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EARLY MODERN PERCEPTIONS OF NATURAL DISASTERS

THE ERUPTION OF THE VESUVIUS IN 1631

JOSE MOUTHAAN

The reconstruction of early modern perceptions of natural disasters involves several implications. The concept of *natural disaster* consists of two competing elements, namely *nature* and *disaster*. Whereas nature concerns space that is unaffected by human interference, a disaster implies a violent disruption of the natural order that deeply encroaches social life. In order to be classified as a natural *disaster* an event has to cause considerable damage to human settlements and infrastructures, and (or) a rather large number of casualties. In this sense, a violent earthquake in a desolated part of the world would not be regarded as a catastrophe. Natural disasters thus paradoxically require human interference in the natural environment. One could even ask the question whether a catastrophe is caused by "natural trigger effects" or by the fact that people have chosen a dangerous place for their settlement. The area surrounding the Vesuvius forms an example of such a potentially hazardous place. Naples, one of Italy's largest and most densely populated cities, is situated only a few kilometres from the slopes of the volcano. Throughout the centuries the fertile soil of the volcano has attracted a large number of people to settle on the flanks or near the foot of this highly unpredictable and potentially explosive volcano. Today the volcanic activity of the Vesuvius is kept under constant surveillance by the *Osservatorio Vesuviano* – which allows a relatively fast evacuation in case of possible danger – therefore the risk of a major catastrophe has been substantially reduced. In the past, however, people were much more exposed to the "whims" of the volcano.

The second reason for the complexity of the understanding of early modern perceptions of natural disasters is formed by the lack of comprehensive explanations for the causes of the different manifestations of natural catastrophes like earthquakes, floods, storms and volcanic eruptions during this period. In fact, the term *natural* is in this respect misleading, since our ancestors have not always explained these phenomena in natural terms. In early modern times disasters could not only be attributed to natural processes, but also to divine wrath or the deceptive workings of the devil, which implies that the concept of natural disasters as such did not yet exist. Whereas historians have previously

shown great interest in early modern perceptions of comets, monsters, miracles, and pestilence, they have almost completely neglected perceptions of natural disasters as a separate topic of investigation. Instead, the different natural catastrophes manifested their particular characteristics. Until the second half of the 1990s, scholars like Lorraine Daston, Stuart Clark, Dudley Wilson and Jerome Friedman often depicted the relationship between the three possible perceptions of strange phenomena as a linear development, according to which supernatural ("religious") and preternatural explanations slowly made way for natural ("natural philosophical") ones, assuming an incompatibility between religion and natural philosophy.[1] Detailed case studies of perceptions of natural disasters in the Kingdom of Naples and the Dutch Republic show, however, that religious and natural philosophical explanations of catastrophic events were not necessarily incompatible.[2]

In this paper I will deal with a natural catastrophe that occurred in a period of important developments regarding methods for the investigation into nature, namely the eruption of the Vesuvius in 1631. This eruption – that had taken place after a dormancy of almost 500 years – was the first one personally observed by Italian natural philosophers in early modern time. Something which is confirmed by the Neapolitan secretary Gianbernardino Giuliani who stated that "con gli occhi propri habbiamo tutti in questi giorni veduto, & in si fiera tragedia osservato, della natura del Vesuuio, e della maniera de'suoi incendi".[3]

Before the volcanic eruption in 1631, Italian natural philosophers had to rely on classic Greek writings concerning the nature and origin of volcanic eruptions. In 1631, however, they had the opportunity to test the ancient theories against empirical observations, albeit these observations were not necessarily performed by the scholars themselves. According to the natural philosophical principles of that time, reports provided by "reliable" eyewitnesses were also considered to be a sufficient basis to draw conclusions.

At the same time, the 1631 eruption was the first one that occurred during the Catholic Counter-Reformation. After the Council of Trent, investigations into nature became more and more defined in terms of a strict interpretation of scholastic Aristotelian traditions. Moreover, Catholic authorities kept a closer watch on the observance of religious doctrines. According to these doctrines, catastrophes had always been interpreted as signs of divine wrath. Does this imply an insurmountable discrepancy between natural philosophical and religious perceptions and explanations of the volcanic eruption in 1631? In the following pages I will try to find an answer to this question.

THE DISASTER

In the night of Monday 15th to Tuesday 16th of December 1631 inhabitants of Naples and the villages surrounding the Vesuvius were roughly woken up by a violent earthquake and a tremendous noise. Although, in the first instance some regarded the panic that immediately broke out as "timor donnesco",[4] the tragic implications of the situation soon became clear. First, a huge column of smoke emerged from the crater of the volcano after a violent explosion. This column – an estimated 13 to 19 kilometres high – mainly contained ashes and stones that were dispersed over a large area through strong winds.
The first weeks after the volcanic eruption, the inhabitants of the surrounding villages were confronted with the devastating effects of lava flows, earthquakes, "nuées ardentes" (glowing clouds of gas), "lahars" (streams of mud and volcanic material), and floods caused by heavy rainfall. Besides, they witnessed terrifying phenomena like the temporary retreat of the sea in the Gulf of Naples followed by a tsunami.[5] The eruption of the Vesuvius in 1631 had been the most violent outbreak since the destruction of Pompei in 79 A. D. and the first with any significance since 1197. Over 4000 people were killed in the disaster and about 20.000 people became homeless.[6] Most of the victims lived in the villages on the flanks of the volcano. Their death was mainly caused by lahars and nuées ardentes that moved with an enormous speed, and by houses collapsing under the heavy weight of accumulating ashes. Many people had sought refuge within their houses trying to escape the burning ashes and the falling rocks. The city of Naples – one of the largest cities in Europe at that time – remained remarkably unharmed by the volcanic eruption that took place such a short distance away. Although the streets were covered with ashes, real damage did not occur.
Regarding the large number of casualties and the widespread destruction of farms, villages, arable lands, and infrastructures, the eruption of the Vesuvius in 1631 can be considered as a genuine disaster. Although according to modern standards the eruption can certainly be classified as a *natural* disaster, contemporary perceptions of this catastrophe vary largely.

DIVINE WINGS OF TRAGEDY: THE VOLCANIC ERUPTION AS INDICATION OF GOD'S WRATH

Shortly after the volcanic eruption, a large number of accounts of the disaster appeared in print. Within the first six months about 60 publications in the form of pamphlets, letters, and more elaborate natural philosophical treatises found

their way to the printing press. Over the centuries, this list extended to about 300 publications by the end of the 19th century.[7]

In most of the texts published within the first months after the disaster we can find detailed descriptions of the reactions of the inhabitants of Naples and the villages surrounding the Vesuvius. Their first reactions were clearly inspired by the belief that "Iddio per nostri peccati, intorbidò il tutto, col crudele, e fiero incendio del vicino Vesuvio".[8] In other words, the volcanic eruption was widely perceived as a divine judgement for sinful behavior. Although the authors remained rather vague about the specific nature of these sins and who could be held responsible for God's discontent, they indicate a collective sense of guilt. An anonymous pamphleteer, for example, wrote that "al mio parere non restò huomo, ne donna, ne persona capace di peccato, che non si confessasse".[9] Since the immediate cause of the volcanic eruption was, in this sense, formed by divine wrath evoked by human sin, the only way to avert this divine judgement was repentance. In this sense, the expressions of a guilty conscience not only indicated that the disaster was perceived as a supernatural punishment, but formed at the same time a remedy against the volcanic eruption.

Ecclesiastics played a central role in the regulation of collective expressions of remorse. In Naples, churches remained open day and night in order to give as many people as possible the opportunity to confess and take Communion. Moreover, priests and monks went to the struck area in order to reach those who were not able to go to confession in Naples, and to convert the "godless". Some clergymen addressed their activities to a particular social group. The friars of the Rosary, for instance, dealt with "female sinners". Within the first two months after the disaster they had managed to convince 150 "Meritrice" not only to abandon "la mala vita", but also to give up their freedom and let themselves be locked up in "Conservatorij, fundati a questo effetto dai fratelli del Santissimo Rosario".[10]

Perhaps the most visible and impressive collective expression of guilt was formed by the large number of processions that were held on a daily basis in Naples during the first weeks after the disaster. Main goal of these processions was to restore the disturbed relationship between God and the people of Naples through the "Sacrament of Penitence": "Tutte le suddette notti si sono fatte Processioni, non con battenti, ma con carnefici delle carni loro, dandosi fortemente con corde, con catene, e spuntoni di ferro: beato chi haveva una Corona di spine per conficcarsela in capo: felici chi haveva una Disciplina, un Cilitio […]; tutte le religioni sono uscite con misterij, Reliquie, e Corpi Santi, moltissimi scalzi con Catene, e Capresti al collo."[11]

Some acts of self-mutilation seem to have been of a more pagan origin, on the

verge of collective insanity. There were, for example, people who – during the processions – scraped their faces, pulled out their hair, covered their faces with mud, or deliberately besmeared themselves with all kinds of dirt.[12] Rather than official religious practices, this behavior was closely related to the zealotry of pagan cults. We must, however, not forget that natural disasters form extreme events of immediate mortal danger that evoke strong emotions among the people that are struck. The often rigid character of prescribed religious rituals might therefore not have provided people with sufficient means to express their despair in a – for them – meaningful way.

A concomitant phenomenon of the daily organized processions was the regulating character involved with it. Instead of purposelessly prowling in the streets people's steps were now almost literally guided. In other words, processions offered officials important means to keep up public order. Moreover, participation in this collective ritual not only encouraged the sense of solidarity – people of all layers of society took part in it – but could also give people the idea of taking their fate in their own hands. Something which was underlined by the dynamic character of processions. These religious parades did not remain in a specific place but usually moved through the city or town towards a particular destination like a sacred place. They offered individuals therefore an important point of reference for dealing with their anxieties: Instead of passively awaiting the outcome of events, people could now actively participate in a collective ritual that was considered to be indispensable to avert the disaster.

Besides acts of penitence, processions served to call upon saints for help. Through the veneration of their cults, saints were asked to intervene and save people from the devastating effects of the volcanic eruption. In almost all printed sources regarding the 1631 eruption we find numerous examples of "miracles" by saints and their relics. Within these texts, authors have especially paid attention to Naples' patron saint, San Gennaro. On Wednesday, the 17th of December (the second day of the eruption), for example, archbishop Francesco Buoncompagno organized a procession in honor of the patron saint. When a large crowd of believers was waiting outside the cathedral for the archbishop to come out with the saint's relics – "la Santa Testa" and an ampulla containing Gennaro's blood – a ray of sunshine appeared through the heavy clouded sky. This little sunbeam was immediately interpreted as a sign of hope "che diede al popolo occasione di gridare Miracolo, Miracolo".[13]

This event was underlined by a more mysterious occurrence. At the same moment of the appearance of the sunbeam San Gennaro, dressed in pontifical vestment and pastoral miter, appeared in the window above the main gate of the cathedral, blessing the waiting crowd. This appearance was generally interpreted as proof of the patron saint's protection of Naples. Shortly after this occurrence,

Fig. 1: *Vesuvius before the eruption of 1631 (Gianbernardino Giuliani, Trattato del Monte Vesuuio e dei suoi Incendi, Naples 1632, in: Collection of the "Biblioteca dell' Istituto e Museo di Storia della Scienza" in Florence).*

archbishop Buoncompagno – unaware of the miraculous events outside the cathedral – emerged with the two relics of the saint in order to start the procession headed towards the Vesuvius. When the procession left the city through the "Porta Capovana", the archbishop brought the large crowd to a halt. After a short oration he turned to the volcano and made three signs of the cross with the ampulla containing Gennaro's blood. Immediately after this ritual the large dark ash-cloud, that had concealed the volcano since the day before, suddenly started to evaporate. Many contemporaries interpreted the disappearance of the ash-cloud as a sign that the patron saint would protect the city of Naples of the devastating effects of the volcanic eruption. The "miracle" of San Gennaro did, however, not initiate a period of dormancy, for the Vesuvius still remained restless for months.

The evident signs of the Neapolitans' agony of conscience indicate that the eruption of the Vesuvius was perceived as a divine judgement. This explanation of the disaster was, however, to a large extent regulated by religious authorities and thus strongly embedded in moral implications. Although after the Council of Trent, the Catholic Church kept a watchful eye on the obser-

vance of Christian morality, there existed a large group of authors who tried to discover the natural mechanism of the disaster. Whereas the eruption of the Vesuvius in 1631 formed an excellent occasion for ecclesiastics to call their "flock" to order and convince them of the necessity of pious behavior, natural philosophical explanations were completely free from moral implications. Reduced to a series of natural effects, volcanic eruptions no longer inspired fear of divine judgement. However, as I will try to show in the following pages, natural explanations of the eruption of the Vesuvius were not completely detached from religious notions of the disaster. In practice, early modern perceptions of natural disasters as either divine punishments or natural phenomena were not always clearly separated.

THE DISASTER AS A NATURAL PHENOMENON

At the beginning of the 17th century, volcanological theories were to a large extent still based on Aristotle's *Meteorologica,* more particularly on his theory of the winds. According to Aristotle, wind was formed through exhalations – or "vapors" – that were generated both by the heat of the sun and the internal fire of the earth. Because the earth contained many open spaces underneath its surface, winds were accumulated within the globe. However, when the pressure of the growing amount of exhalations inside the cavities of the earth had become too large, the air would violently escape thus causing an earthquake.[14] Although in his writings Aristotle did not occupy himself with volcanoes, his theory concerning subterranean exhalations formed the basis of early modern natural philosophical speculations regarding the cause of volcanic eruptions. The treatises published on occasion of the 1631 eruption reflect, however, an important period of transition in respect of natural philosophical practices, in the sense that they combined traditional (classical) theories with empirical observations.

In his *Discorso Astronomico* (1632) Angelo Perrotti, for example, argued that because of the movement of the earth caused by the escaping exhalations, different layers of stone had clashed, producing a spark. Assuming that the caves underneath and within the Vesuvius contained a large quantity of sulphurous and bituminous material this small spark had caused an "ignitione".[15] This ignition became visible from the outside through the large column of smoke that was observed soon after the heavy earthquake in the night of Monday 15th to Tuesday 16th of December 1631. Moreover, the presence of combustible material inside the volcano was proven by the fact that during the eruption people had noticed a strong odor of sulfur. It is important to un-

derline that Perrotti's hypothesis derived from the application of the senses, namely the seeing of the smoke-column and the smelling of sulfur. Natural philosopher Pietro Castelli went one step further in his observations regarding the 1631 eruption: By tasting them, he tried to distinguish different types of ashes, concluding that the ashes tasted "insipido, ò acro, ò salato". Besides the analysis of flavor he also examined the different qualities of the ashes in regard of color ("oscuro, ò bigio, ò bianco"), and substance ("sottilissima, ò grossetta come miglio, ò come arena, ò con meschiate particelle lucenti, altra greve, altra leggiera").[16]

Perrotti, however, not only based his theory regarding the cause of volcanic eruptions on the writings of Aristotle combined with experience derived from empirical observations, but also on knowledge obtained from experiments. In his publication, he provided the reader with indications of how to create an "experimental setting" in order to imitate the effect of a volcanic eruption produced by the combination of aqua vitae, camphor and two other components. These materials should be boiled on a low fire in a small tube placed in a room without windows. If someone, then, entered the room with a candle the air would immediately ignite. Perrotti recalled how some people had used this experiment to play a joke on a bearded friend in Bologna in 1603. The unsuspecting victim – who was known to be very proud of his long beard – was provided with a candle and requested to open a door. Not knowing that behind this door there was a small room with the above-mentioned experimental setting inside, the man entered with the lighted candle. During the resulting chemical reaction the man's beard was completely wiped away.[17] By means of this seemingly innocent anecdote Perrotti tried to explain the mechanism of volcanic eruptions: If it was possible to ignite air through this small experiment, the accumulation of combustible materials within the volcano during several centuries would cause a much larger explosion. He concluded that combustible materials and motion formed the most important prerequisites of the eruption of the Vesuvius.

Perrotti did, however, not believe that the heavy earthquake – causing the spark that ignited the volcano – had occurred just by chance. He based his theory concerning the origin of this earthquake (and thus, implicitly, of the volcanic eruption) both on Aristotelian wind-theory and astronomical observations: 38 days before the beginning of the 1631 eruption an eclipse had blown warm and dry air towards the surface of the earth. This air – or, exhalation – had accumulated within the underground cavities until the pressure became too high, resulting in an earthquake. The eclipse was part of the divine master plan by which all movements of the stars and other celestial bodies were determined in advance by God. This did, according to Perrotti, not immediately imply that

God had deliberately planned the eruption of the Vesuvius. Although God was aware of the fact that the amount of combustible material and exhalation had reached such a high level that a volcanic eruption was inevitable, he did not interfere in the ordinary course of the celestial bodies. In other words, God did not consciously cause the eruption of the Vesuvius, but he did not try to prevent it either.[18] Perrotti attributed volcanic eruptions thus to natural processes, but because everything in nature was created by God, these processes were in a sense also related to divine providence.

VOLCANIC ERUPTIONS AS INSTRUMENTS OF GOD'S WRATH

The question whether volcanic eruptions could be explained by a natural or a supernatural cause became an important point of discussion in natural philosophical treatises regarding the 1631 disaster. Although according to our modern sense of logic a phenomenon can either be explained as natural or supernatural, in early modern treatises authors did not always make such a clear distinction between those two perceptions. In practice, natural and supernatural explanations were not so much experienced as opposites, but formed different layers by which the volcanic eruption could be explained. Perhaps we should attribute this attitude towards natural disasters to the fact that a large number of the natural philosophical explanations of the 1631 eruption were published by ecclesiastics.

The Franciscan friar Eugeni, for example, attributed the eruption of the Vesuvius to three different factors: The "materia principale", the "causa efficiente", and the "causa finale".[19] The principal material was formed by rock-oil mixed with sulfur. Eugeni had, however, two different definitions of the "efficient cause". On the one hand, this cause was formed by the violent earthquake that preceded the volcanic eruption. The sparkle provoked by this earthquake had kindled the "materia principale" inside the subterranean cavities. On the other hand, the friar metaphorically indicated "li nostri peccati" as the efficient cause, because they had "acceso meritamente l'ira di Dio". The final cause consequently implied that "Iddio si sia servito di questi effetti naturali, perchi Iddio volendo mostrar à volta la sua potenza camina per mezzi naturali".[20] Although the mechanism of the volcanic eruption could be explained in natural terms, the disaster formed at the same time a divine judgement since God had deliberately activated the processes that had generated the volcanic eruption.

The perception of the eruption of the Vesuvius as a natural phenomenon applied by God as an instrument to punish sinners was, however, not exclusively expressed by ecclesiastics. In his *Meteorico Discorso* (1632) natural philosopher

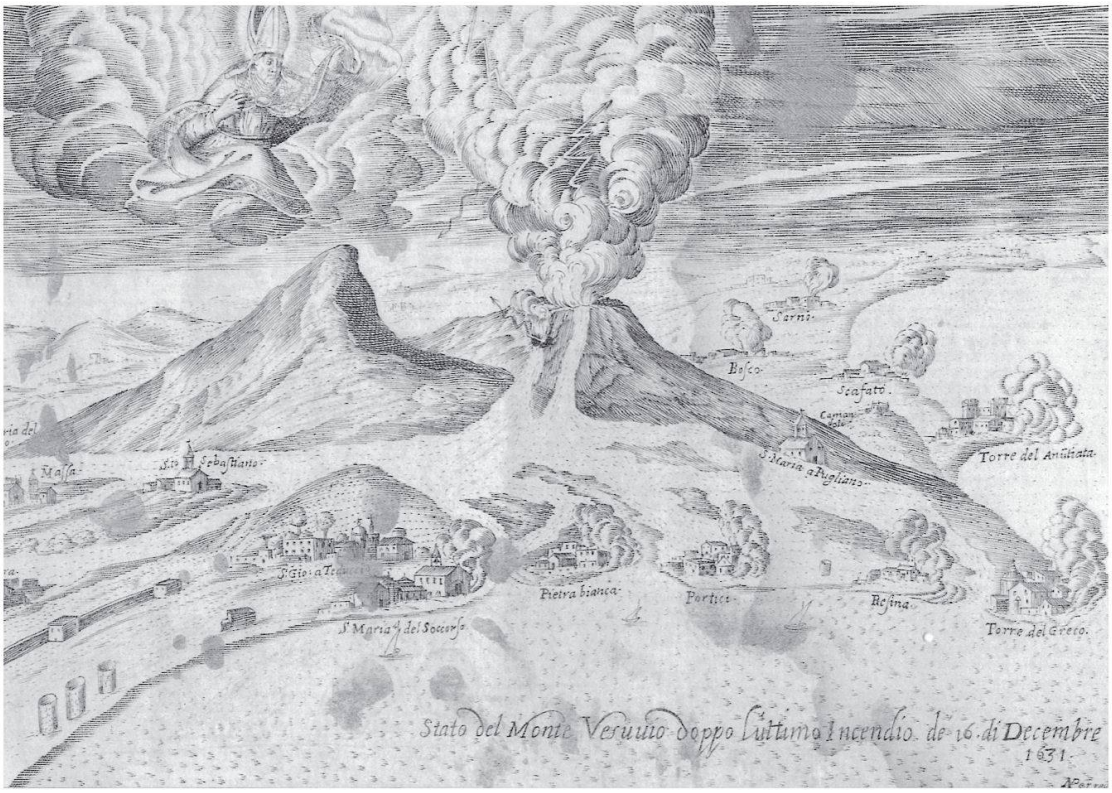

Fig. 2: *Vesuvius during the eruption of 1631 (Gianbernardino Giuliani, Trattato del Monte Vesuuio e dei suoi Incendi, Naples 1632, in: Collection of the "Biblioteca dell' Istituto e Museo di Storia della Scienza" in Florence).*

Giovanni Forleo, for instance, argued that "Iddio benedetto giustamente sdegnato per i nostri misfatti, preteso havesse mandarci di quelli il condegno castigo, e servirsi per istrumento del suo flagello questa si fatta maniera di terremoti e di fuochi".[21] Similar to Eugeni, Forleo made a distinction between natural processes that had generated the volcanic eruption (based on Aristotle's theory of the winds) and the catastrophe that was provoked on purpose by God.

This does, however, not imply that all natural philosophers perceived the 1631 disaster as both natural and supernatural. Antonio Santorelli, for example, was convinced that the eruption of the Vesuvius was an "effetto naturale" generated through natural processes. He explicitly stated that the "causa finale" was not God, but nature, since nature never operates at random.[22] Nor did all ecclesiastics attribute the eruption of the Vesuvius to divine intervention. Abbot Giulio Cesare Braccini, for instance, argued that "non volendo io entrare à perscrutare gli occulti giudizij di Dio, à me giova di credere, che questo incendio con tutti gli altri accidenti occorsi, proceda da causa naturale".[23] According to Braccini, the volcanic eruption could thus be explained in natural terms.

A little more careful in his conclusions was natural philosopher Pietro Castelli

from Rome. Although he argued that the eruption of the Vesuvius was "ad esso naturale", he did not necessarily deny the possibility of divine intervention: "Circa le cause di questo fuoco, non pare che si debba filosofare, perchè altri vogliono, che sia stato volontà di Dio, per castigar i peccati, & intimar la penitenza al popolo: e si vede che la penitenza e l'orationi hanno giovato, e salvato la Città di Napoli da ogni danno. Io so bene, che niente si fa senza la permissione di Dio; e so, che i medesimi mezzi vagliono anco contro gl'effetti naturali: ma per non esser'io Teologo non convien, che ne parli."[24]
The last remark suggests that Castelli wanted to avoid any explanations that could involve theological implications. Does this cautiousness imply that Castelli feared the criticism of Catholic authorities regarding his natural explanation of the eruption of the Vesuvius?
Although he seemed to favor a natural perception of the eruption, he remained rather careful and vague in his conclusion. On the one hand, he held up the principle of "every man to his trade" by refusing to take a clear standpoint regarding supernatural perceptions of the 1631 disaster. On the other hand, he defended himself beforehand against any misinterpretations of his natural observations by stressing that he had finished his text only within 15 days after the eruption. Moreover, because he wrote his treatise "in Roma lontano assai dal Vesuvio ardente" Castelli had not been able to verify all the natural processes involved with his own eyes.[25] He thus largely depended on the collaboration with Neapolitans who provided him not only with personal reports but also with samples of volcanic material like ashes.

CONCLUSION

The different explanations of the eruption of the Vesuvius in 1631 demonstrate that in early modern time natural disasters could be perceived in different ways and, more importantly, in different ways at the same time. Natural explanations of the catastrophe were not necessarily incompatible with the notion of divine judgement. According to this "double-perception", the volcanic eruption was caused by natural processes that were applied by God as instrument to punish sinners. Because disasters involved physical damage, an immediate connection with punishment was not difficult to find. The loss of belongings and loved ones raised among survivors the question why this catastrophe had happened to them. In a culture strongly influenced by religion the answer to this question was almost handed on a plate: The Bible provided numerous examples of sinners punished by God by means of earthquakes, floods and other disasters. The dramatic events that went hand in hand with natural disasters thus

strongly favored a religious interpretation of the destructive forces in nature. At the same time, the natural philosophical developments of the first half of the 17th century offered new perspectives to the investigation into the natural mechanism of disasters. These natural philosophical perspectives, however, were not necessarily incompatible with religious notions as historians have argued until recently, but were integrated in or existed alongside the religious moral framework of natural disasters.

Notes

1 See for example Lorraine Daston, *Marvelous Facts and Miraculous Evidence in Early Modern Europe,* in Chandler et al., *Questions of Evidence. Proof, Practice and Persuasion across the Disciplines,* Chicago 1994, 243–274; Stuart Clark, "The Rational Witchfinder: Conscience, Demonological Naturalism and Popular Superstitions", in Pumfrey et al., *Science, Culture and Popular belief in Renaissance Europe,* Manchester 1991, 222–248; Dudley Wilson, *Signs and Portents. Monstrous Births from the Middle Ages to the Enlightenment,* London 1993; Jerome Friedman, *The Battle of the Frogs and Fairford's Flies. Miracles and the Pulp Press during the English Revolution,* New York 1993.

2 José Mouthaan, *The Divine Wings of Tragedy. Perceptions of Natural Disasters in the Kingdom of Naples and the Dutch Republic, 1630–1735,* unpublished PhD-dissertation, Florence 2002.

3 Gianbernardino Giuliani, *Trattato del Monte Vesuuio e de suoi Incendi,* Naples 1632, 62.

4 Giulio Cesare Recupito, *Avviso dell'Incendio del Vesuvio. Composto dal P. Giulio Cesare Recupito Napol.no della Compagnia di Giesù. Tradotta dalla lingua Latina all'Italiana. Ad istanza dell'Ill.mi Principe, & Accademici Otiosi,* Naples 1635, 7.

5 See for a modern explanation of these phenomena: Mauro Rosi, Claudia Principe, Raffaella Vecci, "The 1631 Vesuvius Eruption. A Reconstruction based on Historical and Stratigraphical Data", *Journal of Volcanology and Geothermal Research* 58 (1993), 151–182.

6 Claudia Principe, "The 1631 Eruption of Vesuvius: Volcanological Concepts in Italy at the Beginning of the Seventeenth Century", in Nicoletta Morello (ed.), *Volcanoes and History. Proceedings of the 20th INHIGEO Symposium, Napoli, Eolie, Catania (Italy), 19–25 September 1995,* Genova 1998, 526.

7 Aldo Marturano and Pierroberto Scaramella, "The Role of Primary Sources in Reconstructing the History of Volcanoes: The Eruption of Vesuvius in 1631", in Morello (see note 6), 281.

8 Gianbernardino Giuliani, *Trattato del Monte Vesuuio,* 2.

9 *Vera relatione dell'horribil caso, et incendio. Occorso per l'esalatione dal Monte di Somma, detto Vessuuio vicino alla Città di Napoli. Dal martedì 16 di Dicembre 1631, sino al seguente martedì 23 del detto mese. Venuta da Napoli con altri particolari saputi per diverse lettere,* Naples 1631, 2.

10 Francesco Ceraso, *L'Opre stupende e maravigliosi eccessi dalla Natura, prodotti nel Monte Vesuuio della Città di Napoli. Liberata per intercessione della Beatissima Vergine, e de' gloriosi Santi Gennaro, Tomaso, & altri Protettori,* Naples 1632, 28.

11 *Vera relationeo* (see note 9), 4.

12 *Vera relatione* (see note 9), 4.

13 Giulio Cesare Braccini, *Relazione dell' Incendio Fattosi nel Vesuvio alli 16 di Decembre 1631 scritta dal Signor Abbate Giulio Cesare Braccini da Giovanni di Lucca, in una lettera diret-*

ta all' Eminentissimo, e Reverendissimo Signore, Il Signor Caro. Girolamo Colonna, Naples 1632, 27.

14 Aristotle, "Meteorologica", IV 359 b 27 and VIII 365 b 21, in G. P. Goold (Ed.), *The Loeb Classical Library,* Cambridge 1978, VII, 163–165, 205.

15 Angelo Perrotti, *Discorso Astronomico sopra li quattro Ecclissi del 1632, & uno del 1633. Di D. Angelo Perrotti, con la risolutione di trenta Quesiti,* Naples 1632, 10.

16 Pietro Castelli, *Incendio del Monte Vesuuio di Pietro Castelli Romano, Lettore nello Studio di Roma già di Filosofia, & hora di Medicina. Nel quale si tratta di tutti gli Luoghi ardenti, delle Differenze delli Fuoghi, loro Segni, Cagioni, Prognostici, e Rimedij, con Metodo distinto, historico e filosofico. Con la giunta d' alcuni quesiti circa il stato presente del Vesuuio, e le loro esplicationi, & annotationi,* Rome 1632, 53.

17 Perrotti (see note 15), 10–11.

18 Ibidem, 16.

19 Angelo Eugeni, *Il Maraviglioso, e tremendo incendio del Monte Vesuuio, detto a Napoli la Montagna di Somma nel 1631. Ove si raccontano distintamente tutte l' attioni, e successi in detto Monte, suoi luochi adiacenti, & à Napoli. Con un discorso Metheorologico, ò Filosofico dell' effetti naturali, che possono haver cagionato questo incendio, notandosi la causa Materiale, Efficiente e Finale,* Naples 1631, 16–17.

20 Eugeni (see note 19), 17.

21 Giovanni Forleo, *Meteorico Discorso, sopra i segni, cause, effetti, tempi e luoghi generalmente di tutti i Terremoti, e Incendij di diverse parte della Terra, con l' insertione d' alcune historie, e applicatione particolarmente a Terremoti presenti, e causa dell' Incendio della Montagna di Somma,* Naples 1632, 2.

22 Antonio Santorelli, *Discorsi della natura, accidenti, e pronostici dell' Incendio del Monte di Somma dell' anno 1631. Del Dottor Antonio Santorelli, Primo Lettore di Medicina, e Filosofia nella scuola di Napoli,* Naples 1632, 20.

23 Braccini (see note 13), 37.

24 Castelli (see note 16), 19–20.

25 Ibidem, 73.

RESUME

LES PERCEPTIONS DES DESASTRES NATURELS A L'EPOQUE MODERNE. L'ERUPTION DU VESUVE EN 1631

Au début de l'époque moderne, les perceptions et les explications des désastres naturels constituaient une question particulièrement compliquée. Dans la mesure où les connaissances étaient souvent insuffisantes pour expliquer, de manière compréhensible, les causes des tremblements de terre, des éruptions volcaniques, des tempêtes ou des inondations, les perceptions de ces phénomènes pouvaient être très différentes. En fait, dans ce contexte historique, le terme de *naturel* est trompeur. Au début de l'époque moderne, ces phénomènes ne sont pas nécessairement liés à des processus naturels; la colère divine et les tromperies du démon sont également invoquées. Le concept de désastre naturel n'existe pas en tant que tel.

Une étude détaillée concernant l'éruption du Vésuve en 1631 montre que les désastres naturels pouvaient être expliqués de différentes manières; plus important encore, ces différentes explications pouvaient être avancées en même temps. Alors que la notion de jugement divin provoquée par les péchés humains prévaut dans la majorité des sources pour rendre compte d'éruptions volcaniques, un certain nombre d'auteurs tentent de comprendre les mécanismes naturels de ce désastre. En théorie, ces investigations philosophiques sur les causes naturelles des éruptions volcaniques sont incompatibles avec les explications religieuses soulignant que les péchés sont à l'origine de cette punition: réduits à une série d'effets naturels, les désastres n'inspirent plus la crainte du jugement divin. En pratique, toutefois, les explications naturelles et les perceptions supranaturelles de l'éruption volcanique ne s'opposent pas vraiment; elles forment plutôt différents niveaux d'analyse au moyen desquels le désastre peut être expliqué. Dans un grand nombre de traités philosophiques, les explications naturelles étaient en effet intégrées dans un cadre moral religieux.

(Traduction: Thomas David)