

**Third Book of the Rose Ursina. Notes to the tenth image of observations, the ninth of the month of January and the fifth of February, from January 26 to February 7.**

First. Fr. Charles Malapert, of our Society, some time ago, after I made my Apelles public, after passing from Ingolstadt to Poland, learnt from me (thanks to the close friendship that unites us) the appearance of the spots and the way to observe them, as well as to represent the Sun authentically. Later on, when he passed through that place again, he learnt from my disciple Fr. Johann Baptist Cysat – whom I had previously taught the same things to – the method of placing the ecliptic with the same care and accuracy with which I had taught him before. By way of repaying me the favour with gratitude, he sent me in Rome some observations he had made in Douai promptly after I had asked him for them. I offer you these observations with great effort, in order, and faithfully laid out in a single circle with the labels "a", "b", "c", and "d", in order to correspond with due gratitude to the favour given, and to attest to the truth and importance of this phenomenon before those who are moved more by authority than by reason, since it is endorsed by such a large number of such valuable studies of other scientists who agree on the same. Also, I have represented the spots by means of stars, circles, triangles, and squares to avoid confusion. Then below I have written the numbers corresponding to the days of the observations, as he himself sent them to me, because on the 28th and 31st of January the hour was not added, and on the 2nd and 5th of February, the altitude of the Sun was missing. So, I did not change anything, but I passed everything on to others exactly as I received it.

Second. The same Father [Cysat] wrote to me on 3 April 1625 that in any cluster of spots he always observes one that as a rule is the principal, that, in the scheme which he enclosed, for him this was Spot A, of which he says the following concerning the 31st: "The lower part of the spot touched the very centre. That same day the same thing was observed when the altitude after noon was 6 degrees, from which it can be deduced that that part was really next to the centre itself." This is what he says. And he also says that his Douai observation was at 24 [degrees] longitude and 50.30 [50°30'] latitude, approximately. The spots that I have expounded on according to my method, I detected in the position and in the order in which I present them, and I am struck by the congruency of mine and those of Ingolstadt. However, he included only the centres of the spots, and so I did not want to divide them up proportionately, although if he had wanted to, he could have done so from mine.

Third. Again one can observe in the curved path of this spot A that it crossed the Ecliptic twice, as can be seen to be the case in both Rome and Ingolstadt.

Fourth. It is evident from the observations made from these three places so distant from each other

that this spot presents no parallax,<sup>1</sup> as neither do the others.

### **Pages 193 and 194.**

#### **Notes to image XVI of observations, the fourth of the month of March and the second of April, from March 24 to April 2.**

First. Again you can see in this proportionally enlarged image the correspondence of the spots observed in Douai with those same spots I myself observed in Rome the same year, where you can notice two things. In the first place, what I have always said and continue to say: that the largest circles of observations, after adding other similar or equal circles, always represent what is on the Sun more precisely and sharply than smaller circles usually do. In the second place, and despite everything, even in those which are smaller, many tiny particles can be appreciated with fair precision, as can be verified to be the case in the group that accompanies spot C on March 27, 30, and 31, and April 2.

Second. To avoid confusion due to the scarcity of positions, I have presented neither every day of observations nor all the spots, but only those best suited to showing the striking correspondence of so many and such scattered positions. But faculae were also seen in their positions and numbers next to the exit of northern spot A on March 31. This is confirmed by the observer himself so that it can be seen that there is the same proportion in parallax of spots and faculae, and also of the umbrae. Compare them one by one and you will note the admirable congruence.

See also Lateral Table VIII of Image XVII, which you can also check was observed and annotated the same in Ingolstadt.

Third. I wish you to note that the sizes and arrangement of the spots in the figures have not been captured exactly, but I have presented them roughly as needed from my observations; the real ones can be consulted in image 15.

Fourth. It should be noted that the places of the spots have been respected with great care, and in both parts the same letters have been adjoined to the same spots; thus, the letter "a" indicates in both parts a northern spot, the letters "b", "c", and "d" the main southern spots at the eastern limb that were to cross the Sun from day 24 onwards.

Fifth. [The data concerning] at what hour, on what day, and at what altitude of the Sun over the horizon the observations were made in Douai are adjoined in the attached diagram.

### **Page 228**

#### **Notes to the image of observations XXVII, comprising three tables corresponding to the months of March, May, and June in Douai and Freiburg, in the years 1618, 1622, and 1624.**

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In the margin: Maculae parallaxi carent. "The spots have no parallax."

Table I. Contains the paths followed by the spots a and b during the year 1618. I was sent these observations by Fr. Charles Malapert and they were all obtained at 12 noon except that of day 15.

They were carried out from the 8th to the 18th of March, the spots on the 15th were observed at two o'clock in the afternoon. This same Father published them some time ago, in the solemn inauguration of his mathematics lectures, which he added at the end of his Euclid,<sup>2</sup> although in a far more summarized form. This version of which I give you a copy he sent me written in his own hand, and of course I keep it with care.

I send you the spots with the same form and size with which he sent them to me. Of course, for something that was not mine I could not add or subtract anything. As for the observations that I myself made in Germany that same year of 1618, I do not have them to hand. However, I am sure that neither do these differ from those nor those from these as to their place and position. One immediately perceives that these movements are curvilinear; also, if you compare this with the paths recorded in Rome during the month of March coinciding with other movements of other years observed during that same time you will see that what I say is true. In passing, he also notes the great number of small spots appearing on the Sun after rising on the eastern limb that did not reach setting on the western limb. Consult the images of observations XIII and XIV and you will find movements that are not very different, although from other years and of different spots. The ecliptic was traversed twice in this path of Douai.

[In the left margin of the text, one can read the following: The paths of the spots noted in 1618 in Douai, Belgium, correspond to those registered in Rome in 1625 and following.]

Table II. Contains the path of a southern spot A, observed in Douai from April 30 to May 10, 1624. Having received it with no hour or altitude indications but set out as such by the observer himself, I show it without those indications, although from its situation it is found close to the ecliptic.

You have the genuine path of that year and of the same spot and the same days represented in Table II of image XXVI,<sup>3</sup> from observations made in Ingolstadt. For my part, I offer this same path with great pleasure so that you can appreciate the power of truth, because it was not I but the observer himself who drew this path emulating the truth. In my images you will find other similar paths, but

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*Oratio Habita Duaci dum lectionem Mathematicam auspicaretur* was published at the end of his edition of Euclid's *Elements* (1620). In the editions of the *Oratio* found on the Web, it does not appear as an appendix to Euclid's *Elements*, but independently. The said *Oratio* would have been a kind of conference given for the inauguration of the academic year, a practice common both then and now.

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This image can be found on p. 217 and explained on page 219, where the following can be read: "Table II. Contains the path of a spot A observed in Ingolstadt in 1624, from April 30 to May 10. You can find a path very similar to this, for the same spot and the same year, represented in Table II about image XXVII, corresponding to Douai. I do not find in 1625 another path more like this in terms of its situation, but of other spots, than the path of the spots A that is described in image XXII. Compare and you will see the similarity of its situation and of its route towards the ecliptic that I intend to demonstrate by means of these proofs."

from different years. Look for example at image 22 of the year 1625.

I almost forgot one thing: that indeed on May 6 the same Douai observer suddenly saw in front of the centre a new spot not seen before, as he himself writes, and then it continued until its end. Since that day 6 was not apt for the Ingolstadt observer, he saw that same spot rather larger not far from the back part of the centre in the westerly direction, and followed it equally by daytime observations until its end. I do not offer its path, nor do I offer that of many other spots, but I say this so that you bear in mind that not only I but also many others think that in the middle of the Sun new spots appear and old ones disappear.

### **Page 229**

Image of observations XXVII.

Three composite tables based on observations and paths taken during three months and three different years in the cities of Douai and Freiburg. March, May, and June of the years 1618, 1622, and 1624. Universities of Douai and Freiburg.

### **Page 256.**

**Notes to the image of observations XL, comprising five tables for the month of August.**

Table I. I received the same from Douai, through the mediation of the Reverend Father Charles Malapert, with observations arranged as you can see, which I adjusted to the ecliptic from mine. If the movements and the position of spots D and E with respect to the ecliptic are compared with the positions and movements of spots F, G, H, and I, described in Table II of Ingolstadt, the striking resemblance will be seen of the paths described in different years and by different spots.

### **Page 280**

**Notes to the image of observations L, accompanied by six lateral tables, of which the first comes from Douai and the second from Ingolstadt. The other four are from Freiburg. Of the years 1621, 1624, 1625. Months of September, October, and November.**

I include these tables so that the striking similarity of the movements of these spots can be verified, even though they were observed in different places, in different years, and by different people, and they were traced in observational circles of totally different sizes.

Table I. This was observed in Douai in the year 1624 by Fr. Charles Malapert of our Society, and it contains the path of spots A, observed from August 31 to September 5. Although this path is incomplete, the fragment offered does not differ from the path of spot A that appears in image 29, corresponding to a spot that I myself observed in Rome in 1625 on the same days. And not because the same spots returned, but because others followed a similar path, in the same position and with similar behaviour towards the ecliptic, as will be clear to whomsoever should collate them.

For the rest, one misses more days of observation at the beginning and end of this path, not because the observer did not do his work, but because the spot was not visible. Indeed, as the Douai observer commented, on August 27, 28, 29, and 30, nothing was appreciated on a radiant Sun. But the observer says that on day 31, at the altitude of the Sun after noon of 8 degrees, 0 minutes, there appeared a spot A which was dim and clear, and not seen before. Others also appeared with it, which are not listed here. On the 7th, when the Sun was observed again, this same spot had already disappeared. So this spot was born and disappeared on the Sun. It is nonetheless evident from the aforementioned image 39 of my observations that this spot did not appear on the Sun on the same day of the year 1625 when, during all those days, the parallel of this spot proportional to the parallel of Rome was completely free of spots of any kind. Whence it is proven that the spots do not persist from one year to another; and not only from this experiment, but from many other practical experiments similar to this one. Collate different years, and you will be able to prove that what I say is true by comparing observations.

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