and also in his splendid new Map of the Heavens, XII folio. While Piazzi had then wished to observe these stars, he encountered this new star, which stood only  $14\frac{1}{4}$  minutes West, and 16 minutes South of these stars, and went through the

same meridian only 57 seconds of time earlier.

Dr. Burckhardt's elliptical orbit comes very near to a circular orbit; he is also of the opinion<sup>4</sup> that it can be found by no other parabola than his, which corresponds to the observations. Except for Soldner, who calculated a parabolic orbit whose elements deviated a good deal from those of Burckhardt, which we, however, in accordance with our given word, may not divulge here. Only thus much can we report: that Prof. Bode has created these two very different parabolas as a general overview for the circular orbit and Burckhardt's ellipse, and *everything* is represented exceedingly well.

This may not be entirely astonishing for such a small arc, which this wandering star [*Wandelstern*] has traversed up until now. When the planet Uranus was discovered, various attempts of the same manner were made. Boscovich showed in a small treatise, that there are *four* parabolas which could satisfy this planet every three months. Lexell proved that still more parabolas could be given, with a perihelial distance of 14 to 18, by which a long series of observations could be represented very precisely for many months. Further observations had to be awaited in this case as well before something certain could be obtained regarding the *entire* orbit; it could be partially presented by more parabolas, but the subsequent observations excluded one another, until Lexell calculated the circular orbit, and finally La Place the true ellipse. Dr. Olbers noted quite rightly, that the elliptical orbit of Piazzi's star will probably not be able to be calculated with great reliability yet. This thorough astronomer writes this to us on July 4th, "Dr. Burckhardt has evidently assumed that the planet was at aphelion right at the time of the first observation. This will actually yield various combinations of the same elements for the elliptical orbit." Dr. Burckhardt himself does not anticipate a great precision for his ellipse, and he is therefore far from issuing it as *true*. He himself mentions<sup>5</sup> that the arc traversed were also too small, and says that he had endeavored to represent the few available observations with an ellipse, because he thereby believed it would advance and facilitate the pursuit of this star after its return from the Sun much further than with the parabolic elements. However, one can not accomplish more than what the state of the problem [*Bedingnisse des Problems*] and Piazzi's *few* observations permit.

With these reservations, all endeavors and calculations of those astronomers who have occupied themselves with this enigmatic heavenly body up until now, have been imparted to our readers of the *M.C.* Its appearance in the world system [*Weltsystem*] is too remarkable for one not to summon all astuteness and assiduity, all possibilities, all probabilities of calculation with which we might be able to facilitate the discovery of this curious star. This is all the more necessary, since one can hardly expect a second chance, that such an entirely small and inconsiderable star, indistinguishable by any attribute, that loses itself in the infinite host of similar forms, should present itself to our eyes without any guidance!

Admittedly, it is a thousand pities, and all astronomers without exception

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<sup>4</sup>[cut off in scan]

<sup>5</sup>July issue, pg. 60

lament it, that Piazzi had not observed this stranger longer than until the 11th of February. Would he not have become sick, or had he desired to give news of his discovery earlier, then other astronomers would still have pursued this star in Feb., March, and April, and if these ongoing observations had also still not given us any outright conclusions concerning the nature of this celestial body, then still they would have instructed us to the extent that we would have been able to find it again with more certainty; on the contrary, astronomers are not without reason in fearing that they may now face great adversity in again spying out this stranger so easily. Prof. Bode is of the opinion that since this star appears as only of magnitude 8, it may only be able to be found with almost the entire absence of the morning twilight, and at a considerable altitude above the horizon. He therefore believes that one has little hope of discovering it before the beginning of September, if all other conditions are advantageous. The longer the epoch of its discovery must be put back, the more the true motion of this star can deviate from our calculated traversed orbits, and thus the more difficult the discovery of this inconsiderable wanderer of space becomes.

We entirely agree with Prof. Bode's opinion when speaking of finding the star by freehand [*aus freyer Hand*]. Only we believe that with well-adjusted *equatorial* or parallax instruments we could successfully track down this stranger earlier, if the pre-calculated locations should also be of some degree of uncertainty. In the anticipated space, a zone of many degrees, only differential observations in the right ascension of all the smaller stars may be made with the initially known and well-determined fixed stars, the already determined stars will thus be able to be distinguished from the undetermined ones with the star catalogue, and from a planet by means of repetition of the same observations; but in order to overlook the respective positions of the stars, differential observations in the declination would necessarily have to be made, or a completely dark night awaited. Because the daily motion of the stars is so large, and nearly  $1\frac{1}{2}$  minutes of time will have elapsed at the beginning of September: this motion alone is already sufficient to recognize the variability of this star in one hour. Namely, between 3 or 4 time-seconds will have passed in this space. Admittedly, it all comes down to the quality of the telescope and the conditions of the atmosphere. However, since these usually tend to be clearer for longer in our northern reaches of Germany at this time of year, those very astronomers, who are provided with better parallax telescopes, must spare no pains, as soon as quality and capability permit, to hunt down this star.

As many astronomers have wished to find that Piazzi's star is probably a planetary body [*planetarischen Weltkörper*], others have also aroused doubts on the matter. The inclination of the orbit of the planet, quite unusual up until now, appears to Bode to introduce some suspicion. It has been calculated up until now to be almost 11 degrees, and in his parabola Soldner finds it to be even 18 degrees. However, it can not be very well argued on physical grounds, since the determination of the latitude of our zodiac is a principle which has been derived *a posteriori*, and solely from experience. Professor Piazzi found therein, as our Oriani reported, a reason to doubt that it is a planet, because the arc he observed appeared to him not to have any proper ratio with its diurnal

motion. Only this much may we recognize from Piazzi's observations, as he had only been able to observe a very small part of this arc. For on January 1st, upon the discovery of this star, he found it already in retrograde; he had only observed the retrograde for the following 9, or at most, 10 days; but the entire duration of the same for this planet must be for at least 100 days, and the arc itself amounts to between 9 and 10 degrees; but since neither can the aphelion be determined with reliability, and nor can the various distances of the star from the Sun and from the Earth, the non-uniform velocity of the elliptical motion, or the inclination of the plane be assumed exactly: then it is also considered difficult to determine this arc of retrograde from the elements, and the error can be very considerable. Thus La Lande has shown (Astr. art. 1190), that if, for example, the observed station of the planet Mars is calculated with a circle, under certain conditions a mistake of  $2\frac{1}{3}$  degrees in the angle of commutation can occur. In this regard, Prof. Prosperin likewise finds that Piazzi's observations of this star are pretty much in a *circle*, that is, that it travels in a planetary orbit that returns to itself, and that the observed station of the same fits together very well. Here is what this renowned and most highly trusted astronomer, with similar calculations, writes to us on June 30th, from Upsal: "Since only two observations are needed in order to calculate its radius and all of the other elements in the assumption of a circular orbit, and these are known from the observations of January 1st through the 23rd<sup>6</sup>, then nothing remains but to investigate whether the standstill of the planet agrees with this circular orbit; where it does not, than this circular orbit cannot be circular, or nearly circular. Here is the entire procedure which I have worked with:

[pedagogy not yet translated]

Whatever the success of these imparted opinions may be, the comet of the year 1770 and Piazzi's new star will ever remain two of the most remarkable, yet unexplored phenomena in the system of the world, which demand the most diligent advertence of all observers of the heavens to occupy themselves longer still, and which may perhaps lead to entirely new conclusions. The study of the immeasurable universe is as great and manifold as are the subjects of these investigations themselves; of this, Seneca said: "and after a thousand centuries the opportunity still will not be missed to add something."<sup>7</sup>

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<sup>6</sup>Prof. Prosperin had at that time only known the observations shown on page 613 of the June issue.

<sup>7</sup>Latin in original: *et post mille saecula non deerit occasio aliquid adhuc adjiciendi.*