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## Peiresc and the First Natural History of the Mediterranean

Who was the first historian of the Mediterranean? Polybius, amongst the Ancients, and Gibbon, amongst the Moderns, are the most obvious candidates. But, one might object, while both of them do narrate events on a Mediterranean-wide scale, neither actually ever makes the Sea their subject. But if not them, who? The protagonists of the “scientific discovery of the Mediterranean,” as in the title of a recent work, surely did take the Mediterranean as their subject, but only, so received wisdom recounts, in the first part of the nineteenth century. With this, we are come to Ranke and his pioneering studies of the Spanish and Ottoman Empires, Braudel’s forgotten — and perhaps intentionally obscured — forerunner.

But what about Peiresc? In fact, we find in his seventeenth-century papers precisely that consciousness of the Sea as a physical and human unit that our very twentieth-century definition of the Mediterranean seeks out. Peiresc, the Provençal, who spent fifty of his fifty-seven years in Provence never more than 20km away from the coast. Peiresc the historian, keen observer of the Mediterranean almost-empire of the Angevins. Peiresc, the first student of the *Llibre del Consolat de la mer*, the Aragonese code of maritime law promulgated in Barcelona in the thirteenth century. And, of course, Peiresc, the leading figure in the European pursuit of oriental learning in the first decades of the seventeenth century, bestriding the sea lanes between Marseille and the ports of the Levant like no scholar before or since. In fact, one could argue that it was this intense focus on the Levant — a region with a meaning for Europeans at least since the Crusades — that made him so conscious of the Mediterranean — a region hitherto without any of those associations.<sup>1</sup> Viewed from Provence, the Levant was no island off the shore of Europe, but belonged to the very same Mediterranean that nurtured and bathed those shores.

But lest all this, and more, be dismissed with the same objection raised against Polybius and Gibbon — a historian in, rather than of, the Mediterranean — we must first turn to Peiresc’s extensive work on the natural history of the Mediterranean.<sup>2</sup> For it is here, indisputably, that we find a student of the Sea.

<sup>1</sup> See Miller, “Peiresc, the Mediterranean and the Levant,” *The Republic of Letters in the Levant*, eds. Alastair Hamilton and Maurits van den Boogert, Leiden, 2005.

<sup>2</sup> In this precise sense neither Prosper Alpini before him, who worked on Egypt, nor Patrick Russell after him, who worked on Syria — like Polybius and Gibbon — were historians of the Mediterranean. On Alpini, see most recently Nancy Siraisi, “Hermes Amongst the Physicians,” in: *Das Ende des Hermetismus. Historische Kritik und neue Naturphilosophie in der Spät-*

Peiresc was fascinated by its very waters. In a note dated to June or July 1634 and labeled "FLUX ET REFLUX/ COURANNT D'AFRIQUE" Peiresc examined the currents of the Mediterranean.<sup>3</sup> His starting point was that of the Black Sea which penetrated the Hellespont and traversed "all the Mediterranean" to Sirtes in Lybia, to the Gulf of Cap St. André and Spac and the town of Souchon, then inhabited by "Grenadins", or Morriscos. The movement of sand was evidence for the strength of this current, capable sometimes of throwing 66 quintals into a boat — which could have been very dangerous. He then offered three eye-witness accounts, that of his acquaintance, the Patron Pascal of Marseille, and that of the vice consul in Algiers via the consul in Marseille, his friend Vias, both of whom were in accord that along the Barbary Coast the prevailing current was rather from west to east. The third eyewitness was the Chevalier de Montmeian, who had been a slave for three years in North Africa and reported that in the estuary of the river that served as the outlet of the port of Bizerte in Tunisia the tidal flux was so great that it could easily leave boats high and dry. He had learned this from galley slaves and many others who had lived in that port. Montmeian had seen nothing like it, Peiresc noted, in the mouth of La Goulette, or the lagoon of Tunis, or at Carthage.<sup>4</sup> There was also a fourth eye-witness account, this insisting on the flow of the Black Sea into the Hellespont and Mediterranean, given in a parallel memoir, preserved among the Dupuy Manuscripts and labelled "1634. 29 Juillet/ Courants de la Mer/ Mediteranee." Its opening paragraph reads as follows: "At Constantinople, M<sup>r</sup> the Count Marcheville and the Captain Gilles of Marseille who piloted the ship Dauphin on which he returned, and who stayed in the port there for six full months on his last voyage, have attested to us as a well-known, indubitable, thing, and which one saw daily."<sup>5</sup>

The explanation for the contrary (West to East) current along the African coast came from Antoine Novel, a Provençal doctor based in S. Lucar de Barrameda near Seville. Peiresc had solicited from him information on the current in the Straits of Gibraltar. In a long letter of 10 December 1633 Dr Novel reported on the strength of an "Oceanic" (Atlantic) current capable of driving a ship before it even into the teeth of a strong wind. Reports from Spanish mariners sailing to and from North Africa who had to correct for this strong west to east current corroborated those on sailing from Ocean to Sea and back.<sup>6</sup>

renaissance. *Dokumentation und Analyse der Debatte um die Datierung der hermetischen Schriften von Genebrard bis Casaubon (1567-1614)*, ed. Martin Mulsow, Tübingen, 2002, pp. 189-212 and on Russell, Maurits van den Boogert, "Patrick Russell and the Republic of Letters in Aleppo," in: Hamilton and van den Boogert, eds. *The Republic of Letters in the Levant*.

3 Carpentras, Bibliothèque Inguimbertaine [= Carp.], MS. 1821, fol.127.

4 Carp. MS. 1821 fol. 127; Paris, B.N. Dupuy MS. 669, fol.81.

5 "A Constantinople Mons.<sup>r</sup> le Comte de Marcheville et le Cap.<sup>ne</sup> Gilles de Marseille qui conduisoit le navire Dauphin sur lequel il estoit revenu, et qui y avoit seiourne dans le port six mois entiers a ce sien dernier voyage, nous ont attesté comme chose notoire, indubitable, et qui se void journellement." Dupuy MS. 669, fol.83.

6 Novel to Peiresc 10 December 1633, *Correspondants de Peiresc*, 2 vols., Geneva, 1972 [rpt], II, pp.699-700.

Ocean tides were much more pronounced, and Peiresc was interested in these too — especially those off the coast of Brittany which he had heard to be the highest in the world. But he believed that one could still make "really rare discoveries by diverse observations in the Mediterranean Sea, which is not at all exempt from this flux and reflux, as is more commonly believed."<sup>7</sup>

The "flux and reflux" of the sea had, of course, wider implications for the Copernican theory. But here Peiresc's interest seems more focused on the unity of the Sea in a physical sense, bound together by the winds and currents that swept from one of its ends to the other.

If the water's movements bound the eastern to the western, and the northern to the southern, shore of the sea, Peiresc's interest in the complementary shape of mountain ranges on the northern and southern coasts seems to suggest that he viewed them as once linked. A memoir entitled "DES ALLIGNEMENTS PARALLELES des plus GRANDES MONTAGNES et des plus longues et de leur suite du Levant au Ponant", and dated 20 January 1635, addresses this question.<sup>8</sup> Like so many of Peiresc's natural-historical inquiries it is framed autobiographically. "The 20<sup>th</sup> January 1635, walking on the other side of the Chapel of St Marc with Mr Gassendi, Provost of the Cathedral of Digne, and Mr. Gaultier, Prior of La Valette, and descending from the coach by the mill of Eastety for better consideration of the countryside, and the veins of rocks posed in the form of banks one atop the other, and in which direction they were oriented." Peiresc proceeds to describe this very carefully. The striation of rock seemed to continue across the valley of the River Arc. "Because the divisions of the banks or veins of the rocks, and the direction taken by the separations of those banks correspond from one side of the river to the other." He added, in particular, that in that place the peaks seemed to slope away to the north and south, whereas the ridge-line seemed to go from east to west. "We had therefore crossed the breach in the mountain walking from north to south."<sup>9</sup> As the walk continued Peiresc noticed similar formations. He was especially attentive to the broken south-facing rock walls.

From these very local observations Peiresc looked into the distance. "So much it is," he opined, "that it is always a constant and indubitable thing that all the great mountains of this province have the extent of their biggest length on the alignment of east to west and the majority of the hills that extend from them are also aligned from east to west." After this general observation, Peiresc returned to detailed observations of places, beginning with the valley of the

7 "Dont on a desia fait de bien rares decouvertes par diverses observations dnas la mer Mediterranee qui n'est pas du tout exempte de ce flux et reflux comme l'on le croid plus communement" (Carp. MS. 1821, fol.279). Most of this memoir, entitled "Pour les mares, et les vents, et les eclipses", and probably dating from the first part of 1636, is devoted to the rocks and waters around Belle-Isle.

8 Carp. MS. 1821, fols. 74-5.

9 "Laquelle en cet endroit là biaise son cous du midy quasi an septentrion, pour se venir jetter dans la vallee d'entre leditz montaygues et la ville d'Aix, qui va du levant au ponant, nous avons donc traversé la bresche de la montaigne cheminants du septentrion au midy" (MS. 1821 fol.75).

Gaspeau, in which sat his country seat at Belgentier. A survey of all the mountain ranges of Provence followed, in which their East-West axis was maintained, "and with some interruption the continuation of the mountains of Aulps and others possibly all the way to the Couyer at Peiresc" — the mountain town owned by the Fabri and originally called *Castrum de Petrisco* — from which the scholar took his name.

In Provence, Peiresc had looked from one side of a river valley to another; in a memoir dealing with the natural and human antiquities of Belle Isle, off the Breton coast, he looked across to the topography of the nearby mainland. In a questionnaire to a correspondent he specifically asked him "to observe on the other islands and coasts of the mainland closest to Belle Isle, principally those of Blanet, Morbian and Quiberon, if the banks or layers of the rocks are not of the same quality, nearly, and arranged or heaped up, in the same direction and order close to that of the rocks of Belle Isle." The implication is that the island was once part of the landmass before splitting off.<sup>10</sup> *How* this could have happened is not touched upon — yet.

Instead Peiresc launched on a different tack. He wanted to know if the mountains of Brittany were oriented from East to West, like the rest of Europe's mountain ranges, or not. Examples offered were the Apennines, Pyrenees, Sierra de las Nieves, Alps, Caucasus, Lebanon, Mount Hermon and even Mount Atlas; "all are aligned from East to West, whatever little skewing they might have." Peiresc's conclusion to this section, like its beginning, is puzzling for the heat attached to such a seemingly arcane subject: "This could help a lot in penetrating further than it might seem into the highest origins of the most secret things of nature."<sup>11</sup>

It was this line of inquiry that Peiresc developed in his essay on mountain ranges, but now projected on to a Mediterranean-wide scale. "I want to say that all these mountains and hills [are] so proportionally ranged and aligned in almost parallel lines from west to east, and have some correspondence with the Apennines and the Rhaetic Alps which separate Italy and Germany."

He also affirmed a connection between the Mediterranean's mountains and its waters, "since [the waters] having in some way occasioned the alignment of the said mountains in the situation in which they are found, more than on the contrary or transverse [i.e. from North to South]. As one presupposes that there are similar currents of the sea beyond the Cape of Good Hope and the Straits of Magellan, from East to West and in the Mediterranean Sea on our coast of Europe from East to West also, and on that of Africa the contrary, (which Sr de Breves found at Cap Bon near Carthage). The Black Sea flows out constantly at Constantinople and disgorges into the [Greek] Archipelago."

But the relationship between water and mountains was not coincidental. Salt came out of the sea and pebbles were formed in riverbeds. "In the same way, it

seems that in the sea is formed, in parallel, not only pebbles and gravel and particular rocks in which are enclosed sea-shells and large salt water fish and other animals that sought their home and defense there, but also entire mountains, whether small or great, where those that are completely beneath the waves could receive accretions which attach to it, where they congeal as on old rocks, according to the seasons most opportune for this effect." (Salt mountains, of the sort found in Sicily and Poland, were said to be evidence of this process.) We will return to the off-hand reference to marine animals and shells immured in mountainsides.

Peiresc's very elaborate theory tying together currents of the sea and the building of mountains, and the role of salt and pebbles, is a remarkable attempt to sketch a naturalistic mechanism for the creation of rock in which water, and the seas, played a crucial role. The essay concludes on a comprehensive note. "That if this could presuppose or could advance a reason why the southern slope of all the mountains of Europe is more cut or sharper, because it was on this side that is found the shore of the Mediterranean Sea, however receded and much retracted, and it is possible that one who observes the mountains of Africa where they are found so much to the contrary, rather cut and broken on the northern facade. So too, that the big rivers cut the terrain and make as if large work areas ["chantiers"] here and there on their shores. One must write to Tunis and Algiers."

And so he did. Peiresc's letters to the humanist-secretary Thomas d'Arcos, enslaved by the corsaires and eventually turned renegade, explore this history of water and earth.

Peiresc began, in a letter of 7 October 1634, with the question of currents and tides. He repeated the information given him *that very day* by the "Commandeur de Montmeyan" [sic] about the powerful tides in the canal of Bizerte; he wanted to know if there were anything similar at La Goulette near Tunis. Peiresc's hope was that gathering "relations from diverse places of the Mediterranean Sea, which seem to blaze a trail to a great beginning for penetrating even to the real causes — and at least to the progress and proportions and some rule for the consequences that could be drawn with some utility — and which seems to advance far forward toward the primal causes in giving account of the diversity of the periods of these vicissitudes in different places in the Mediterranean Sea, as well as of the Ocean."<sup>12</sup>

But Peiresc's thinking about water was also tied to his thinking about winds. He collected memoirs describing several well-known local winds, with

12 "...des relations de divers endroitz de la mer Mediterranée, qui semblent frayer le chemin à de grandes ouvertures pour en penetrer sinon les vraies causes, au moins le progrez et les proportions, et quelque règle pour les suites et consequences qui s'en peuvent tirer avec quelque utilité, et qui semblent mordre bien avant dans les causes primitives, en rapportant la diversité des périodes de telles vicissitudes en divers lieux de la mer Mediterranée aussi bien que de l'Océan, dont les moindres font reconnoistre ce qui est quasi imperceptible aux grandes." *Lettres de Peiresc*, ed. Tamizey de Larroque, 7 vols., Paris, 1888-98, VII, pp. 140-3; Carp. MS. 1871, f.366r.

10 Carp. MS. 1821 fols. 284-5.

11 Carp. MS. 1821, fols. 284-5.

observations of their regular movements. "Du VENT DE LA VAUDAISE au Lac de Geneva... le 25. October 1634",<sup>13</sup> for example, or the winds of Nyons and Ventoux, sent to him by a "Sr. Boule",<sup>14</sup> or from a crater on "Le COÛYER...fort haute montaigne" close to Entrevaulx and near his eponymous town.<sup>15</sup> Since Peiresc knew Provence fairly well, he focused in greater detail on the relationship between rainfall, mountain grottoes, and lakes in this region. He began by supplementing the narrative with a map, drawn in his own hand, of the region described in the essay's opening paragraph. It was based on information about the wells, waters and winds of the area around his house provided by one Jacques Latil and his brother, Michel, whom Peiresc described as the son of the "Hugues — the one who makes our cheeses of Peiresc."<sup>16</sup>

From d'Arcos he sought out some connection between variously reported strong local winds, such as those found in Provence, and extreme tidal phenomena. "And by this means to proceed in observing certain little winds which are born from the orifice of some subterranean caverns and whose course is more or less limited to the surroundings." Having had more success with this method than he had dared expect, he thought it even more important to obtain from d'Arcos "some small relation of the biggest winds that you have seen in those lands and those which could be observed in the future, that you would find worthy of sending me." Peiresc added the customary insistence upon extreme accuracy of measurement of time and place. "But it is necessary to be exact in marking as carefully as possible the time of the birth and of the cessation [of the wind] and one must not neglect, if there is another cavern in your mountains, to observe if the wind does not emerge from it, at least during the morning before the rise of the sun, or like the vapors that can be seen in the winter, like the breath that emerges from our lungs."<sup>17</sup>

Peiresc continued on the question of winds in a second letter, from the end of April 1635, that commented on the fate of the chameleons d'Arcos had sent him before the winter.<sup>18</sup> Peiresc wondered if d'Arcos could draw up for him a report on the "constitution of the air in that land this past winter, as far as possible, for making the comparison with that here, which was rather rude, although," he added, "the northern winds were not the cause of it." He wondered in particular whether the mountains around Tunis were ever covered with snow, and if so how long this lasted.<sup>19</sup> Peiresc then suggested that d'Arcos keep a weather journal, "that if you would have the patience to mark sometimes in the form of a journal the days on which the great winds begin to rule, [and] from what direction they come, one could draw great usefulness for making the

comparison with similar remarks made by those curious about the sea, in order to see the connection and relation and reciprocation that there could be from one pole [of the sea] to the other."<sup>20</sup> In fact, Peiresc asked another correspondent of his, Nicolas Antelmi of Fréjus, to do the same thing and his journal has survived — a record of winds and meteorological conditions that ran from 21 September through to 5 January 1636.<sup>21</sup>

Peiresc ended his letter to d'Arcos by apologizing again for his mania about precision. But even here he could not resist reminding d'Arcos of the importance of any information he might have about caverns that emitted winds for their usefulness in explaining the flux and reflex of the sea "where we have discovered great secrets of nature by comparing [par la conference] its periods in different places of the Mediterranean Sea, as well as that of the Ocean." And so in the midst of a discussion about mountains and winds, Peiresc turned back to the Sea, urging d'Arcos to describe "if you have there caverns which are capable of producing wind, as we are full of these in this country." Peiresc promised many happy consequences. "Above all," he added,

it was necessary to observe at the *mouthes* of the rivers there, where they discharge into the sea, if there was not any sand that ruins the coast and undermines the situation of the ports nearby, which are below the principal flux of the sea by the beaches and sandbanks that stop there. It is necessary to note if this be to the east or the west of the aforesaid mouth of the river, and if it is at the back of a gulf or in the midst of the sea, or in a cul-de-sac, or indeed on the open coast which abuts the open sea, because all this can change the constitution and disposition of things and produce very different effects.<sup>22</sup>

A year and a month later — after letters that focused on eclipse observation and the life and death of the chameleons sent from Tunis — Peiresc came back to focus on the question of alluviation.<sup>23</sup> Did the African rivers that flowed into the Mediterranean show the same deposit patterns as the Rhone? The Rhone left its sand on its western bank — and further downstream from it — meaning that current came from the East. Peiresc thought d'Arcos could ascertain this without doing any fieldwork, "just like me, without budging from here" (*tout de mesme que moy sans bouger d'icy*). The point is that everyone knew that the prodigious quantities of sand brought downstream by the Rhone were thrown by the sea always to the west. "That's to say that on the side that comes to Martigues and Marseille the sands never cause much obstruction" and if a big

13 Carp. MS. 1821, fols. 131-2.

14 Paris, B.N. Dupuy MS. 488, fols. 175-85 and Carp. MS. 1821, fols. 159-64.

15 Carp. MS. 1821, fol. 155.

16 Carp. MS. 1821, fols. 156-58.

17 *Lettres de Peiresc*, VII, pp.140-3; Carp. MS. 1871 fol.366r.

18 *Lettres de Peiresc*, VII, pp.145-6; Carp. MS. 1871, fol. 368r.

19 Peiresc to d'Arcos, 29 April 1635, VII.145-6; 368rff.

20 *Lettres de Peiresc*, VII. 146-7.

21 Sunday October 14<sup>th</sup> is a typical reading: "La matinée temps calme, le ciel serain, la girouette a la tramontaine: sur les 9. a 10. heures temps serain. La girouette au levant, avec un vent assés fort au terre, laquel a duré jusques a 3. heures apres midi. Et sur les 4. heures laditz vent fort petit. Et sur les 6. heures temps calme, le ciel tousjours serain et la girouette au Levant." Carp. MS. 1821, fol. 233v.

22 Peiresc to d'Arcos, 29 April 1635, *Lettres de Peiresc*, VII.145-6; 368-370.

23 Peiresc to d'Arcos, 30 May 1636, Carp. MS. 1871, fols. 377r-380v; *Lettres de Peiresc*, VII, p.169.

wind — Peiresc mentions a “Labesch” — happened to throw sand to the East, “the daily current of the sea which moves naturally from East to West would always push the sands back below its bank or course.”<sup>24</sup>

Ever the historian, Peiresc explained that the Romans had cut a canal named “FOSSAE MARIANAE which issued forth near Martigues, at the village of Fos (from which it received its name), to clear all the sand from the mouth of the river proper.” But, by contrast, to the west, the coast of Languedoc was perilous for sailors and in the least weather one courted fortune and, what was more, the entire coastline was sandy without any worthy port because of the continual alluviation brought by the “perpetual current of the sea, by the sole load of its water. From this it follows that since only the time of St Louis the port of Aigues Mortes finds itself remote from the old seashore by more than a good league that is all sand.”<sup>25</sup> Peiresc even offered the counter-example of the silting up of the Argens near Frejus in order to prove the point: in this rare case of alluviation from west to east there was the peculiar current of the Gulf of St Tropez that explained it.

But when there were no such exceptional circumstances, the rule on the northern Mediterranean coast was clear: “all the rivers of Europe that issue into the Mediterranean Sea and which have their regular course from North to South, like the Rhone, have their western banks more sandy than the eastern ones.”<sup>26</sup> Peiresc wanted to know what was true on the coast of Africa, or at least that part known to d’Arcos, or even potentially knowable. Peiresc added that sailors would be ideal informants because sure to know if there were any sandbars outside these ports. The position of the bars would indicate the direction of the current, whatever other alterations the great winds might be capable of making to the surface of the waters. Peiresc asked in particular if d’Arcos could inquire — it was not necessary to actually go there — whether sailors in the sea outside the entry to La Goulette were able to recognize a perceptible current, and whether it was more often from east to west or west to east. He even suggested ways of doing this: by dropping a piece of paper, or small bit of wood, or a cork into the water and watching its direction — again noting that sometimes the great winds were capable of sending the water back in the opposite direction, as he had himself “proved” with the Rhone.

We know from a series of memoirs on mountain springs in Provence that the waters of the region could not be studied apart from the mountains. The waters that fed the Sea had their origin high up in the mountains; the path of the waters was in some sense also the path of the mountains. The connection between water and earth, and their orientation in space, is elaborated *writ small*

24 *Lettres de Peiresc*, VII, p.171.

25 *Lettres de Peiresc*, VII, p.172.

26 “Mais quand il n’y a pas de telles occasions heteroclytes, toutes les rivières de l’Europe qui aboutissent à la mer Méditerranée et qui ont leur cours réglé du septentrion au midy comme le Rhosne, ont leurs bords occidentaux plus assables que les orientaux” *Lettres de Peiresc*, VII, pp.172-3.

in another note, this devoted to springs and wells in Provence, labelled “FONTAINES & CARRIERES naturellement alignées du Levant au Ponant, selon le P. André Monastier...FONTAINE FOULETINE du REFLUX/FONTAINE DU PETROL de BESIERS” and dated 3 September 1634.<sup>27</sup> What interested Peiresc was that this peasant believed “that all the mines and quarries had their origin and progress from east to west. Just as the spines of the mountains usually are in this situation, even if mountains turned around from north to south could be found.” The peasant “held, equally, that the waters had their course more naturally from east to west than the contrary.”<sup>28</sup> What is especially revealing here is the connection between mountains and the periodicity of mountain springs. The role of rainwater and underwater aquifers is noted in “FORMATION DES CAILLOUS”, written in January 1635 but reflecting experiences Peiresc had as a boy, playing in the Rhone — he recalls that it was before he learned to swim — by the Pont d’Avignon.<sup>29</sup>

The Mountains. In Peiresc’s Mediterranean, as in its microcosm, Peiresc’s Provence, the mountains defined the sea as much as the sea the land. Peiresc proceeded to develop the questions first posed on his walk in Provence to explain the shape of mountains on both sides of the Mediterranean. In these letters to d’Arcos we encounter an extraordinarily sophisticated theoretical model for the function of mountains in a systematic approach to the history of the earth.

He began with his hypothesis about the typical east-west alignment of Mediterranean mountains, mentioning as examples the Pyrenees, Appenines, the “German” [Swiss?] Alps and those of Provence, as well as the mountains of the Auvergne.<sup>30</sup> But then Peiresc launched forth in a still different direction. He wanted to know, in great precision, the exact shape of those mountains: their declivities and the direction of their ridges. Did they seem cut or broken more on one side or the other? Was one slope more precipitous or gradual than the other? And above all: did their watershed break east-west or north-south? Peiresc also wanted to know the direction of any visible “veins” or layers of rocks within the mountains (“divers bancs ou assietes entaillées et rangées les unes sur les autres”).<sup>31</sup> Peiresc noted that these “veins” were most easily found in those places where water had forced its way through the rock and cut it open. Again, he insisted on knowing whether the cuts or breaks ran east-west or north-south. “These veins”, Peiresc continued, “or banks or threads of rock seem to be

27 Carp. MS. 1821, fol. 135.

28 “Mais il tenoit que toutes les mines et carrieres ont leur naissance et progres du Levant au Ponant. Comme les doz des Montaignes communement son en cette situation, encores mesmes qu’il se trouvast des montaignes tournées a rebours du septentrion au midy. Auquel cas les veues ne laissoient par d’aller du Levant au ponant. Et tenoit pareillement que les eaux eussent plus naturellement leur cours du Levant au ponant que au contraire.” Carp. MS. 1821, fol. 135.

29 Carp. MS. 1821, fols. 78-83.

30 Peiresc to d’Arcos, 29 April 1635, *Lettres de Peiresc*, VII, pp.145-6; Carp. MS. 1871, fols. 368-70.

31 Peiresc to d’Arcos, 29 April 1635, *Lettres de Peiresc*, VII, pp. 147-48.

ranged one atop the other horizontally and more or less evenly". But if the breach cut across the mountains parallel to the meridian (elsewhere he terms this direction "Equinoctial"), that is, north-south, then he wanted to know — very precisely — if the aforesaid veins seemed torqued with one side pointed into the ground and another raised up and which direction was which. Peiresc noted that all this could be most easily observed by going down to the sea shore, and especially to islands, which were of "living rock" ("roche bien vivve").<sup>32</sup>

Peiresc took up these themes in a letter of September 1635 to M. Pion, Vice-consul at Algiers, a correspondent and dependent of Peiresc's friend Baltasar Vias, Consul at Algiers but resident in Marseille. He began with the question of currents, suggesting that there was a current beneath that of the surface, but then turned directly to mountains and the very questions laid out in the previous April's letter to d'Arcos. Whether the mountains were oriented from east to west or west to east, whether these chains were more broken on their northern or southern facing sides, more precipitous on the one than the other, whether they contained banks or veins of different kinds of stones and whether these were parallel or skewed. Nor, he concluded, did everything have to be found perfectly consistent, for even a large number of examples would suffice for reaching a judgment. What makes this letter so precious, however, is that Peiresc had the copyist reproduce in the file copy of the letter the drawings that Peiresc must have made in the holograph. And so, from the two relevant perspectives, we see Peiresc illustrating exactly what he meant. In the first drawing, looking as if from the north, we see the slope of the mountain rising up gradually from the east, the jagged ridge line, and then broken, sharply declining western face. In the lower drawing, as if looking from the east, we see the sharp northern rock face and then the gentle sloping away from the ridgeline to the south. The dotted lines represent the "banks or veins" of rock mentioned in the letter.<sup>33</sup>

Peiresc advised d'Arcos that the required descriptive tasks could be performed without extensive field work. He hadn't needed to budge from Aix to know that the Appenines and Piedmontese Alps and the Pyrenees and Sierra de las Nieves were all aligned from East to West. And so, too, the Taurus, Caucasus, Lebanon and Hermon ranges, and also "the Mountains of the Moon in your Africa." What he meant by "alignment" is spelled out: if they were, for instance, 25 or 30 leagues in length but only 3 or 4 across, and proportionally for those that were even longer, such as those in "ceste grande Asie."<sup>34</sup> The

32 "Vous reconnoistrez cela fort facilement quand vous irez vous promener sur les rochers exposez au bord de la mer, principalement s'il y a là des isles dans la mer qui soyent de roche bien vivve où vous les puissiez considerer de tous les aspectz pourveu que l'isle aye quelque notable estendue et que le roc soit bien solide et bien desgarny de terrain et consequemment incapable de confondre sa vraye situation et forme primitive." April 29 1635, *Lettres de Peiresc*, VII, pp.148-9.

33 Peiresc to Pion, 29 September 1635, Carp. MS. 1874, fol. 391.

34 Peiresc to d'Arcos, 30 May 1636, *Lettres de Peiresc*, VII, pp.173-4.

## 1. Carp MS 1874 fol. 391



Piedmontese Alps were exemplary in this regard. They were "ridges of long chains of mountains disposed in parallel situations one before the other, so that their alignment and length go from east to west, so the col de Tende is situated before Mont Genevre, and that one before Mont Cenis and so on the others." It meant that the valleys were long, though thin, and stretched from west to east. Turning to the landscape around him, Peiresc noted that the chain of the Ste Baulme stretched more than 4 or 5 leagues from east to west but was barely a half league across from north to south. Mont St Victoire, near Aix, had likewise 4 leagues from west to east on the road to St Maximin and not a quarter of a league's traverse from north to south. The same was true for the Luberon, for the two ranges between Aix and Marseille, for the Aubagne range east of Marseille and for Les Baux to the West. "All the other great mountains of this

province are in a situation just like this" and, for the most part, so too those of Languedoc and the Auvergne.<sup>35</sup>

But in thinking about the orientation of mountain ranges, Peiresc took in those immured in the sea, as well, the big islands of Sicily, Crete and Cyprus. Their orientation was exactly like that of the surrounding mountain ranges. "If you consider the length of Sicily, Candia and Cyprus, it is much greater from east to west than the width of these islands and there are Mediterranean mountains of the same alignment as these islands."<sup>36</sup> The Mediterranean Sea itself, he writes, was aligned from West to East from the Straits of Gibraltar to the Holy Land. The same was true for the Black and Adriatic Seas (though he notes that latter declined a bit to the south). Nor was the Red Sea, Peiresc added, so very differently aligned. "And," he concluded, "I think that the majority of the mountains that border all these great seas follow the same alignment, almost, and particularly those of your map of Africa" (d'Arcos had prepared such a map for Peiresc).<sup>37</sup>

The situation of Tunis was no different, he thought. Without going anywhere d'Arcos was in position to observe the mountain ranges closest to the sea, as well as those to the south of Tunis, both said to be aligned from east to west. Going still further south, deeper into the Continent, Peiresc asserted that the winding course of the Niger River, from east to west, had to have been channeled by some extant mountain range.<sup>38</sup>

A more recent commentator has also noted that "although interrupted by inlets of the sea, the mountains correspond on either side of the straits to form coherent systems. One range formerly linked Sicily and Tunisia; another, the Baetic range, existed between Spain and Morocco; an Aegean range used to stretch from Greece to Asia Minor (its disappearance is so recent in geological terms as to correspond to the Biblical flood)...." Braudel, whose words these are, also describes these as "high, wide, never-ending mountains" — without emphasizing the implied east-west orientation — but qualifies his comments on their inter-connection as "hypotheses". "What we can be certain of," he concludes, "is the architectural unity of which the mountains form the 'skeleton':

35 "Nos Alpes mesmes Piedmontoises sont des croupes de longues suites de montagnes disposées en situations parallèles les unes devant les autres, en sorte que leurs alignements et longueurs vont du levant au ponant, comme le col de Tende est scitué au devant du mont Genevre, et celuy cy devant le mont Cenis et ainsi des autres dont les vallées d'entre deux ouvrent des passages du ponant au levant de fort longue suite, quoyque bien estroits à traverses de l'une en l'autre de ces montagnes." *Lettres de Peiresc*, VII, pp.174-5.

36 "Si vous considerez la longueur de la Sicile, de la Candie, et de Cypre, elle est bien plus grande du levant au ponant que la largeur desdites isles par le travers et y a des montagnes Mediterranée squi sont au mesme alignement au long desdictes Isles." Peiresc to d'Arcos, 30 May 1636, *Lettres de Peiresc*, VII, p.175.

37 "Et j'estime que la plupart des montagnes qui bordent toutes ces grandes mers suivent les mesmes alignementz à peu prez, et particulièrement celle de vostre carte d'Affrique." *Lettres de Peiresc*, VII, p. 175.

38 Peiresc to d'Arcos, 30 May 1636, *Lettres de Peiresc*, VII, p.176.

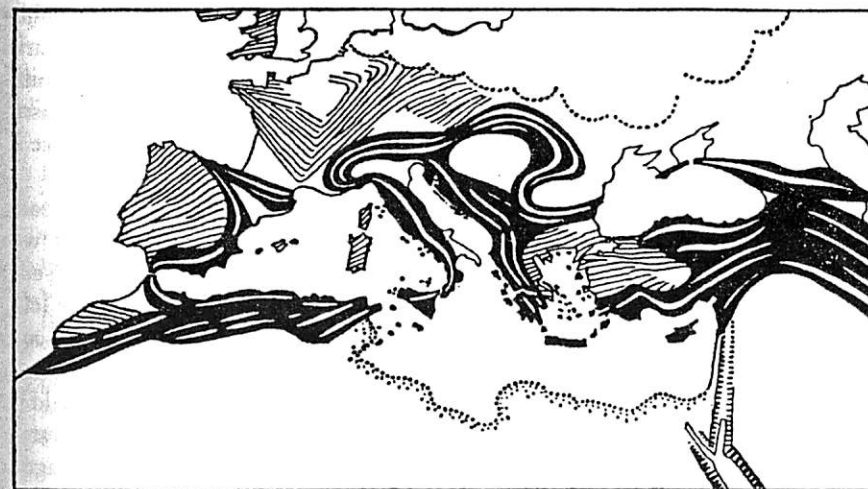


Fig. 2: *The folds of the Mediterranean*

Hercynian blocks banded, Alpine foldings in black; the white lines indicate the direction of the mountain ranges. To the south, the Saharan plateau in white, borders the Mediterranean from Tunisia to Syria. To the east, the tectonic fractures of the Dead Sea and the Red Sea. To the north, the intra-Alpine and extra-Alpine plains are in white. The dotted lines mark the furthest limit of former glaciers.

Fig 2. Fernand Braudel's map of the Mediterranean's mountains in vol. I of "The Mediterranean and the Mediterranean World in the Age of Philip II" © Librairie Armand Colin 1966. English translation © 1972 by Wm. Collins Sons Ltd. and Harper & Row Publishers, Inc. Reprinted by permission of HarperCollins Publishers.

a sprawling, overpowering, ever-present skeleton whose bones show through the skin." The map he had prepared for the second edition of the *Mediterranean* is a perfect representation of Peiresc's comments on the Mediterranean's mountain ranges as well (vol. I, p. 27, Fig. 2).<sup>39</sup>

Surely the most concrete instance of Peiresc's approach to the Mediterranean as a physical unit was his attempt to correct its maps. This was linked to the simultaneous lunar eclipse observation that he organized for 28 August 1635, with observers garlanded around the shores of the Sea. Peiresc's archive preserves the report drawn up after the event by Gassendi, based on the informa-

39 Fernand Braudel, *The Mediterranean and the Mediterranean World in the Age of Philip II*, New York, 1972, 2nd edn [1966], pp.25-27. The first edition of the book contained no maps or plates. *The Mediterranean. Environment and Society*, eds. Russell King, Lindsay Proudfoot and Bernard Smith, London and New York: Arnold, 1997, chs.1-4 offers a useful contemporary introduction to some, but by no means all, of the processes referred to by Peiresc.

tion sent him. Observations were made under Peiresc's guidance by Theophile Minuti and Simon Corberan at Aix, Gassendi in Digne, Ismael Boilliau in Paris, Athanasius Kircher, Melchior Inchofer and Gaspar Berti in Rome, Camillo Glorioso in Naples, Agathange de Vendome and Giovanni Molino in Cairo, Father Celestine de St Lidiwine, Father Michelangelo and Baltasar Fabre in Aleppo and unnamed Jesuits in Quebec.<sup>40</sup>

By correctly determining the longitudes of the various cities, and already knowing the distances between them, one could draw a map. This was important because, according to Peiresc, the most expert mariners of Marseille had complained about their having to "to give a quarter of wind to the left" when passing from Crete and Cyprus eastward. With the results he and Gassendi obtained in Provence and those of the Chancellor of the French legation at Aleppo, Baltasar Fabre, Peiresc believed that existing maps could be corrected.<sup>41</sup> A month later, in a letter to the Dupuy brothers, Peiresc elaborated. He now spoke of an error in existing sea charts of "more than 2 or 300 leagues [around 1000km] too much between Naples and Palestine, for which the practice of mariners had found a remedy whose cause and reason they never could comprehend: that is, from Malta to Candia they used to give a quarter of wind on their compasses to the left, and from Crete to Cyprus two quarters of wind, and on the return they did the same, and always to the left, which made the difficulty less easy to dissolve."<sup>42</sup> Subtracting all that space explained everything easily.<sup>43</sup>

But it was fire, even more than earth, sea and wind, that brought out the most speculative — and spectacular — example of Peiresc's Mediterranean framework for natural history. And this takes us back to his interest in fossils, mentioned already.

40 Carp. MS. 1832 fols 33-35. A slightly different version of this is preserved as a letter from Gassendi to Diodati in August 1636, MS. 1832, 24r-29v.

41 Peiresc to d'Arcos, 20 July 1636, *Lettres de Peiresc*, VII, pp. 181-2.

42 "...une erreur en toutes nos cartes marines de plus de 2 ou 300 lieues [around 1000km] d'entre Naples et la Palestine qu'il y a de trop dans les cartes, à quoy la routine des mariniers avoit trouvé un remède dont ils n'avoient jamais su comprendre la cause et la raison: c'est que de Malte en Candie, ils souloient donner un quart de vent à la gauche en leurs boussoles, et de Candie en Cypre deux quarts de vent, et au retour ils en faisoient autant, et toujours à la gauche, ce qui faisoit la difficulté moins facile à dissoudre." Peiresc to Dupuy, 12 August 1636, *Lettres de Peiresc*, III, pp. 542-3.

43 Corradino Astengo, *La cartografia nautica mediterranea dei secoli XVI e XVII*, Genova: Erga edizioni, 2000, pp. 50-60 ("L'asse del Mediterraneo") notes that there was a problem with Mediterranean maps that seventeenth-century cartographers acknowledged and which resulted in the placement of Cyprus too far north of Crete and, therefore, an addition of more than 100 miles between Cyprus and Damiette. The use of latitude to correct magnetic distortion was actually pioneered in Marseille (p.58). Was Peiresc simply wildly off base? Astengo does conclude that it was only with astronomical observation that accurate maps of the Mediterranean would be produced, around 1680 (p.60). Peiresc was surely ahead of the game in his approach, but it remains unclear exactly what problem of longitude — and therefore of length — he and his sailor friends were referring to.

Gassendi tells us that Peiresc had been interested in the question of fossil remains at least since 1607. According to him, Peiresc saw — literally — the question of fossils as linked to the transformation of the earth, to all that was solid itself having a history.

Because he had observed in a long row of Hills, as far as from Belgentier, a certain Zone as it were, which was high, but yet plain and parallel to the horizon, and even surface of the Sea, which was full of such kind of Creatures turn'd to stone: he made no question, but the Sea in ancient times had overflow'd the same, at least he thought he might have recourse to the flood of Noah, or to the Creation, before the waters were gathered into one place. For he thought it unquestionable, that the Sea did by little and little forsake some countries, and overflow others; as Aristotle proved touching Aegypt, Polybius concerning the Euxine, and himself concerning Arles, Nilus, Danubius, Rhodanus and other Rivers, making continents of the Earth, which they continually bring along in their streams, so that in process of time, both low places became high, and Sea-Coasts become midland countries.<sup>44</sup>

It was this that made him think that Venice, for example, would eventually become attached to the mainland.<sup>45</sup>

But for a set-piece discussion of fossils we must turn to the copy of an undated essay on sea shells discovered in the soil near Rheims, in Champagne, preserved in the Dupuy Collection in Paris.<sup>46</sup> The pages were excerpted from materials on the "Antiquitez de Reims" prepared by Nicolas Bergier and sent to Peiresc by Venot in 1635. Peiresc described it as a "si docte & iudicieux discours" and then added his own corroborating evidence.<sup>47</sup> The essay begins by

44 Pierre Gassendi, *The Mirror of True Nobility and Gentility*, London, 1657 [1641], year 1607, p. 119. This was a lifelong interest as is attested by a letter to Jean Lombard on those fossils in the mountains above Belgentier (16 June 1636, MS. 1821, fol. 289) and extended to the furthest geographical reaches of Peiresc's correspondence. In a letter to the French jeweler Herryard at the Mogol court in Lahore, written in 1630 to accompany the passage to India of Fernand Nuñez and Manuel da Costa Casseretz, Peiresc had focused on the question of fossils amidst more mundane questions about diamonds and rubies. Discussed in Sneyders de Vogel, "Une lettre de Herryard, joaillier du Grand Mogol", in: *Neophilologus* 39, 1955, pp. 6-8. For more on this see Charles de la Roncière, "Un Artiste français à la cour du Grand Mogol", in: *La Revue Hebdomadaire*, March 1905, 181-97.

45 Gassendi, *Mirror*, year 1630, p. 57.

46 Paris, B.N. Dupuy MS. 669, 42-49. In a copyist's hand, the essay appears in a volume of memoirs and letters that can all be positively associated with Peiresc (i.e. either autograph materials or copies of autographs found also in the Carpentras archive.) Gassendi does not refer to it, however. He stresses Peiresc's understanding of "seeds" producing a certain kind of humor which petrified into shells. Nevertheless, this did allow Peiresc to come, if for the wrong reason, to a fair assessment of what the fossil contained: "As for what concerns the shapes of Oyster shells, snails, cockles, periwinkles, and innumerable other things: this happens by chance; for the living creatures being dead, it happens, that their shells and coverings, become the receptacles of the foresaid petrifying humor, which being coagulated and hardened, puts on the shape of the thing containing." Gassendi, *Mirror*, year 1630, p. 47; it was the role of these 'seeds' that led Peiresc to connect fossils with other forms of transformation, like the origin of pebbles, or encrustation of submerged metal.

47 Peiresc to Venot, 26 April 1635, Carpentras, Bibl. Inguimb. MS. 1876, fol.528r.

describing the location of the find, and the type of soil in which it was found. Bergier notes possible explanations for the presence of shells, including the playfulness of nature, the workings of as yet unidentified animals, or the remains of the universal deluge. "I uphold thus the third opinion," he concluded, "just like one who would want to debate me. And because the thing seems difficult to believe, I rely on authority and on reason."<sup>48</sup> This was not the only place in the world where sea shells were found far from their natural habitat, "and I am not alone in taking these for marks and relics of the universal deluge."<sup>49</sup> Amongst the authorities cited are Apuleius, Herodotus, Plutarch, Strabo, Pomponius Mela, Ovid in the *Metamorphoses* amongst the Pagans and Orosius, Tertullian and — what strange company! — Jacques Gaffarel, Peiresc's friend but also a radical skeptic, amongst the Christians. Out of Gaffarel's *Questions Innouyees* Bergier extracted a report of shells found in the ground near Forcalquier, in Provence. He observed that Cardano explained this away as petrification of stone, and while initially Gaffarel rejected this in favor of a more naturalistic explanation, he later himself reverted to it because he could not otherwise explain the presence of shells on the highest mountain tops. "Nevertheless," Bergier concludes, "the clause that he adds, when he says that the sea did not cover Egypt at all, nor the Appenines, Alps and Pyrenees, and that it would be absurd to believe this, if it were not what was meant by universal deluge, shows that he does not agree with us, but only with those who do not wish to recognize the great deluge, whose belief is for us a point of faith."<sup>50</sup>

This explanation is evidence of a certain but rare irony: that it was the believer whose presuppositions brought him closer to the truth. The skeptic, Gaffarel, precisely because of an a priori classification of the "Flood" as Biblical hokum, ended up further away from the truth. Perhaps this is that convergence of reason and authority to which Bergier referred. It is noteworthy that earth science, rather than astronomy, could elicit such an explicit statement of faith.

It was publication of Francesco Stelluti's version of Cesi's study of fossils that brought Peiresc back to these issues. David Freedberg's recent and quite splendid work on paleontology in the *Accademia dei Lincei* shines a glancing light on to Peiresc's contemporary researches.<sup>51</sup> When a respected colleague, Jacques de la Ferrière, doctor to the Cardinal-Archbishop of Lyon, Alphonse-Louis Duplessis de Richelieu (the Cardinal-Minister's brother), accompanied

48 "Et parce que la chose semble de difficile creance, je l'appuye de l'autorité & de la raison."

49 "& je ne suis pas seul qui les prend pour marques & reliquat du deluge universel."

50 "Neantmoins, la clause qu'il adjouste, quand il dit que la mer n'a point couvert l'Egypte, non plus que l'Apennin, les Alpes, & les Pyrenees, & que c'est chose absurde de le croire, si ce n'est, dit il, qu'on l'entende du deluge universel, empesche qu'il ne conclue [sic] comme nous, mais seulement comme ceux qui ne veulent reconnoistre le grand deluge, dont la creance est un point de notre foy."

51 David Freedberg, *The Eye of the Lynx: Galileo, his friends, and the beginnings of modern natural history*, Chicago, 2002, 331-33 and *Fossil Woods and other geological specimens*, with Andrew C. Scott, London, 2000, pp. 51-6.

the Cardinal to Rome, Peiresc charged him with investigating the site at Aquasparta that was the subject of Stelluti's representation of Cesi's views. Afterwards, he hoped to send him on to Sicily, to study giant bones that a Roman correspondent of his, Claude Menestrier, kept mentioning.

Sicily, in the center of the Mediterranean, also lies at the center of Peiresc's interest in the relations between water, earth, wind and fire. It was Europe's primeval treasure house. He had wanted to go there himself on his Italian trip and would urge the same on others, like Lucas Holstenius. A few years before, Peiresc had prepared a memoir entitled "1633. Sicila/ Malta GIGANTUM OSSA" containing information on various human contacts in Sicily who could be approached for help. These began with the Prince of Botera, who lived in Castelvetro, about 25 miles from Palermo, and was said to have the best antiquities "cabinet" in Sicily. It was there that the giant bones were found "in quantity, whose carcasses the apothecaries raised up on platforms at the fairs." The fairs were held at the beginning of August ("au temps de raisins") before the festa at Trapani in mid-month. It was there that the heads of giants, as well as other bones, were to be seen. This Prince was often in Spain. So, too was Don Joseph de Balsano of Messina, "fort curieux de peintures, desseins & medailles." There was also the expatriate Bordelais, Jacques Zagry, now of Palermo, trafficker in diamonds and clever at business; "a man appropriate to be shown these bones of the giant." There was Giacomo Maringo, a bookseller in Palermo who possessed many medals and might know of the composition of the collection of Mirabella, which fell into the hands of Botera. Switching from people to places, Peiresc described some of the ornamentation at Monreale, the porphyry that was quarried from the nearby Mt Pellegrin and which supplied the great columns for the the Chapel of Santa Rosalia and the church of the Theatines. But ethnography was not forgotten. "LI GREGUI", Peiresc continued, "are at 10 or 12 miles outside of Palermo on the side of Monreale towards the south of Sicily, and occupy four or five villages where they retain the Greek vernacular, and the female clothes of the Maltese Greeks." At Castelvetro and Calatanacetta there were salt mines, some of which contained "gli occhi di sale" — cubical grains.<sup>52</sup>

Peiresc was a careful reader of Cluverius's *Sicilia Antiqua* and was delighted to be sent relations on Sicily by Cassiano.<sup>53</sup> And so, when Menestrier turned from Sicilian amber to giants' bones and a mountain full of teeth, Peiresc was ready to follow.<sup>54</sup> He was even willing to cover the costs of Menestrier's voyage to Sicily in the unlikely event (or so he thought) that Cardinal Barberini would

52 "LI GREGUI sont a dix ou douze milles hors de Palerme du costé de Montreal ver le midy de la Sicile. Et occupent quatre ou cinq villages ou ils ont retenu le vulgaire Grec, et les habits des femmes comme les Grecs de Malte" (Carp. MS. 1821, fol. 140).

53 Peiresc to Cassiano, 2 August 1635, *Lettres à Cassiano dal Pozzo*, ed. Jean-François Lhote and Danielle Joyal, Clermont-Ferrand, 1989, p. 197.

54 Menestrier to Peiresc, 19 December 1634, *Lettres de Peiresc*, V, pp. 739-40, copy in Carp. MS. 1821 fol. 70.

himself refuse.<sup>55</sup> This brought him back to Vincenzo Mirabella y Alagona's *Dichiarazioni della pianta dell'antiche Siracuse* (1613) which reported on giant skeletons found there, and thence to Tunisia, where his correspondent, Thomas d'Arcos, had come across giant remains 6 or 7 years ago.

It remained necessary, Peiresc thought, to investigate "the forms and quality of the ivory fossils and other things mentioned that could be found buried together, in order to make a more certain conjecture if these were teeth of an elephant, hippopotamus or of another marine monster." Nor would it surprise him if the fossils reported found on Malta also proved to be marine monsters or other large creatures.<sup>56</sup>

Peiresc explained himself in a long letter of 21 March 1635 to Pierre Bourdalot in Rome that was intended as a guide for La Ferrière. He first expressed his pleasure at being introduced to La Ferrière by Pierre's uncle, Jean. Then, turning to the giant bones, Peiresc wanted to know as much as possible about the remains found there, but also about the "fabric" or structure in which they were found, as well as the nature of the surroundings. He commented specifically on the possible use of caves as human dwellings, or any other signs of human construction, as well as the possible presence of other sorts of bones or shells still immured in nearby rock faces. More precisely, Peiresc wanted La Ferrière, a medical doctor after all, to affirm that the bone or bones were indeed from a human. His own experience had led him to suggest the possibility of a large fish or whale — something which could be corroborated by the presence of even the least "petrification" that could be found there, whether of shells, snails or other marine fossils. The uncertainty and obscurity of these matters demanded such attention to detail. Other objects of study would be the fossil mountain that he had heard about, as well as the salt mountains and Aetna and all that was "vomited up from these sources of petrol" (est vomé de ses sources de petroglia), and the many-colored amber found in various places. What Peiresc wanted was an examination of the places where these were found and a detailed relation — that was why it was necessary to write out instructions, and not work from "simple traditions" and "imprecise and uncurious locals" but rather from the best sort. Peiresc was willing to supply the information found in that memoir, containing the addresses of the principal prelates, princes and seigneurs and of "curieux" living in Sicily, just in case they — La Ferrière and perhaps Menestrier — needed "to excavate a little further into the earth". Peiresc lamented his inability to go there himself and give more precise instructions.<sup>57</sup>

55 Peiresc to Menestrier, 1 February 1635, *Lettres de Peiresc*, V, pp. 757-9.

56 Peiresc to Cassiano, 2 August 1635, *Lettres à Cassiano dal Pozzo*, pp. 198-201.

57 Carp. MS.1821, fol.221r-v: "... pour les reliques des ossementz des Geants et des circonstances et dependances qu'on y pourroit observer pour prendre les assurances requises et necessaires a la qualité des lieu ou ils ont esté inhumés et s'il y a heu [sic] des fabriques ou structures affectées pour leurs tombeaux ou non, ou bien s'ils n'ont esté que tumulterairement comblés de sable ou de terre ou de rochers, et si ceux lieux d'alentour il ne se trouve aucunes marques de chose qui puisse avoir esté accommodée de leur temps a leur usage comme des cavernes a faulte de fabriques mesmes s'il ne s'en trouve point dont les ossementz soyent putrefies et engages dans

Peiresc's thinking about fossils was shaped by his work on antiquities. In a memoir sent to a French collector later in that same year of 1634, Peiresc sought specific information about the location in which a Roman spoon was discovered. No distinction can be drawn between the archaeological and the paleontological practice of this antiquary. Peiresc wanted to know "if it was found confusedly [without particular order] in the ground, or in some vase of clay or lead, or in some tomb, if all was found together at different times; if you went quickly to the places when you had the news, if this was very deep in the ground or closer up, if the quality of the soil is mineral or corrosive or not, and whether one could recognize in the pieces of copper found there if it is very humid or watered by fountains or brooks or indeed whether it is very dry. Because all this affects the quality of the rust that we have found there on several pieces...."<sup>58</sup>

la substance des rochers ou du tuf comme les autres petrifications des coquillages et autres choses maritimes et sur tout si les os de la teste sont bien precisement de la forme humaine car j'en ay veu qui n'ay respondoint pas bien entierement et qui me faisoient revoquer en doute que ce ne perissent estre des monstres marins comme il se trouve de ces bouts qui ont des mains et des pieds fort approchant des humaines et de fort prodigieuse grandeur Cetarce [sic], ou du nombre des baleines c'est pourquoy j'estime qu'il ne fault pas negliger d'observer bien curieusement toutes les moindres petrifications qui se pouroient rencontrer es environs des lieux ou il s'en trouve, soyent coquillages, limassons ou autres poissons et plates maritimes ou autres choses qui puissent favoriser ou destruire ceste chetive Imagination qui a besoin de beaucoup d'autres adminicales en concurrence des uns des autres pour pouvoir trouver quelque bonne consequence en matieres si incogneues et abstruses et ou les simples traditions sont subiect a tant de supposition et alteration. J'entends mesmes qu'il se trouve en ce pays là des montagnes touches de l'ebur fossile que ie ne verrois pas moins volontiers si ie pourrois entreprendre le voyage. Et les environs de les montagnes de sel comme aussy de Mont Ethna et tout ce qui en est vomé de ses sources de petroglia, mesme cet Ambres de differentes couleurs qui se retrouve en quelques endroits pour pouvoir examiner la qualité des lieux ou la nature les a peu produire et pense que d'une relation bien exacte de toutes ces choses là il se terroit des merveilles suites et notices tres nobles et tres excellentes c'est pourquoy il fault tascher d'en escrire prendre des instructions qui soyent pas receuies temerairement et sur des traditions simples, ou rapports de personnes mal exactes et peu curieuses et pense qu'il y fault aller muni de bonnes addresses et des principaux prelates princes ou seigneurs du pays et aux personnes plus curieuses qui y resident voire si besoin est aux officiers a celle fin qu'on n'y rencontre aucun obstacle ains toute sorte de facilité et de faveur et secours pour faire en cas de besoin fouillerient peu plus avant dans la terre que ne font ceux qui se contentent de voir la superficie seulement et pour en faire attester les memoires de telle chose qui pourroit meriter d'en prendre acte public a de le faire certifier et souscrire par des personnes qualifiees et tesmoings des lieux mesmes irreprochables, combien que telles formalites se puissent obmettre mais elles pourroient bien aussy n'y estre pas inutiles en cas de rencontre de choses contraires a la commune creance des hommes. Pleust a dieu fusse ie en ceste peine la sur les lieux et si j'estois capable de vous donner du conseil nous prendries nos mesures en sorte que vous puissiez vous rendre sur les lieux plus important et plus curieux quand Mr de la Ferriere y pourra estre pour en pouvoir tesmoigner quant et luy, n'estonnant pas que vous soyés si attaché que vous ne peussiez obtenir quelques semaines de conge..."

58 "...s'il fust trouvé confusement dans la terre, ou dans quelque vase de terre ou de plomb, ou dans quelque tombeau, si tout fut trouvé en un coup à diverses reprises, si vous vous transportastes bien tost sur les lieux quand vous en eustes la nouvelle, si c'estoit bien profond en terre ou peu avant, si la qualité de la terre est minerale ou corrosive ou non, et qui ce peut recognoître aux morceaux de cuivre qui se treuvent, si elle est fort humide ou arrosée des fontaines ou ruisseaux ou bien si elle est bien seiche car tout cela sert a la qualité de la rouille que nous y avons trouvée en quelque pieces, mais principalement j'ay grand interest de sçavoir bien au vray si vous rancon-

But the best example of Peiresc using stratigraphy to generate a "philology of objects" comes from the realm of paleontology: supposed human remains of the mythical Gallic King Teutobachus. "His" bones had been found in the Dauphiné in 1613 and been the subject of an extended polemic through 1618 that has been recently commented upon by Antoine Schnapper.<sup>59</sup> In a letter to Dr. Nivolet, at St Marcellin near Romans, dated 18 September 1634, filed by Peiresc under the title "Du Geant de Langon en Daulphiné", he thanked Nivolet for the packet containing all the controversial writings that had appeared since the giant's discovery nearly twenty years earlier. He had additional questions, however, and understood that they might be hard to answer given the passage of so much time. The questions that follow represent, therefore, something of a "wish list" and in that way reveal to us Peiresc's thinking on the subject in its purest form.

First, he wanted additional witnesses so as to be able to compare accounts. Then, he wanted to make sure that these were human bones — he was himself very skeptical of the identification with Teutobachus. No one else, beyond those who claimed its discovery, had seen the site or the inscription — which would, in any event, not have been written in Latin, the language of his enemy. Anticipating the retort that the tomb was erected by the victors in honor of an admired adversary, Peiresc answered that a Roman inscription would have given more than just his name and been more elaborate than plain unornamented brick. The coin with the initials "MA", according to Peiresc, denoted Massilia not "Marius" and thus could not be used to date the find. Moreover, a coin hoard had been found in the area in 1613 and this MA must have come from there. Moreover, "ceux qui ont la congnoissance de l'usage des Romans" would know that Marius would never have been written this way, but always as C. Marius. Nor did Peiresc believe that the tomb was built of brick, cemented at the corners, and on a big stone, because the ground was sandy and the Romans wouldn't have built on sand. Moreover, if it were stone, it would have broken on such a weak foundation; and since there was no such fine stone in the area, it would have over the years been scavenged for spolia — though none were known nearby. Peiresc also disputed the claim that because of his size Teutobachus needed 4 or 6 horses to carry him, since he would still have dragged on the ground. If the bones were human, they were put there long after defeat of Teutobachus. The bricks would have had to have been older too; and

trastes la cueiller de Mercure en mesme temps que tout arrosé si ce fut de la main des ouvriers qui travailloient à la terre ou de quelque orphevre qui l'eusse acheptée d'eux et si ce fut long temps apres ou non, car il me semble que vous disiés que le manche avoit esté destourné et, emporté quelque part...." Peiresc to Venot, 2 December 1634, quoted in Jaffé, "Peiresc and New Attitudes to Authenticity," *Why Fakes Matter. Essays on Problems of Authenticity*, Ed. Mark Jones, London, 1992, 169.

59 Schnapper gives the history of the find and the debate, which would run through the middle of the eighteenth century, *Le Geant...*, 101, but he does not note Peiresc's intervention in this conversation, or explored its importance.

to say that they were put in place without cement, as in a Cyclopean wall, would in this case require huge stones, which he had never seen. Finally, that sand was found on the bones — fossilization — showed that the tomb could not have been so well cemented after all. After all this Peiresc apologized, as usual, for speaking his thoughts so freely, but he hoped that his recipient was "as jealous as me for the research of the pure truth which has such advantage over the veils which so often cover it."<sup>60</sup>

And so, when Peiresc addressed to Cassiano his desiderata for any research into a possible find of fossil bones on Sicily he saw no need for the development of a different methodology. "And to examine the quality of the places where they are found interred, if any structures are found nearby, or no, and of what sort, or whether they are only interred in the earth, or in an arena, or along with stones, or enclosed in stones, or placed confusedly, or interred in the material of the rock itself like the other petrifications...."<sup>61</sup>

In other words, paleontology and archaeology were cognate sciences, sharing one central methodology: stratigraphy (though of course where the dating of human artifacts could be absolute, those of natural ones could only be relative — at least before the development of modern technologies of dating.) If Peiresc's approach to human antiquities in the ground was no different than his approach to natural antiquities in the ground, it was nevertheless true that natural antiquities, especially those of great age — what we might call prehistoric — had to be explained not, as with antiquities, by reference to human agents, but by reference to nature as an agent: the realm of earth science.<sup>62</sup>

It was in writing about Sicily, and about volcanism, that Peiresc drew the two together most spectacularly. Indeed, so keen was Peiresc's interest in volcanos that he collected three contemporary treatises on Vesuvius and bound them with a long letter written on 27 March 1632 to "D. Severo di Napolo Cer.<sup>ro</sup>".<sup>63</sup> Peiresc supplemented this information with his own collation of modern eruptions of Aetna and Vesuvius, drawn from printed as well as eyewitness sources and ranging in date from 1329 to 1538.<sup>64</sup>

Peiresc also thought about an even more distant volcano. A memoir entitled "1631. 1632/ INCENDIE SOUBSTERRAIN/ EN ARABIE, ET AETHIOPIE", and probably based on information received from Jean Magy,

60 "aussy jaloux que moy de la recherche de la pure verité qui a tant d'avantage sur les voiles dont on la couvre si souvent" (Carp. MS. 1821, fols. 173-5).

61 Peiresc to Cassiano, 20 March 1635, *Lettres à Cassiano dal Pozzo*, pp. 175-6.

62 On the history of paleontology, see Martin Rudwick (see n. 82); for earth science, Gabriel Gohau, *Les Sciences de la terre aux XVIIe et XVIIIe siècles. Naissance de la géologie*, Paris, 1994.

63 The letter is 16 folio pages long and might have been a printed text in the form of a letter, Carp. Bibl. Inguimb. MS. 1821 fols. 178-93. It is preceded by a later note giving the titles of those three volumes with which it was bound: Giovan Bernardino Giuliano, *Trattato del Monte di Vesuvio & de suoi incendii*, Naples, 1632; Pietro Castelli, *Incendio del monte Vesuvio*, Rome, 1632; F. Giulio Cesare Braccini, *Incendio fattoci nel Vesuvio a XVI. di decembrio 1631 e delle sue cause et d'effetti*, Napoli, 1632.

64 Carp. Bibl. Inguimb. MS. 1821, fol. 195: "De Incendiis Montium Aetnae ac Vesuvii".

Peiresc's chief agent in Cairo, described how the Ragusan-born Mamet [sic], Bassa of Suachem, "having heard spoken of, in Cairo, of the eruption of Mount Vesuvius" mentioned that "around the same time", on the border of his department, about two or three days walk into Ethiopia, there had been a similar eruption that had desolated several places and whose smoke could be seen from afar.<sup>65</sup> The memoir goes on to mention the earthquakes felt in Cairo at the same time, and then discusses reports of heavy rains at Mecca in 1631 that brought forth noxious hot fumes from underground caverns, and hot springs in the Sinai Desert and in Medina. Magy had learned of the fumes from the Damascene merchant-living-in-Cairo, and great bibliophile, Bobaquer Soala, who blamed it on the vices of the governor of Mecca.<sup>66</sup>

When the Capuchin Fathers Gilles de Loches and Cesarée de Rosgo stopped at Aix in July 1633 on their way home from Egypt they were debriefed by Peiresc. He added to this same memoir their confirmation of Magy's account, though emphasizing that Mount Sem erupted several months prior to Vesuvius.<sup>67</sup> Peiresc himself suggested some connection between the presence of hot springs in the region and volcanic phenomena. "Which shows clearly that there are exhalations of the earth which contribute to the heat of that water and which could explode in eruptions, or noxious winds, such as those of Mecca."<sup>68</sup>

The masterpiece of Peiresc's thinking about volcanism, reflecting his study of Vesuvius and Aetna as well as Sem, is found in a letter to Philippe Fortin de la Houquette written only a few weeks later, 6 September 1633.<sup>69</sup> Peiresc reported that "cez Marseillois" — presumably sailors — had heard of the eruption of that Mount Sem (perhaps Ras Dascian, 4685m) from the mouth of Memet Bassa of Suachem on the Red Sea, where the flames and smoke were visible. He suggested that without a doubt proximity to the sea contributed to the eruption since "we see that the water of the burning fountain [lava?] being conducted along earth disposed to burn, gave birth there to flames and served as their base, just as the flames penetrate through the water in order to make a pyramid of fire or flames on the water, without the water showing any apparent heat." The model for this was Greek Fire, which could be communicated atop water without being affected by it because of the camphor and other bituminous and oily matter found in it, all of which were found also in "these great furnaces or mouths of subterranean fire."

What Peiresc had not yet been able to explain sufficiently to himself was the ability of the fire to emerge from so deep beneath the ground, as it had to,

65 Carp. 1864, fol. 263r.

66 For this person see Carp. MS. 1864, fols. 256r and 263v.

67 Carp. MS. 1864, fols. 263v-264r.

68 "Ce qui montre evidamment qu'il y a des souspiraulx de terre qui contribuent de la chaleur à cette eau et qui peuvent esclater en embrasements, ou vents infects, tels que celui de la Mecque." Carp. MS. 1864, fol. 264r.

69 Peiresc to La Houquette, 6 September 1633, *Philippe Fortin de La Houquette, Lettres aux frères Dupuy et à leur entourage (1623-1662)*, ed. Giuliano Ferretti, 2 vols., Florence: Leo S. Olschki Editore, 1997, I, pp.323-28; Carp. MS. 1809, fols 182-83.

"because it raised up islands in the midst of the sea, and opened up mouths of fire in their midst as is recounted of some found in the sea of Naples as well as that of Greece." Peiresc thought there had to be some connection to Aetna and Vesuvius "and would seem to imply I don't know what kind of necessary correspondence of the one to the other beneath the surface of the water, because in it one finds the fiery islands of Vulcan and Stromboli."<sup>70</sup>

In fact, Peiresc continued, the majority of sources of hot springs that he knew of, in Aix and elsewhere, came from below the ground up to the surface. Cold water sources, by contrast, tended to move from above to below. Where hot springs had gotten less hot, like that of Aix since the time of Strabon, it was likely the result of cold water intermixing with it. The heated water came from fires deep within the earth "as it has been verified at the baths of Pozzuolo at the place at which opened a mouth of subterranean fire during the time of Pope Paul III, whose slag formed a very high mountain in 24 hours, which I viewed up to the summit where there remained a form of a great theater or caldera [chauderon] whose mouth was closed up by the collapse of the earth on either side which the rains carried down into it."<sup>71</sup>

The peak of Teneriffe in the Canary Islands, which was held to be one of the highest mountains in the world, seemed also to have been formed in the middle of the ocean by the same process. The crater remained open, though no longer on fire.<sup>72</sup> In the northern lands, Peiresc continued, and in the midst of the ocean, there were still "burning mountains" much more marvelous still, as well as others that had ceased to erupt. There were said to be additional ones in America while some in Greece were no longer visible — in the same way that the fires of Sodom and Gomorra had left no trace.

Turning back to the Levant, Peiresc noted that on one side of the Red Sea there were the hot springs in the city of Medina and at a-Tor and it was said that near to Mecca in these last years a pestiferous subterranean wind killed a number of people and camels. There could be some connection, he speculated, with the

70 "Mais ce que j'y trouve le plus estrange est de voir que le feu puisse venir de si profond, comme il fault qu'il vienne, puis qu'il a faict eslever des isles au milieu de la mer, et faict ouvrir des gueulles de feu au mitan d'icelles, comme on raconte d'aucunes de celles de la mer de Naples aussy bien que de celle de la Grece. Car il faudroit presupposer qu'il eusse prins sa naissance dans les entrailles du Mont Aetna, ou du mont Vesuve, qui n'en sont guieres moins esloigné l'un que l'autre. Et sembleroit induire je ne sçay quelle necessité de correspondance de l'un à l'autre, par dessoubz le lict de la mer, puis que dans icelle se trouvent les isles bruslantes du Vulcan et de Stromboli" (pp.323-4).

71 "...estant bien certain que leur chaleur provient du feu qui est par dessoubz, ainsy qu'il s'est verifié aux bains de Pozzuolo à l'endroit desquelz s'ouvrit une gueulle de feu soubzterrain au temps du pape Paul III, dont les baveures formerent une montagne bien haulte dans 24 heures, laquelle j'ay vuee jusques au sommet où il est demeuré une forme de grand theatre ou de chauderon, dont la gueulle s'est refermée par le croulement des terres de ça et de là que les playes y ont traînées" (p.324).

72 Peiresc's "Memoire des plus jolies curiositez qui se peuvent recouvrer des Isles Canaries, et particulièrement de celles de Teneriffe, Madere, & du Fer" (Carp. MS. 1821, fols. 490-1) makes no mention of this history of volcanism, though it does show that Peiresc had thought seriously about the natural history of the Canaries.

eruption of Mount Sem on the other side of the Red Sea "if it is that the material which feeds these subterranean fires is deep enough under the ground to have some connection from one place to the other, beneath the Red Sea, just like it seems there is between Aethna and Vesuvius and other places around Pozzuolo, as well as with Vulcan and Stromboli."<sup>73</sup> Even though over time the eruptions seemed to cease, and the canals to the crater seemed clogged "I don't think, however, that they stopped within because one sees it lit up from time to time."

Again, it was Pozzuolo, which Peiresc had visited on his Italian trip, that served now, three decades later, as a point of reference. So, just as the Monte Novo had not erupted since its opening had closed up, though the fires still burned deep inside its cone — the smoke issuing forth nearby, at Solfatara and Fumarola — "and I indeed think that the passage or communication from the one of these places to the other could be blocked up and closed, for some time, by earthquakes and rockslides as could the mouths", and then open once again, even far out in the sea, "whatever difficulty we have in conceiving of this" (*quelque difficulté que nous ayons à le concevoir*). "The Fire was capable of raising mountains and new islands, where exhalations of subterranean fire burning beneath the sea opened up. It has pushed up similar mountains or elevations within the depths of the sea between Sicily and Syria which did not arrive at such a height as to appear above the surface of the waves and opening up like the others."<sup>74</sup>

Drawing on his knowledge of the winds, Peiresc suggested the Scirocco was "capable of impressing some kind of movement of compression in the deepest entrails of these burning furnaces" with the effect of stoking and augmenting the fires in the submarine cones.<sup>75</sup> Mariners, according to Peiresc, had no more certain signs than these, "so they say," and it was likely upon the basis of similar experiences that was founded the ancient fable of the rule of Aeolus. Because of the relationship between these burning mountains and the appearance of winds the one was used to predict the other.<sup>76</sup>

73 "si tant est que la matiere où s'entretiennent cez feux souterreins soit assez profonde dans la terre pour prendre quelque correspondance d'un lieu à l'autre, par dessoubz la mer Rouge, comm'il semble qu'il y en ayt du mont Aethna au Vesuve et aux autres lieux d'autour de Pozzuolo, aussy bien qu'avec le Vulcan et le Stromboli."

74 "Le feu a esté capable de pousser des montaignes et des isles nouvelles, où il s'ouvroit des souspiraulx de feu souterreain embrasé par dessoubz la mer. Il se soit poussé de semblables montaignes ou enleveurs par dedans le fondz de la mer d'entre la Sicile et la Syrie qui ne soient pas arrivées assez hault pour paroistre sur le niveau des ondes marines, et pour s'entr'ouvrir comme les autres."

75 "Les quelles, estant heritées par le gros de la mer, agitées du siroc soient cappables d'imprimer quelque mouvement de compression dans les plus profondes entraillez de cez fournaies bruslantes, en sorte qu'elles en irritent le bruiet et en augmentent la fumée et les flammes à leur gueulle, toutes et quantes fois que le vent syroc se met sus, et les fassent paroistre si long temps à l'avance comme l'on dict."

76 "Car le mariniers n'en ont point de signes plus certains que ceux là, ce disent ilz, et c'estoit vraysemblablement sur quelques pareilles experiences qu'estoit fondée l'ancienne fable du regne d'Aeole sur les ventz, s'il pouvoit en predire certainement quelques uns par telz signes de ces montaignes bruslantes, la cessation des quelz pouvoit induire la succession des ventz contraires selonc la commune vicissitude des choses de ce monde."

Peiresc then speculated about the existence of subterranean connections between different parts of the earth's surface that *explained* similar, but widely spread physical phenomena. "That if it was possible to suppose an underground connection as well between Mount Aetna and those of Greece and Palestine which burn or produce hot springs, and with those others along the Red Sea, supposing also that these fires, being based on bituminous and oily materials, form a crust or a kind of pocket or furrow capable of supporting the sea water and preventing it from entering these burning caverns."<sup>77</sup> Peiresc went on to consider what role the Mediterranean Sea itself might play as a geological agent.

It will be much easier to understand and conceive that the Mediterranean Sea, being agitated from Syria in the direction of Sicily, makes such a great impression on these flaming caves and caverns covered by the sea, that it makes enough compression to expel the smoke and flames and extraordinary noise that precedes the Scirocco a certain time more or less long according to whether the wind is more or less strong and impetuously. For this shock of the sea, finding material obliging because of its softness or oiliness, and compressing the subterranean void, the smoke and flames and noise in fact emerge as if by a syringe from the mouths of Mont Aetna, and those of Vulcan and Stromboli and others, whose smoke covers the sea and is then carried by the Scirocco all the way to our coast of Provence towards Frejus and the isles of Hyeres, where it still preserves its stench and smokiness.<sup>78</sup>

The role of the wind as a propellant, as the proximate cause of the fire via the wind's impact on water, led Peiresc to remind his reader that if Stevinus's wind-driven sled could travel 14 leagues in an hour, the Scirocco could travel very quickly from Syria to Sicily. Of course it would be preceded by the fire, whose movements were not only faster, but whose course, aided by the convexity of the earth, was also shorter.

Peiresc was using wind and water to explain patterns of volcanism across a Mediterranean that stretched from the Ethiopia to Teneriffe. Peiresc even

77 "Que s'il pouvoit estre loysible de supposer une communication soubsterraine aussy bien du mont Aetna, en ceux de la Grece et de la Palestine, qui ont bruslé ou produit des eaux chaudes, et avec ces autres d'autour de la mer Rouge, supposant aussy que telz feux, en fondant cez matieres grasses et bytumineuses se forment une crouste ou une espeece de bource ou de fourreau capable de soustenir l'eau marine et de l'empescher d'entrer dans cez cavernes enflammées, comme la charge et froideur de l'eau pourroit empescher ce feu de percer telle crouste, si ce n'est par quelque accident extraordinaire."

78 "Il seroit bien plus facile de comprendre et de concevoir que la mer Mediterranée, se trouvant agitée du costé de la Syrie et portée vers la Sicile, fit une si grande charge sur cez antres ou cavernes enflammées couvertes de la mer, qu'elle y fist assez de compression pour en exprimer la fumée et les flammes et le bruiet extraordinaire qui precede le vent syroc de certain temps plus ou moins long, selonc que le vent est plus ou moins fort et impetueux. Car ce heurt de la mer, trouvant des matieres obeissantes en quelque facon pour la molesse ou graisse d'icelles et compriment le vuide souterreain, en fait sortir comme par une syringe la fumée et les flammes et le bruiet par les gueulles du mont Aethna, et de ceux du Vulcan et de Stromboli et autres, dont la fumée couvre incontinent la mer et est portée par le syroc subsequnt jusques à nostre coste de Provence vers Frejus et les isles d'Yeres, jusqu'ou elle conserve sa puanteur et noirceur."

thought to pre-emptively answer those who rejected the ability of water to press the fire through its subterranean channels, or who denied the power of wind to move stone. Here, though, the example came from closer to home. When he had lived in Paris he had been taken up to the top of the stone bell-tower of St Jacques de la Boucherie which shook from the vibrations of its large bells even though this was not visible from the ground. In Peiresc's mind, the work of the wind at sea could be equated with the pressure change produced by the bell's vibrations on land.

Peiresc allowed that his reader might mock his "feverish reveries", but he recalled to La Hogue that during Vesuvius' eruption the sea at Naples retreated and left galleys and large barques high and dry. Peiresc thought that the loud, thundrous noises coming from the earth could have opened up some kind of fissures in the roots of the mountain into which the Bay drained.

"Who knows," Peiresc concluded, "whether the similarly burning or boiling liquids spit up by the mountain through diverse fissures on its sides, and which formed torrents that ravaged the surroundings did not come from waters swallowed in that way, like redirected rivers."<sup>79</sup>

That the level of the waters swiftly returned to normal — at least to the naked eye — was a function of nearby waters filling the void. Peiresc wasn't sure "if the shells and plants and maritime animals that are found at certain levels in almost all the mountains of Provence, and which constrain us to declare that the level of the sea had once mounted up to that height, even though it is a quite considerable height above the present level of the sea," meant that the difference between the sea level then and now reflected the quantity of water that had been absorbed into the fiery fissures of the deep. "But finally I have said enough," Peiresc concluded.<sup>80</sup>

Around this same time Peiresc would seem to have drawn up a concise memoir, untitled, that covers precisely the points made at greater length in this letter.<sup>81</sup> He began with a discussion of the hot springs ("La fontaine ardante") of Dauphiné, that was cool when dry, but whose rising waters brought up the heat. Peiresc then turned to the Scirocco "that blows in Sicily" and moves the smoke and fumes of Aetna and Vulcan two or three days ahead. Then Peiresc discussed the possibility of "subterranean caverns that could communicate

79 "Et qui scayt sy les eaux pareillement bruslantes ou bouillantes que la montagne vomit par diverses ouvertures laterales, qui formerent des torrents lesquelz firent des grands ravages et creusements des terres et noyerent des grandes campagnes, ne vindrent pas de ces eaux englouties de ceste maniere comme des rivières destournées, à ce qu'on presuppose."

80 "Voire je ne scay sy les coquillages et plantes et fructs maritimes qui se trouvent à certains niveaux quasy de toutes les montaignes de Provence et qui nous contraignent d'advoüer que le niveau de la mer est autresfois monté jusques là, bien qu'il soit à une hauteur fort considerable au dessus le niveau de la mer d'a present. Ne pourroit point faire comprendre que les embrasements soubzterrains peuvent avoir engloutty en tiré ailleurs toute l'eau qui y manque à present d'un niveau à l'autre, qui est de plus de cent toises de hauteur ou de difference. Mais enfin j'en diray trop" (p. 328)

81 Carp. MS. 1821, fol. 198

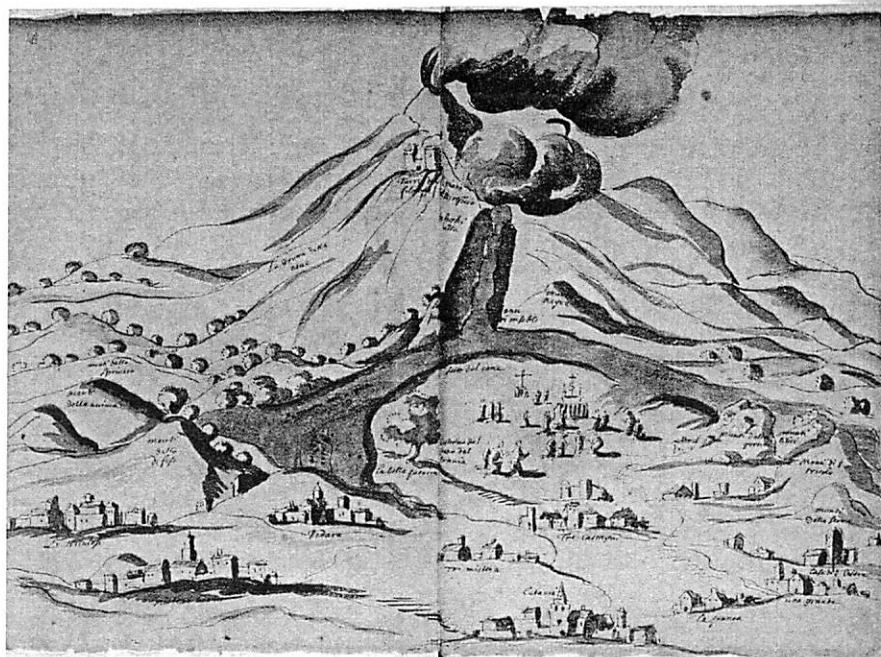
beneath the Mediterranean Sea" and connect, for example, Sodom and Gomorrah with "Aetna and these other burning mountains." Peiresc turned to the question of wind velocity, drawing on Stevinus's wind-driven ice sled as an experiment in near friction-free wind speed (14 leagues in 2 hours; in the letter to La Hogue he gave it as 14 leagues *per* hour), in order to suggest how fast the liquified fire compressed by the wind-driven waters could travel beneath the surface of the sea. Next, Peiresc discussed the "sac", or channel, through which the magma (not his word) travelled, and the properties of its crust. Finally, Peiresc noted the relationship between seismic activity and the fracturing of sea beds — both sucking in water and stoking the burning liquid at the heart of the mountain. The example of Vesuvius and the Bay of Naples stood at the center of the discussion.

In a letter to Cassiano dal Pozzo of 2 August 1635 Peiresc summarized his thinking on the subject, this time putting these radical observations back into the conventional framework of the Bible. The general context was Peiresc's hopes for La Ferrière's visit to Sicily, the immediate one, d'Arcos's report of giant bones found in Tunisia, which he thought more likely to be an elephant or sea monster.

Now, just as in these mountains are found so many shells, crabs and other maritime things, so there could have been buried relics or bodies of large fish (if you don't want them to be giants), but in times when I do not believe tools of great architecture were used; [rather] with those revolutions of the Fires of Aethna and Vesuvius, and of the separation of Sicily from the continent of Italy, and perhaps also in times much more high and more ancient in fact than those perhaps of the Deluge. Because all antiquity, and the holy fathers of the primitive church themselves, are of accord that the waters had other times flooded the surface of the land inhabited by us, and left there the ruins [spoglie] of so many shells, crabs and other fish, and plants or animals, that are found here and in all Italy, France and Germany, it could not be too difficult for these revolutions to gather big fish as well as little ones, as well little shells as big ones, there being found in our hills of Boysgency some that are more than 3 palms in diameter...In sum, the thing merits being clarified in these times in which are sought out the true anatomy of things (vere anatomie delle cose).<sup>82</sup>

Peiresc did not stop thinking about volcanos. The regular eruption of Aetna offered continuing possibilities for close ocular observation — albeit by a surrogate. Peiresc received a letter written from Malta in 1636 that described a tour of Sicily and, in particular, a terrifyingly close examination of Aetna.

82 Peiresc to Cassiano 2 August 1635, p. 199. It would be a mistake to view Peiresc's recourse to the language of Universal Deluge as especially old-fashioned; as Rudwick has observed it, served as the dominant explanation for those who viewed fossils as organic on into the 18<sup>th</sup> century. Extinction as the driving force had to wait until Georges Cuvier's paper of 1794. Martin J.S. Rudwick, *The Meaning of Fossils. Episodes in the History of Palaeontology*, Chicago and London, 1985, 2<sup>nd</sup> edn, 87, 101.



3. Paris, Bibliothèque Nationale, MS. Dupuy 488, f. 173.  
Cliché Bibliothèque Nationale.

I approached it with horror and admiration and can assure you that that which the ears heard of the terrestrial Phlegeton does not arrive at expressing that which the eyes saw. The matter that flows is like a liquified metal that flows from the furnace to make a piece of iron; very red and blazing and which hardened little by little in the measure that it grew distant from its source. It is a mixture of iron, lead, earth, salt and sulphur. I was curious to approach within four fingers of the iron, to toss stones at it, and plunge some piece of wood into it, which caught fire quickly, and nevertheless it was distant from the source of the fire by about two leagues — being a little above “le grand Chesne” or “la belle quercia” (which you could see on the plan that I have sent...<sup>83</sup>)

The map that Antoine Leal prepared has survived – down to the larger than scale figures praying at a make-shift altar surrounded on three sides by lava fields, though whether this met Peiresc’s standard of detail as outlined in the letter to Cassiano is unlikely.

<sup>83</sup> “Je m’en approchay avec horreur et admiration et puis assurer que ce que les oreilles oyent de ce terrestre Phlegeton, n’arrive pas a exprimer ce que les yeux voyent. La matiere qui coule est comme le metal liquifié qui coule de la fournaise pur faire une piece de fonte, fort rouge et fort

Gassendi’s characterization of Peiresc’s volcanology is succinct, and startling. He gives Peiresc credit for theorizing the existence of what we would call a ‘Ring of Fire’:

hereupon he discoursed largely touching Channels under ground, by which not onely waters, but fires also might passe from place to place: and consequently Vesuvius might communicate the fire to Aetna, and Aetna to Syria, Syria to Arabia Foelix, Arabia Foelix to the Country, bordering upon the Red Sea, in which stands the Mountain Semus aforesaid: whether a long row of arched Rocks do make the Channel, or whether the fire it self breaking in at the chinks do make it self way, and create channels, pitching the same so with a bituminous suffumigation, that it keeps out the Seawater which goes over it. And that fires under ground do make themselves way, may be known by the Mountain Pouzzoles in the time of Pope Paul III, and others at other times made by the eruption of fire.<sup>84</sup>

Peiresc’s link between archaeology, paleontology and geology seems to prove the truth of Martin Rudwick’s claim that “a modern interpretation of the organic resemblances of fossils was thus delayed by the lack of any satisfactory explanation of geographical change,” but inversely. Because Peiresc *was* able to explain changes to the earth’s geography he *was*, therefore, able also to account for the existence of fossils.<sup>85</sup>

Hooke’s “Discourse of Earthquakes” of 1688 would seem to be the direct descendent of Peiresc’s work on the Mediterranean of the 1630s.<sup>86</sup> Hooke, too, was trying to describe the process of earth history that could account for the existence of fossils (and the current shape of the planet). “Physiological description” was the term Hooke used in the sub-title of *Micrographia* to denote this type of work, and “description” best captures Peiresc’s approach as well.<sup>87</sup>

ardante laquelle peu a peu s’endurcit a mesure qu’elle s’esloigne de son origine. C’est un meslange de fer de plomb, de terre, de sel, et de soufle. Je fus curieux de m’approcher a quatre doigts du fer, de jeter des pierres contre, et d’y plonger quelque piece de bois que s’allumé en peu de temps, et neantmoins c’estois esloigné de la source du feu deux lieues environ estant un peu dessus le grand Chesne ou la belle quercia (que V.R. pourra voir au plan que ie luy envoyé et qu’elle portera s’il luy plaist de ma part au R.P. provincial quand elle ira a la congregation aprez qu’ell l’aura veu et fait voir au votres et a noz amys.) Le feu en cet endroit ou ie le considerois avoit au moins 1000 pas de largeuer.” Antoine Leal to P. Hugues Guile [rector of the Jesuit college at Aix], 18 March 1636, Carp. Bibl. Inguimb. MS. 1810, fol. 104v; another letter, of the same date, describes his tour of Sicily at greater length, fols. 102-3; partial copy in Carp. MS. 1821, fol. 270; additional full copy in B.N. MS Dupuy 488, fols. 172-3.

<sup>84</sup> Gassendi, *Mirrouir*, year, 1633, pp. 90-1.

<sup>85</sup> Rudwick, p. 39. Cecil J. Schneer, ed. *Toward a History of Geology*, Cambridge, MA, 1969.

<sup>86</sup> Ph.D diss Yushi Ito, *Earth Science in the Scientific Revolution* and an article in: *British Journal for the History of Science* 21, 1988, 295-314; and R. Rappaport on earthquakes in: *British Journal for the History of Science* 19, 1986, 129-46.

<sup>87</sup> Michael Aaron Dennis, “Graphic Understanding: Instruments and Interpretation in Robert Hooke’s *Micrographia*”, in: *Science in Context* 3, 1989, 309-65. See also Miller, “Description Terminable and Interminable: Looking at the Past, Nature and Peoples in Peiresc’s Archive”, in: *Historia: Empiricism and Erudition in Early Modern Europe*, eds. Gianna Pomata and Nancy Siraisi, Cambridge, MA: MIT, 2005, 355-97.

Hooke emphasized earthquakes rather than volcanoes, though obviously the two are deeply linked phenomena. These explained to him how the ocean floor could become a mountain top, bringing marine fossils to the peaks. And it was this very discussion that led him back to the convergence between the study of natural and human antiquities.

There is no Coin can so well inform an Antiquary that there has been such or such a place subject to such a Prince, as these will certify a Natural Antiquary, that such and such places have been under the Water, that there have been such kinds of Animals, that there have been such and such preceding Alterations and Changes of the superficial Parts of the Earth: And methinks Providence does seem to have design'd these permanent shapes, as Monuments and Records to instruct succeeding Ages of what past in preceding. And these written in a more legible Character than the Hieroglyphicks of the ancient *Egyptians*, and on more lasting Monuments than those of their vast Pyramids and Obelisks. And I find that those that have well consider'd and study'd all the remarkable Circumstances to be met with at *Teneriffe* and *Fayale*, do no more doubt that those vast Pikes [sic] have been raised up by the Eruption of Fire out of their tops, than others that have survey'd the Pyramids of *Egypt*, or the Stones on *Salisbury* Plain do doubt that they have been the effects of Man's Labours.<sup>88</sup>



88 Richard Waller ed., *Posthumous Works of Robert Hooke*, 1705; facs. NY, 1969, p.321.

Reihe Kulte/Kulturen

# Sintflut und Gedächtnis

Erinnern und Vergessen des Ursprungs

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## Vorwort

Der biblische Mythos von der Sintflut erzählt nicht nur von einer Katastrophe im Sinne von Schrecken und Strafe, sondern auch von einer Katastrophe kollektiven Erinnerungsverlustes: Das Gedächtnis der Menschheit mußte zusagen durch das Nadelöhr der Reduktion auf ein einziges Menschenpaar, ging dabei verloren? Was wurde aus dem vollkommenen Wissen Adams der frühen Patriarchen? Was wurde davon erinnert, überliefert? Und auch einer anderen Perspektive läßt sich nach der Erinnerung fragen: Wie wurde die Katastrophe der Sintflut selbst erinnert? Wurde ihr Schrecken verdrängt und vergessen? Und lebte das Verdrängte fort, indem es der Kultur der Noachiden so nachhaltiger seinen Stempel aufprägte?

Fragen dieser Art sind keineswegs erst nach Freud gestellt worden. So schon in der orientalistischen Gelehrsamkeit des 17. Jahrhunderts als auch in den Menschheitsgeschichten des 18. Jahrhunderts haben die Noachiden und ihre Söhne innern und Vergessen eine entscheidende Rolle gespielt. Erst von Noah und seinen Söhnen an meinte man eine Geschichte im Sinne einer lückenlos erinnerten und tradierten Kultur vor sich zu haben. Mit ihnen war der archimedische Punkt gegeben, von dem an die Geschichte der Diversifizierung des Menschheitswissens und der menschlichen Verhaltensweisen begann. Ursprüngliche Religion und heidnische Idolatrie, ursprüngliches Gesetz und ungesetzliche Korruptionsformen hatten hier ihren gemeinsamen Ausgangspunkt.

Bei Theoretikern wie Ralph Cudworth und John Spencer kann man im Bezug auf den Moses-Ägypten-Diskurs sehen, wie im späten 17. Jahrhundert entscheidende Weichen in der Gedächtnisgeschichte des Komplexes von Monotheismus, Judentum, Esoterik und Pantheismus gestellt wurden. Diese Orientierungen, die mit der Entwicklung der historischen Kritik, des säkularisierten Naturrechts und der modernen Naturwissenschaft zeitlich zusammenfallen, lassen sich – auf ihre Weise – auch im Diskurs über die Sintflut ausmachen. Der Umschlagspunkt der Sintflut ist ein Ereignis von Vergessen, doch-nachhaken, Umbesetzen, Korumpieren, Teilvergessen und Kompensieren.

Von Thomas Burnet über Goguet bis Boulanger entwickelte sich eine Aufmerksamkeit für die Sintflut, die naturwissenschaftliche Forschung über die Sintflut mit chiliastischer Erwartung, die Differenzierung von Esoterik und Exoterik mit Religionskritik, mit Kulturtheorie und mit politischer Anarchie des Despotismus verband. In seiner reifsten Ausgestaltung bei Boulanger wurde der Sintflut-Diskurs so zentral geworden, daß die gesamte Kultur der Antike als Bewältigungsversuch einer durch den Sintflut-Schrecken geprägten Menschheit angesehen und den heidnischen Mysterien die Rolle eines Antidotes gegen diesen Schrecken zugewiesen wurde. So wie im Moses-Diskurs seit Herodot und – in der Neuzeit – seit Spencer die jüdische Religion im Sinne