

GAUSS to OLBERS

Brunswick

August 6th, 1802

Translated from the German by Tarrajna Dorsey

I had indeed intended, at the close of my calculations of both new planets, to thence make an agreeable occupation of drawing up a pretty detailed draft of the method I used for the determination of an orbit for you. Only I feared that a long time would yet pass before I would be entirely ready with those calculations. I would be very much pleased, were you to think of me at some point [while you are] in Rehburg as well, and I have thus applied several hours in order to bring an entire summary sketch¹ of the same onto paper. Nevertheless, you will find everything essential therein; that which is missing from the development of the calculation, you will easily fill in, and that which I have other than from my proper calculations is of an even more trifling significance. In order to still reach you in Rehburg, I have hastened so much, that I have not taken the time to write it out again clearly. You will excuse me for requesting that it be sent back to me at some point in the future if I am able to consider a more detailed treatment, since, due to this haste, I am only sending you a Brouillon².

You, my dearest friend, have expressed such a flattering expectation concerning this method, that it will please me even if it only partially measures up to this. The most essential point of this method is formula (7) in article 6, which I came upon more than nearly a year ago in an entirely different way. It is effectively the counterpart [*das Pendant*] to yours, and it could be said, that both require a second differential; yours requires the change of the geocentric velocity in order to find the relationship of the distances, and mine requires the changes in direction in order to find the distances themselves. When I read your determination of the orbit of comets³ for the first time more than five years ago, I had suspected that there had to be a similar one besides your formula; I expressed something about it to the late LICHTENBERG at that time, who encouraged me very much to engage in the investigation, only my very arduous occupations with higher arithmetic at that time, as well as investigations

¹These papers, returned from Olbers to Gauss, have not been found up until now, and are probably destroyed. — ed.

²*Brouillon* stands in the original, a French word, signifying a rough or first draft of one's own work. — [TAD]

³*Ueber die leichteste and bequemste Methode die Bahn eines Cometen zu berechnen* (Weimar, 1797). — [TAD]

of other branches of analysis, upon which I will write something to you in the future, soon drove the matter out of my mind again. Since I had arrived at the formula entirely unexpectedly in earlier years, I immediately saw of what value it must be to the simplification of the first method of approximation with a determination of the orbit of a heavenly body which should be independent of hypothesis. Fortunately, I received PIAZZI's observations in the September issue of the *M. C.*⁴ right around this time, with which I immediately resolved to make a test of the method. I determined to make the difference in my results from the preceding ones known, and further calculations, which I would thereby include, prompted the further development of the method.

When you, dearest friend, have gone through these papers, then show me the friendship of imparting your advice to me concerning the most convenient manner of publication. Herr BODE has of late requested *the spirit* of the method for his journal. That would be approximately that which these pages contain. However I confess that I, as I know myself, would scarcely have the desire to take up a more detailed treatise if the most essential aspects were to be made known now. Mainly, I also do not have the time to give a shorter paper the polishing that I would like to, and I will therefore have to decline the former request. These *Particularia* will be a hint to you of how much I must call upon your discretion, so that Herr BODE will not be angry.

Regarding both of the planets, I recently received a letter from MASKELYNE, who had observed *Pallas* until the 18th, though he was uncertain whether it were [a planet]. It was of the 11th *magnitude*. He promised the entirety of his observations to me as soon as he could not see the planet anymore. Upon his request, I have also sent him an ongoing ephemeris of *Pallas*, of which you will here find a copy.⁵ What a fine prospect for rediscovery next year, when it will come markedly closer than on July 18th. MASKELYNE's eyes and instruments must be wholly unmatched. His equatorial telescope is five feet and has a $4\frac{1}{10}$ inch aperture.

I still have a small piece concerning your idea of the cosmogony of ♁ [Ceres] and ♀ [Pallas] in mind. As soon as I have made the remaining determinations of both orbits, and am thus able to give *the point* where the orbits will be next more exactly, I will calculate a small ephemeris where these points appear in various seasons, such that a small map can be constructed. Thus, some kind of a guidebook will be needed in the hunt for other planetary debris. — But write to me when you have the chance, whether your comet-seeker⁶, with which you have discovered ♁ and ♀ is the same as that which you used for your fine determination of the time? Sometimes I occupy myself with a little practical astronomy for enjoyment; I find the aforementioned determination of the time

⁴Freiherr von Zach's *Monatliche Correspondenz* (Monthly Correspondence), the main astronomical journal of the time — [TAD]

⁵This ephemeris no longer exists. — ed.

⁶A "comet-seeker" is a smaller type of telescope, built with the intention of finding comets more easily, by allowing for more light. Hence, a greater aperture (approx. 12 inches), short focus (2-3 ft.), wide fields, and low power are characteristic features of the comet-seeker. — [TAD]

to be wholly excellent, though I used only a very small telescope that belongs to ZACH's sextant, borrowed with his kindness. Is the aforementioned comet-seeker a domestic, or an English instrument, and how much does it cost? I would greatly desire to acquire one at some point. I heard that TIEDEMANN has also made one of these in Stuttgart.

P.S. Please forgive me that I have not paid for this letter in advance. I thought that it would be better, in case it should not reach you in Rehburg.
