The Captain is the first Man I ever heard of that took notice of a Red Streak of Light preceding the emersion of the Sun's body from a total Eclipse. And I take notice of it to you, because it infers that *the Moon has an Atmosphere*; and its short continuance of only 6 or 7 Seconds of Time, tells us that *its height is not more than the* 5 *or* 6 *hundredth part of her diameter.*

VI. *An Abstract of a Letter written from* Geneva, May *the* 31th, 1706. N. S. *by Monsieur* J. Chr. Facio Duillier, *R. S. S. to his Brother Mr* Nic. Facio, *R. S. S. Containing some Observations of the Sun's Eclipse, on the* 12*th of* May, 1706. N. S.

THE total Eclipse of the Sun, which happened on the 12th of *May*, 1706. N. S. did present to the Inhabitants of *Geneva* a magnificent and surprizing Sight. The more Learned did observe that Eclipse with much Satisfaction: But it did strike many of the Common People with a great deal of Terror. A little after the Sun's rising, the Sky did seem clear; tho the Air was thick already with some Vapours. Many little Clouds did afterwards arise here and there, and the Vapours did much encrease. For want of a Pendulum Clock, in a convenient place, the Moment of the total Immersion, the Moment of the first Emersion, and that of the End of the Eclipse, could not be accurately observed. Tho the Sky was somewhat overcast, the Heat of the Sun was already felt, when the Eclipse did begin: But a very sensible Coldness took place, as the Moon did, by degrees, cover

cover a greater and greater part of the Sun, and the Light decreaſe. The Eclipſe was obſerved only with ſome Glaſſes, either darkned with Smoak, or but little tranſparent; and by receiving the Sun's Image, through a ſix foot Teleſcope, which repreſented the Objects inverted, upon a white Paper, placed at ſome Diſtance, from the Eye-Glaſs. When the Sun was near being totally dark, the bright Creſcent, which did remain, was ſeen to diminiſh more and more, upon the Paper, where its Image was received. And when that Creſcent was reduced to a very narrow Breadth, and to a very little Length, it was ſeen of a ſudden to diſappear: And in that Moment the whole Sun was eclipſed. At the ſame Inſtant of Time, the Darkneſs, which was already very conſiderable, did become much greater. The Clouds did change of a ſudden their Colour, and became Red, and then of a pale Violet. There was ſeen, during the whole Time of the total Immerſion, a Whiteneſs, which did ſeem to break out, from behind the Moon, and to encompaſs it on all ſides equally. The ſame Whiteneſs was but little determined, in its outward Side, and was not broad the twelfth part of the Diameter of the Moon. This Planet did appear very black, and her Disk very well defined, within the Whiteneſs, which encompaſſed it about, and whoſe Colour was the ſame, with that of a White Crown, or *Halo*, of about four or five Degrees in Diameter, which accompanied it, and had the Moon for its Center. The Star of *Venus* was ſeen, at the ſame time, at ſome Diſtance, without that Crown, between the Eaſt and N. E. in reference to the Sun. The Planets of *Saturn* and *Mercury* were ſeen alſo by many, Eaſtward from the Sun's place. And if the Sky had been clear, many more Stars might have been ſeen, and with them the Planets of *Jupiter* and *Mars*; that towards the Eaſt, and this toward the Weſt: And ſo the ſeven Planets might have been ſeen, almoſt all at once. Accordingly

ſome

ſome Gentlewomen, being in the Country, did tell, as is ſaid, more than ſixteen Stars. And many people, which were on the Neighbouring Mountains, did ſee the Sky Starry, in ſome places, where it was not overcaſt, as during the Night, in the time of the full Moon. The total Immerſion did begin about three Quarters paſt nine. The Duration of the total Darkneſs was preciſely three Minutes, or 180 Seconds, to the Moment that the firſt Ray of the Sun did begin to appear again, with much Brightneſs. And this Time was obſerved, with a ſimple Pendulum; which was afterwards compared with a Pendulum Clock, ſhewing the Seconds, and regulated upon the mean Motion of the Sun. The Council was met, during the time of the Eclipſe; but they did riſe from their Seats, a little before the total Obſcuration; becauſe one could neither read nor write. They perceived, as they came down the Stair-caſe of the Town-Houſe, ſome Swallows amazed, looking for a reſting place; and many Bats flying out. In other places the Hens and Pigeons would make haſte towards their Houſes. There were ſeen, in ſeveral places of the Town, ſome Perſons of the *Roman* Religion, and among them two Prieſts, proſtrate on the Ground, and praying; thinking that the laſt Day was come. A little after the Sun had began to appear again, the Whiteneſs and the Crown, which did encompaſs the Moon, did entirely vaniſh. The Sun did then ſhew itſelf more and more; appearing at firſt as a little Creſcent, which did ſtill increaſe; and whoſe Concave Side did ſeem terminated, as by an Arch, deſcribed with the Compaſs. A little before the total Obſcuration, the Country, on the Weſt Side, did already ſeem overcaſt with Darkneſs; and after the total Obſcuration, the Darkneſs was ſeen to leave us more and more, and to fly Eaſtward. According to Mr Profeſſor *Gautier*'s Obſervations, from the firſt Emerſion of the Sun, to the End of the Eclipſe, there was

1^h 9' 30". As to the accurate times they are uncertain, the Pendulum Clock having been ſet only by a ſmall Sun Dial. I ſend you alſo the following Account, which the ſame Gentleman did communicate to me.

" Obſervations on the Eclipſe of the Sun, of the " 12th of *May*, 1706, made at *Marſeilles*, in the " Obſervatory of the *Jeſuits* of *St Croix*; by " Monſieur *Chazelles*, Ingineer of the Galleys, " and by Father *Laval*, *Jeſuit*, Royal Profeſſor " of Hydrography.

	h	'	"
" The Eclipſe did begin at	8	28	40
" It did reach the Sun's Center at	9	6	11
" It was total at	9	34	15
" The Sun did begin to appear again at	9	37	9
" The Eclipſe did come again to the Center at	10	12	23
" It did entirely end at	10	47	50

" Three Stars were diſtinctly ſeen; and during three " Minutes it was not poſſible to read. And there did re- " main one bright Digit, all about the Globe of the " Moon.

The Mannor Houſe of *Duillier* is in the Latitude of 46° 24'. In Longitude it is 4° 13' 45" to the Eaſtward of the *Royal Obſervatory* at *Paris*. And *St Peter*'s Church at *Geneva* is, in Latitude, 0° 12' to the Southward, and in Longitude, 0° 5' 2" to the Weſtward of *Duillier*. But of this another time.

Before I make an end of this Abſtract, I muſt take notice that, according to theſe Obſervations, the Altitude of the Moon's Atmoſphere cannot well be ſuppoſed leſs than of 130 Miles, in perpendicular Height: Of which Miles 60 go to one Degree of the Earth. Neither could that Atmoſphere be diſcovered, before the time of this Eclipſe, by any Refraction of the Stars: Probably becauſe of this Refraction's ſmallneſs; and for want of

pro-

proper Obſervations. And tho it was very plain that the Atmoſphere of the Moon muſt needs ſhew itſelf, in the time of a total Eclipſe of the Sun; yet I do not know that any body did think of this, till, in the laſt Month of *May*, many Perſons did actually ſee it. Such as have read Monſieur *Hugens*'s *Coſmo-Theoros* may gueſs how much this Diſcovery would have been acceptable to that Illuſtrious Author.

Some particular Obſervations, which are intended to be made publick, do evince that our Atmoſphere is ſometimes viſible, all along, from the Surface of the Earth to the perpendicular Height of one Semidiameter of the Terreſtrial Globe. And the continued Appearance of a Crown, of only four or five Degrees Diameter, about the Sun, during the whole time of the total Obſcuration, does ſhew that the Æthereal Matter, in which that Crown was produced, muſt be at a very great Height above the Surface of the Earth. But if that Crown was to be ſeen, ſo far as the Weather did permit, in all the Places, where the Eclipſe was total, it muſt be concluded, that the Cauſe of it was not in our Air, but in ſome Vapours incompaſſing the Sun: And probably, in thoſe very Vapours, which produce that pointed Light, that has been obſerved lying in a manner along the Ecliptick, and that has the Sun for Center. Now either of theſe Concluſions, *viz.* concerning the great Height of the parts of our Atmoſphere, capable of producing that Crown, or elſe concerning a Meteor obſerved, not in our Air, but in the Vapours that incompaſs the Sun, is very ſingular, and deſerves a great deal of attention. If ever ſuch another Appearance ſhould be ſeen, in the time of a total Eclipſe, it would be proper to obſerve accurately the leaſt Diameter of the Crown, from inſide to *inſide*: And to take notice whether, during the whole time of the total Immerſion, the inward Circle be every where continued, and of an uniform Figure. The leſs the ſaid Diameter,

and the greater the Exceſs of the Moon's apparent Diameter above that of the Sun; as alſo the greater the apparent Altitude of the Sun is above the Horizon; the higher the Cauſe which produces the Crown muſt be, above the Surface of the Earth. And the Poſition, upon the Moon's Disk, in reference to the Zenith, of the Points of Contact, where the Sun diſappears, or begins to ſhew itſelf again, is here alſo of ſome conſideration. As to the accurate Calculation, it ſhall be given in another place.

VII. *Pars Epiſtolæ á Cl. D.* Joh. Jac. Scheuchzer, *M. D.* Tigur. *& Societat. Reg.* Lond. *Soc. ad D.* Jacobum Petiver, *dictæ Societ. Soc. de Eclipſi Solis totali Die* 12°. Maij Tiguri *obſervatâ.*

ILluſtri Societati indica, habuiſſe nos die 12°. *Maij* Eclipſin Solis totalem ſimul & annularem; totalem, quoniam Sol integer á Lunâ fuit obtectus; annularem autem non propriè ita dictam, ſed per Refractionem, quandoquidem circa Lunam fulgor apparuit rutilans, á radiis per Atmoſphæram Lunæ refractis ortus. *Vide Tab.* 2.

Initium Eclipſeos fuit manè horâ	8.	54'.
Medium horâ	9.	58'.
Finis horâ	11.	12'.
Mora mediæ & plenæ obſcurationis		4'.

Quâ viſæ fuerunt Stellæ tam fixæ, quàm erraticæ; ad nidos ſuos ſeſe receperunt Aves; prodiêre é latebris ſuis Veſpertiliones, & Aquæ innatârunt Piſces: Nos autem experti ſumus ſenſum frigoris manifeſtum; & in Plantas decidit Ros.

Tiguri d. 21. *Maij*, 1706. VIII. *An-*