

the context. As soon as this roll is finished, they will begin a Latin one. There are some so voluminous, and the papyrus so fine, that unrolled they would take up an hundred palms space. They tell me, that some of the Latin ones are in a running hand; which confirms the opinion of the Marquis Maffei, "That the character, by us absurdly called "Gothic and Lombard, is the antient running- hand, corrupted by time." However, I have not seen any of these last. The curiosity of these papyri is, that there is no little staff of wood, on which they were rolled.

Thus I have told you all, that I know, concerning these papyri.

We may comfort ourselves, that the affair is in good hands; being under the care and conduct of so learned an antiquarian, as the Canonico Mazzocchi, and of this able and adroit Father Antonio.

XXIV. An Account of the several Earthquakes of late felt at Constantinople; by his Excellency James Porter, Esq; his Majesty's Ambassador at that Place; in a Letter to the Reverend Mr. Wetstein, F. R. S. dated February 15, 1755.

Read April 17, 1755. **H**istorians of the lower empire give us various accounts of earthquakes, which have happened at Constantinople. Gillius informs us of many of later date; and an ancient co-

lumn standing in the city, called the burnt pillar, declines from the perpendicular, as a testimony of some considerable shock. The only memorable one I have heard mentioned was in the year 1719, which seemed so rather from the continuation of several shakes for thirty days, than any considerable damage.

Some incon siderable, and scarce meriting notice, I have felt in different seasons; one very sensible on the $\frac{15}{26}$ th of May 1752, at five in the morning.

We had an account of a violent earthquake at Adrianople that year, on the $\frac{18}{27}$ th of July, at about eight p. m.; that it was attended with uncommon fissures and openings of the earth, and eruptions of waters, carrying a sulphureous stench. Considerable damage was done to many mosches and houses: the ruins remain to this day. Lesser shakes were felt the whole month of August. We did not hear, whether it extended to the westward, nor of any particular phænomena preceding it.

On the same day and hour we had it very strong at Constantinople; it lasted some seconds. I mark'd the wind at south that morning, and the spirits in the Thermometer at 40: the mercury in a small mercurial Thermometer of Bird's stood at 79. The afternoon the wind came about to the E. S. E. a strong gale, which continued during the earthquake. Its first motion appeared to us perpendicular, and a heaving of the house, and us, as it were, off of our chairs. It was succeeded by three or four regular momentaneous horizontal vibrations, so that the walls of the house receded and returned, like the reciprocal motions of a ship; and it was with difficulty we stood firm. These vibrations we judged had their direction

direction from N. W. to S. E. and their origin from Adrianople. The Thermometer at that time stood at 36; the mercury at 81. A dead calm succeeded, and at 11 at night I marked the spirits 37, and mercury 80. The letters from Smyrna told us, that a small shake was felt there at the same hour: so that if we could suppose all the clocks and watches exact, and that the first explosion of the igneous matter was at or about Adrianople, we must conclude the communication of these vast distant motions to have been instantaneous; and though we should vary some minutes, the velocity is incredible, and may be thought nearly to come up to that of sounds.

We had on the 9th of November, that year, a small shake, at 5. 30'. a. m. Spirits 68. a. m. 66. p. m. Merc. Ther. 56. a. m. 54 p. m. Wind N. E. fair weather.

The most violent one I ever felt, was on the 2d of September 1754, at 10 at night. The preceding month did not vary 4 or 5 degrees of heat from other years: it came, as that of the 29th of July, without any preparatory signs, and with this difference only, that it was in a dead calm. The wind that day had been from E. N. E. to E. the sky at night with short clear undulating clouds, some bluer than others, and a bright moon. The first shock seemed intirely perpendicular, and the house, with a violent crack, heaved as it were off of its foundation; so that the floor of a large chamber seemed to rise from the exterior wall of the house to the interior of that room, and made a perfect inclin'd plath. The windows appeared to me higher, and the chair, in which I sat near that interior wall, to sink lower; and when I rose up I perceived

perceived the inclination very sensibly. It settled soon after, and was succeeded by several horizontal vibrations: all the pendulums stopp'd; mine precisely at ten, some at a few minutes after or before, according to their greater or less regularity. My servants told me, that the horses rose from their litter with violent emotions, and continued some time uneasy: all the fowls were on the wing, and cackled; dogs and cats ran about seiz'd with fear. The wells, of which I have three, became the one dry, the others almost so. The damage was considerable, but mostly amongst the old stone or brick buildings, as mosches, the seven towers, public khans, and old walls. All the houses are built with wood and mud brick dried only by the sun, which the people of the country pretend to be, by the less weight on the foundations, a greater security against earthquakes: in fact, none but very old ones, and but few suffered; those well repaired came off unhurt, or with some cracks and fissures only. It was immediately said, that the persons killed amounted to some hundreds; but the truth is, there were not above sixty. The more elevated the apartments, the more sensible the shock; those, who were in the streets, or in the fields, in motion, did not feel it. The duration by many was extended to minutes; but, as far as I could judge, it did not exceed some seconds, at most 30". The Thermometer at 48. a. m. 47. p. m. the Mercury at 74. a. m. 72. p. m. and the Mercury in the Barometer at 2. Tolerable good weather.

We perceived its line of direction from the east, from whence we had afterwards an infallible confirmation; for it has been traced from Sivas, a large city

city in Asia Minor, towards the confines of Diarbeckir, or Mesopotamia, where it has done some damage: thence it came on west, and left great ruins in some small towns and villages; passed to Nicomedia, and so to Constantinople. We had no account of its extending to Adrianople; it was merely felt at Smyrna; other shakes were felt that night at twelve of the clock.

And on the 3d, at 10 and 12 a. m. wind at E. and S. E. Ther. 46. a. m. 44. p. m. Mercurial 75. a. m. and p. m.

On the 4th, two more, one at 2 and at 11. 15'. p. m. wind N. and N. E. fresh. Ther. 42. a. m. 44. p. m. Merc. 78. a. m. 75. p. m. Bar. 1. mark'd dark weather, wind N.

The 5th, one at the break of day, and another at 9. 40'. a. m. wind E. N. E. to N. fresh clouds. Ther. 44. a. m. 45. p. m. Mer. 75.

On the 6th, two shakes at four in the morning. Little wind, almost calm. Ther. 44. Mer. 77. a. m. 76. p. m. At between 8 and 9 of the clock this night we had a singular phenomenon; a topical oblong cloud formed itself due west in the very point where the sun had set, of a black dense consistency, emitting flames, rays, and fiery coruscations, direct and transversal, sometimes stellate, like stars, sometimes like laminæ or blades, intermixed with seeming blue or sulphureous steams: precisely at 9 there issued from it a hollow rumbling sound: the cloud suddenly broke forth, as it were, from a fix'd point, and by an equal slow motion traversed the whole northern hemisphere, which was before, and remained after, extremely bright and clear; the noise continuing,

continuing, as it approached us, like one uninterrupted confused peal of thunder, accompanied first with a shower of hail, and soon after converted into a heavy rain. It lodged itself due east, where it continued emitting flame, and diminishing; until at about 10. 30'. it seemed to have consumed itself.

If this collected mass of igneous steams and vapour had freed us from earthquakes, it might be presumed to have had some immediate connection with them. However, it may be worth observation, whether such an evaporation might not diminish the quantity of that combustible matter in the interior of the earth, and consequently the force of the explosion and tremulous motion.

On the 7th, wind S. W. and W. some rain. Ther. 47. a. m. 51. p. m. Merc. 73. a. m. 70. p. m. we had none, at least that we sensibly perceived. Bar. 1. and o. changeable.

The 8th, wind N. W. and N. rain at night, and some in the morning, at 4. 30'. and at 10 of the clock, a. m. we had two shakes. Ther. 52. a. m. 55. p. m. Merc. 69. a. m. 67. p. m. Bar. at o. changeable.

The 9th, fair and calm, wind N. E. and E. N. E. Ther. 54. a. m. 53. p. m. Mer. 68. we felt none Bar. o.

10th, wind at N. and N. N. E. Ther. 52. a. m. 50. p. m. Mer. 70. B. at 1. marks dark heavy weather, and N. wind. we had two earthquakes, one at midnight, and the other at four in the morning.

The 11th, wind E. and N. E. Ther. 50. a. m. 52. p. m. Merc. 71. a. m. 69. p. m. Bar. 2. marks passable weather, an earthquake at 12. 30'. at night.

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The 13th, wind E. fair. Ther. 49. a. m. 51. p. m. Merc. 72 a. m. 70. p. m. Bar. 2. an earthquake at three in the morning.

Though I have noted only those, which for the most part I felt, there may be two or three founded on such reports, as I could fully depend on. Most people pretend, that all this month, at one hour or other, there were continued shakes, and with little intermission. The wind was for the most part of that time at N. E. the spirits falling, and cold increasing.

On the 6th of October, after we had almost forgotten our earthquakes, we were again reminded of them at 8. 45'. p. m. a dead calm. There were several strong horizontal vibrating shakes, the motion undulating equally, without any previous violent crack or noise, or any other preparatory sign, the wind blowing the preceding part of that day at N. E. and E. N. E. the Ther. at 72. a. m. 69. p. m. Mer. 53. a. m. and 55. p. m Bar. at 0. changeable.

On the 7th, wind E. N. E. fair. Ther. 68. a. m. 69. p. m. Merc. 57. a. m. 59. p. m. a small shake was felt at 12 of the clock at noon.

From that time wind variable, but principally hanging towards the N. and N. E. Ther. varying from 62 to 66, we felt none until the 4th of November. We had then a short one at 10. 19'. at night, wind N. E. fair, with light clouds. Ther. 66. a. m. 65. p. m. Mercurial 57. a. m. 58. p. m. Bar. c. changeable. Another was sensible to many on the 19th following, at 9. 45'. at night; but as I was in motion, I did not perceive it. That day heavy clouds, and cold. Ther. 72. Mercurial 53.

From the 15th of December to the end of the month, the weather has set in colder, and more snow and frost than has been known for several years. The spirits varied from 80. great cold to 90. and the Mercurial from 45 to 38. During the month of January, from 88 to 94, 95, and 98. and the Mercurial from 35 to 30.

From the 15th of January to the 20th, the wind varied to S. W. and S. E. the Ther. at 88. Merc. at 38. rose gradually to 81. and 45. accompanied with a thaw.

On the 20th, the wind came about strong, blowing hard about E. N. E. mizzling rain, mix'd with sleet, without consistency. We had three strong vibrating shakes of an earthquake at 12. 34'. Noon, Spirits at 83. Merc. 42. and Bar. at between 1. and 0. tolerable good weather, and changeable; and tho' the cold greatly increased, another was felt on the 23d at 10. 30'. a. m. the snow falling thick, hard frost, wind N. E. Spirit 91. and Merc. 36.

The beginning of February snow continued, and cold augmented; we have had the greatest known, at least remembered here. The 4th the Spirits sunk under 100. and the Merc. Ther. at 28. The canal, which separates Pera from the city, was frozen over, from the arsenal up to the fresh-water river.

From these observations it doth not appear, that there are any fixed or probable prognostics of earthquakes; but that they come on us indiscriminately in the midst of high winds and calms, heat and cold, rain, snow, and fair weather; so that no other connexion can be suspected of these with the atmosphere, than merely the collected mass of igneous exhalations, perceived on the

the 6th of September at night ; unless the direction of the winds, which seemed most commonly nearly in the same line with the shaks of the earthquakes, might be thought to have any.

2dly, What some of the ancients have told us of the spring and autumn being the two usual seasons for earthquakes, appears not only from these, but what has been observed by others, to be no general secure rule, since they happen equally in all seasons.

3dly, The velocity of motion, and the distance of the line of communication, appear extremely surprising. From Adrianople to Smyrna, in a right line, is not less than 250 miles, and to Constantinople 150 miles. Possibly the reason it was felt with less force at the former of these places arises from the difference of distance, and that its force decreased in proportion to it ; whence we might form a conjecture on some grounds, that the origin of the explosion was at or about Adrianople.

Sivas, in a right line, I compute at about 750 miles. I cannot yet be informed of the hour or precise time when they felt it there : I heard that it was on the same day. These people are not sufficiently observing to remember to an hour.

N. B. The Thermometer is graduated from 1. to 100. descending, 50 temperate, 60. to 65. cold, 80. freezing point, 95. to 100. extreme cold, greatest heat in this climate 35. to 30. not durable.