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remarks, replied, that they were not birds of passage; and the cause of their sudden disappearance, but irregular return, was, they had a fixed day for immersing in the water, but none for emerging from it. On my doubting his hypothesis, he told me, that as a neighbour of his, not long before, was draining a pond, on a warm day, near the season of the year in which the swallows first appear, his attention was attracted by observing the mud, which, in consequence of draining the pond, had for some time been exposed to the sun, move and appear animated; he then ordered a quantity of this mud to be conveyed into a room in his house, which he caused to be gradually warmed by a slow fire. From this mud there soon arose a number of swallows, hovering over himself and family, who had been spectators of their resurrection.

These few observations, however imperfect, may possibly afford a large field for speculation to the philosophic mind, and lead to useful discoveries. For my own part, I am now become a proselyte to the doctrine of the swallow's remaining in a torpid state during the winter, not only from speculative researches, but from ocular demonstration *.

XVIII. *Meteorological Observations made at Padua in the Month of June 1783, with a Dissertation on the extraordinary Fog which prevailed about that Time.* By M. TOALDO †.

BAROMETER.—Its greatest elevation was on the 24th and 25th of the month, *viz.* 28 inches 4 lines; its greatest depression on the 16th, 27 inches 4 lines. In the summer months there is generally very little variation in the baro-

* Pennant, in his British Zoology, Vol. I. p. 414, feels disposed to smile at the accounts given by Olaus Magnus, Derham, and Klein, of the submersion of swallows. Let the physiologist and anatomist reason on the matter as they may, there seems to be positive evidence of the fact. E.

† From the *Journal de Physique*.

meter, and it remains almost always stationary. It appears that it rose very much after the fog, of which I shall soon speak.

THERMOMETER.—The month, in general, was cool: its mean heat, which commonly is 19 or 20 degrees, was this year only $16\frac{1}{2}$; for in the latter part of the month the thermometer did not rise above 22·6, and in the beginning it was at 10. I shall observe that it fell four degrees between the 16th and 17th, owing to a storm which came on.

HYGROMETER.—Notwithstanding the rain, it always pointed to dryness; which proves the exaltation of the vapours.

RAIN.—If we consider the days when it rained little or a great deal, we ought to say that the month was extremely rainy, for it rained twenty-two days: but the rain in general was not abundant, as there fell two inches less of water than usual. This observation is applicable only to the level country; for in the mountains the rain was excessive, and occasioned a very great swell in the rivers and torrents.

But there occurred two particular phenomena to be observed, *viz.* the fog and thunder. On the morning of the 18th, after a storm, which had been preceded by several others, the sun appeared extremely pale through a light fog, which filled the whole atmosphere. This fog became still more condensed the following days; and was not dissipated by the winds, nor even by the storm of the 26th in the morning, accompanied by a great deal of thunder, which was heard all along the direction of the mountains from one sea to the other. This fog still existed in the beginning of July, and seemed to become thicker, at least at certain hours. It did not prevent the sun or stars of the first magnitude from being seen, except in the lower part of the horizon. People could look at the sun without being incommoded, and without using coloured or smoked glasses. It appeared of different colours, according to the kind of rays which the difference in the density of the fog suffered to pass. As the
yellow

yellow and red, being the strongest, were those which pierced it ofteneft, the fun appeared like a ball on fire, or of a blood colour; which gave occafion to many whimfical people, whose imaginations were heated, to fee there, as in the clouds, the figures of men and animals. Very often the fun, in the higher part of the atmofphere, feemed pale and white by the abfence of feveral coloured rays; and he appeared red when he was lower, becaufe his rays then paffed through a greater portion of the atmofphere.

That it may not be imagined that this phenomenon is new in the world, I fhall here give a fhort account of thofe obferved formerly, analogous to it. But it will firft be proper to fay a few words refpecting the caufe of this extraordinary fog, which I am inclined to think came from Sicily and Calabria, where there were violent earthquakes. We know, by the accounts given, that the heavens in thofe countries appeared cloudy after the great fhocks, which may be readily believed when we confider the immense exhalations that muft have been difperfed throughout the atmofphere. In the month of June the fouth-eaft winds prevailed throughout all our country. Thefe winds at Venice are called *Fo-riani*, becaufe they firft take place on this fide of the gulph. It is very probable that thefe winds, traverfing that part of the atmofphere, may have carried with them a large mafs of exhalations, which, being ftopped by the chain of the Alps, difperfed themfelves in Lombardy, and occupied even the Alps, which people, with aftonifhment, beheld red, or of different colours, according to the pofition of the fun and of the obferver. It does not appear that thefe exhalations arofe from our territory, which was not feen to fmoke, as is generally the cafe in the time of a fog; but it proceeded downwards, as if it had fallen from the atmofphere. It was not feen to touch the earth, except when, by an optical illufion, the nebulous ftratum, by being lengthened, appeared united with the fenfible horizon. It occafioned no hurt, therefore, to the fruits of the earth; it is faid only that it blafted the olives

and vines a little on the elevated grounds. If any suffered in the flat country, the cause may be ascribed to the rains which took place at the time when they were in bloom.

If this fog arose, as I have said, from exhalations disengaged at the time of earthquakes, it must have been dry, and must have contained abundance of earthy, fiery, mineral particles, with a great deal of inflammable air and electric fire. To these may be ascribed the frequent thunder which took place, especially towards the middle of the month. The thunder in general made dreadful ravage, burning houses and destroying men and animals. Letters from Hungary state, that, after several shocks of an earthquake, the city of Kremnitz was set on fire by lightning. The same fate was apprehended for Vicenza on the morning of the 26th, the repeated claps of thunder being so violent. Five or six houses were that day struck by the lightning, which occasioned considerable damage. The lightning fell also in about a dozen of places in the neighbourhood, particularly in the mountains.

I shall here subjoin a sort of chronicle of the periods when the sun was seen obscured by fogs; and I am persuaded that many other instances might be found in different authors. This notice will serve to banish every thing marvellous in regard to the fog of 1783; and to shew that nothing happens at present which has not happened formerly, and even attended with more disagreeable circumstances.

Epochs of the Sun being darkened, and of other similar Phenomena.

Years of
Rome.

291 The sun darkened; a comet; fire in the heavens,
(that is to say, an *Aurora borealis*.) *Julius Obsequens*
de Prodigis.

542 Sun redder than usual, being of a blood colour.

552 The disk of the sun appeared smaller.

554 In the kingdom of Naples, the weather being serene,
the

Years of
Rome.

the sun appeared of a blood colour, and the heavens as if on fire, (that is to say, an *Aurora borealis*.)

710 Among the prodigies observed during the year of Cæsar's death, is reckoned that of the sun being darkened, and appearing red.

Cùm caput obscurâ nitidum ferrugine texit,
Impiaque æternam timuerant sæcula noctem.

Julius Obsequens relates at more length the prodigies which appeared ; particularly torches seen in the heavens, and crowns surrounding the sun, which for several months seemed to emit only a pale feeble light : People, therefore, could look at his disk,

Years of the
Christian æra.

264 A great earthquake, and darkness for several days.—
Friſtchio.

396 At Constantinople there were such extraordinary storms that the earth shook, while the heavens seemed on fire. At that period people expected the end of the world.

790 And, according to others 798. For seventeen days the heavens afforded no light. This phenomenon was preceded by earthquakes in Candia and Sicily.—*Colleſt. Acad. de Lancil. Friſtchio*.

937 The heavens being serene, the sun was darkened; and his rays, passing through the windows, seemed bloody.

1020 The moon appeared of the colour of blood, and flames fell from the heavens like a tower, (that is to say, a considerable thunderbolt, or globe of fire like a carcass or bomb full of grenades, such as is said to have been observed this year (1783) at the cathedral of Liege. If I am not mistaken, Scheuchzer of Berne relates that he observed one). According to history there were other catastrophes : the sea left its bed, and inundated

E e 3 several

Years of the

Christian æra.

several places in the neighbourhood. The same thing happened during the hurricane of March 11th this year (1783).

1104 The sun and moon in disorder were eclipsed several times, (that is to say, were obscured :) there were seen falling stars, flaming fires, fiery meteors, lightnings, hail; typhons and hurricanes took place, which overturned churches and houses; destroyed men, cattle, and plants; and occasioned great devastation in the fields. This is exactly what happened in 1783.

1154 On the 1st of October, the sky, being serene, appeared all of a sudden quite darkened.

1206 People imagined that they saw in the heavens a human head; and the following year, in Germany, the sun seemed divided into three parts. Similar phenomena may easily deceive the imagination of men, which is generally confused during such events, as was observed in 1783.

1227 An earthquake and comet—the sun of the colour of blood.

1263 The sun obscured, without any clouds, in such a manner as not to give any light.

1383 An earthquake in Switzerland. A large circle afterwards around the sun for several days.

1549 There appeared in the afternoon, for three days in April, a globe all on fire. It is even said, that armies had been seen fighting in the heavens before, and two lions engaged. (These were the sportings of the light of an *Aurora borealis*.)