Euler to Wettstein
Berlin, 15 November 1755
Letter 290 (2791)

[…] The almanacs that you ordered from me have been sent last week, and I hope that they will arrive soon after you receive this letter, I have enclosed some copies of a new map that we have had printed here, where the four measurements that the French use to determine the shape of the earth are produced all at once and based on the same scale. This map and its curious nature should probably find buyers in London.

We have finally learned that Mr. Huber who had to leave on the 29th of last month had been authorized by our president to bring back a new type of telescope composed of five lenses, of which they have created quite a stir in France. I am particularly curious to see how well it works since I have been working on this subject for quite a while and that I am assured that one can remove the lens with greater advantages than those of the reflective telescopes. I have also found that to arrive at that goal one must use a number of lenses and that by the power of six one can easily produce a telescope of two feet which in turn will show Jupiter's satellites distinctly. It is not by the prior method of lenses that I propose ones which provided for very little opening and are not appropriate to this design where everything should return to a great clarity. One can arrange the lenses in such a way that the breakup of the various refrangilbilities of the rays becomes imperceptible and that the objects appear without a border discoloration, finally everything comes down to whether the glass has a wide enough opening without causing any perceptible distortion to the objects. For this effect one might use curved lines, but they would never be able to be manufactured practically. I am limited myself to spherical surfaces to which glass most easily lends itself, and I am

supposing that the surfaces of each lens has been manufacture to the exact specifications that the calculations indicate and it is here that the glasses can have the greatest degree of perfection and execution. I have treated this material at length in a work on dioptrics and which is ready to be published as long as some publisher will do it. I have examined all the types of glasses and I am flattered to say that I have noted the limit to which each type of glasses is capable of being perfected. I have no doubts that my findings will not sit well with the multiple lens telescope which Mr. Dolland has spoken about in the last volume of the Transactions. To insure that I am correct, I am taking the liberty to tell you the plan of a telescope of my design which will be approximately 40 inches long and will have a magnifying power of x 50 in diameter, that is to say the same as a nine foot telescope and that with a great deal of clarity and no distortion as much to do with the refractibility of the rays as with the spherical lenses. I would greatly appreciate it if you think that this matter is worthy of a presentation to the Royal Society and I would be even more pleased if there were some craftsman who wished to manufacture them.

Here are the specifications.

I. The telescope is composed of two lenses PP and QQ placed one next to the other.
The first PP is a planed convex showing its convexity from without and the rays of the sphere of which the convex surface is a part of 43 5/9 inches. The other QQ is a meniscus facing the convex without and the concave within. The ray of the convex surface if 25 5/6 inches and that of the concave are 63 5/9 inches.
These two glasses must have 2 inches in diameter so that they might receive an opening of 1 3/5 inches in diameter.

II. The glass in the middle RR is a meniscus turning its convex surface towards the object and the concave towards opening at

SS; the ray with its convex surface is a ½ and 11/12 of its concave face. This glass must have an opening of ½ inch in diameter where it opening will be slightly larger.
This glass must be placed in front of the objective's threshold at exactly 1 ¼ inches. Since the objective's composed threshold will be about 39 3/5 inches, the distance AB will be about 38 1/3 inches; however the threshold of the glass piece must be fine-tuned.

III. The ocular glass C is part convex, having its threshold at ½ inch in distance and its opening at 1/5 inch in diameter. This glass piece will be placed at 1 ¼ inches distant behind the middle piece at RR; it is a good idea to leave the glass moveable to adjust to different eyesight's.

VI. The eye O should find itself at a distance of 3/10 inches being the vision glasses SS. These eyeglasses with magnify objects 50 times their size with a great degree of clarity and sharpness which opens to a skylight of 45 degrees.

In these specifications I have employed a double glass lens; however the advantage would be considerably greater if one chose to use three lenses, however, I wish to see the specifications of this project executed before we push this project any further.

In the event that this project is successful, I have no doubts that everyone will rush to have such glasses, and no craftsman will risk a thing by undertaking this project unless some lord would prefer to assume the expenses.

I was glad to hear that Mlle Dehuron had safely arrived in London since we still have pleasant memories of her stay. I have no doubt that Mr. Splittgerber has orders to pay me the money that you have sent me, but I have not found the time to find out from him. I am very grateful to you for the excellent book by Mr. Leland, and I expect to study it in depth, I have told some friends about this book and they too have found it excellent. I request, Sir, that you give my very best regards to Mr. Achard and to all those who have taken interest in Mlle Dehuron. Mr. de

Maupertuis, Baron de Gorgier, Mr. Formey, all the Academy and all our compatriots present their very best and I ask that you present my very best regards to your illustrious president Lord Macclesfield to which the Paris Academy has indulged to honor me in such an extraordinary fashion, and all the members of Society. My entire family is always sensitive to your memory and as such assures you of their respect as to your wife, I have the honor to be with all possible affection [...]