

Dragons, Fairies, Miracles and Worship at Pavin and Other European Maar-Lakes

3

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Abstract

The legends, miracles and fantastic stories of Pavin and around are numerous, although the key ones are so far not attributed to it. The current legend, that of the *Sunken City*, common to many lakes, was created in the late XIXth century. The *Thrown Stone* and the *Whirl and storm* stories reported in the XIXth century are the transposition of the descriptions made since the XVIth century (Chap. 2), although the Thrown Stone motif also existed for other mountain lakes, before being used for Pavin. The *1547 miracle* that occurred near Pavin can be understood as a passer-by loosing and recovering his sight during a Pavin CO₂ degassing event. It is followed by many abnormal events during 100 years, recorded in the Vassière pilgrimage registers, that can be attributed to Pavin misbehavior. The *Gloomy Lake Dragon* story, reported in 1632, can be related to a mudflow produced by Pavin overspill.

The *Fairies Garden* legend, found in church archives in the XIXth century and here attributed to Pavin, takes place during the pagan era when another type of lake-bound dragon was regularly worshipped by local tribes, including human sacrifices, until eventually defeated by the first evangelizator of the area (Vth century). Gregorius of Tours (before 600 AD) mentions another *dragon attack of hermit Caluppa*, around 590 AD, and details a regular pagan lake cult, followed by an early Christian settlement, both could be re-attributed to Pavin. The fear of *lacus pavens* is possibly featured in the iconography of the medieval Besse church, some 4 km away (XIIth century capitals, XVIth century misericords, 1670 Santa Martha chapel).

The Longue Durée comparison of Pavin legends with those of other maar lakes in Italy and Germany highlights multiple signs of misbehaviors in most of these meromictic lakes, which can be attributed to degassing features. Since the early Antiquity regular and important pagan cults were established on their rims (Averno, Albano and Nemi Lakes), followed by Christian cults (Defeat of *pope Silvester dragon* -330s AD- and conversion of pagans, possibly at Albano Lake; Monticchio, Laachersee Lakes). Tunnels or canals were excavated to avoid lake overspills (Albano, Nemi, Averno, Monticchio, and Laachersee). Descriptions of dragons (Albano or Nemi), fantastic animals (Ulmen Maar), access to Inferno (Averno), legendary records of village destructions and sudden death (Toten Maar, Pulver Maar) are some of the means of risk transmission across generations that started at least 2700 years ago. Degassing maar-lakes may be a major point of origin for some European myths, lake legends and fantastic creatures, a point worth further investigation.

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There are so many tales about Pavin, or Pavens as it was named by Romans, concerning the thick clouds that were blanketing it, the exhalations that one inhaled on its shore, the stones thrown into the surface waters, that will develop from its depth clouds from which the storm would come, and a perpetual bubbling. (Piesse 1863)

In those times it was told that its waters were covering a damned city which should have sunk into the infernos, as no one ever found its depth. No boat could sail on it without sinking and no fish, carp, perch or trout, could live there... They also said that, if one was throwing a stone into the lake, it triggered winds and storm... This lake without boats, as a perpetual whirl was swallowing them, this bottomless lake, which should communicate with the infernos, remained for a very long time surrounded by fears. (Henri Pourrat 1935)

"Still in the 16th century many natural events were prodigia"... "a myth also trades definite and conclusive statements concerning a true state of the case, which are founded on real events. These sentences are transmitted through time to confirm life continuance becoming a permanent structure which simultaneously refer to the past, present and future... ancient historiographers, not having all the answers to every possible questions, solved the problem by introducing narration statements belonging to divine actions, fate and myth". (Vittori et al. 2007)

3.1 Introduction

Marvellous stories without anything worth mentioning (Chabrol 1786), *one hundred absurd nonsenses* (Legrand d'Aussy 1788), *tradition* (La Porte et al. 1790), *fables* (Lavallée 1796), *old time stories and women's tales* (Delarbre 1805): these terms have qualified the old descriptions of Pavin made during the XVIth and XVIIth centuries (see Chap. 2). Their collection and publication by Lecoq in 1835 will unexpectedly promote these *Pavin stories* throughout the XIXth century (see Sect. 2.3.6 and above quote of Piesse 1863). The fear of Pavin by the local population, latent in the earliest descriptions, may be much older. According to Taylor, Nodier and Cailleux, the precursors of the Romanticism, the Vassivière Virgin, on her mountain sanctuary near Pavin, protects Besse people from threats generated by telluric forces (Nodier et al. 1829). At the turn of the XIXth century, Jaloustre (1910), an Auvergne historian, suggested that a pre-Christian cult at or near Pavin could have been present at Vassivière. For Reynouard, a local historian, Pavin itself was home to a tribe, eventually expelled by a catastrophe (Eusebio and Reynouard 1925). Camille Julian (1901), a well-respected Antiquity historian, stated about people living near Pavin during Antiquity: "*They were plac-*

ing in these silent and hypocritical waters the impregnable asylum of a divinity of the deep, which should not be troubled, only with presents."

Our analysis of Pavin legends here is inscribed within a geo-mythology approach. The pioneer work of Back (1981) on hydromythology and ethnohydrology opened interdisciplinary approaches in Earth Sciences and the perception of geological hazards by local people, as transmitted across generations through myths and legends, has allowed for the reconstruction of past events (*Myths and Geology*, Piccardi and Masse 2007). This community works mostly on extreme and catastrophic events – e.g. tsunamis, landslides, volcanic eruptions, earthquakes. Convincing examples of combined interpretations of legends, myths or beliefs with earth system dynamics, have already been given: for earthquakes in Gargano, Italy (Piccardi 2005), for submarine inflow of Greek karstic freshwaters, a marvel described by Antiquity historians (Clendenon 2009a, b, 2010). The Italian geochemists and volcanologists were the first to integrate the so-called mythological stories of lake Albano in which they found actual descriptions of degassing (Funciello et al. 2002, 2003, 2010).

So far the community of anthropologists, folklorists and mythology specialists has only worked in concert on well identified natural wonders, such as volcanoes, earthquakes or meteorites, a specific example being the historical Ensisheim meteorite fallout in Alsace, in 1492 (Kammerer 1994), but has not yet included lake degassing as a grounded basis for lake legends, excepted for Eugenia Shanklin, an anthropologist from the College of New Jersey, USA. She studied Nyos and Monoun lakes legends in Cameroun soon after the Nyos event of 1986 (Shanklin 1989, 2007) and found that hazard perception of these degassing lakes was quite developed among the first settled populations. In her euhemeristic interpretation of the legends, she postulated that old lake stories can be explained very precisely by referring to actual events and that lake stories can provide contemporary scientists with insight on past lake behavior and concluded that lake stories were worth exploring at length. The recent findings of Italian earth scientists (Funciello et al. 2002), about a past catastrophic degassing event at Lake Albano in 398 BC, so far denied by Archaic Rome historians, are a first confirmation of Shanklin's approach (See Sect. 1.6.2.1).

The following questions are addressed here: (i) What are the existing tales or legends associated with Pavin, with their

authors and/or contexts? (ii) Are there other representations, religious, legendary and/or fantastic, that could be related to Pavin? (iii) How has the fear of Pavin been expressed in pagan and Christian beliefs? (iv) Are these legends, beliefs and stories different from the ones found in other European maar-lakes, *i.e.* is there a common frame in Auvergne, Italy and Eifel?

3.2 Approach and Sources

The methodology used here is definitively interdisciplinary and iterative (see Fig. 1.1), combining historical sources on Pavin (VIth and XVIth to XVIIth centuries), XIXth century folklore registers, religious history and iconography (XIIth to XVIIth), with limnology, history, mythology and folklore of other meromictic maar-lakes in Italy and Germany: the Colli Albani near Rome holds Albano and Nemi Lakes, the Campi Phlegrei, west of Naples, holds Averno Lake and the Monte Vulture, between Campania and Puglia, holds the two Monticchio Lakes; the Eifel region, west of the Rhine south of Aachen, holds a dozen lakes (See their characteristics on Table 1.1). In addition to these maar-lakes some other lakes with specific legends are briefly considered (Léman, Pilatus Lake near Lucerne, Switzerland, and Nohedes Lake in the Canigou Mountain massif of the Pyrenees). The studied period goes as far back as possible, *i.e.* to pre-Roman period, for the Latium lakes and Averno.

The use of legends as part of the risk assessment process at Pavin has been orally advocated by Thierry Del Rosso, a hydrogeologist, in a long interview published by the Galipote, a local satiric magazine. He argued on the possibility of violent events at Pavin, based on new scientific findings and on some Pavin tales: “*the fairy of the waters and its associated phenomena are without doubts geysers...other tales mention lava fountains and fissures, cinder ash mud that fill the valleys, very certainly in the mid-1200s, the city [of Besse] has been considerably destroyed by a water mass originating from Pavin*” (Del Rosso 2009a). He also presented his argument in May 2009 in the final and public session of the international Conference on *Pavin and other meromictic lakes* held in Besse (Jezequel et al. 2010) mentioning fairies and dragons that could be related to past limnic and even volcanic events, although he did not present his sources (Del Rosso 2009b). The occurrence of recent volcanic events was much questioned by other scientists who also replied that (i) there was only one tale at Pavin, the *Sunken City*, (ii) this tale was not specific to Pavin but a common tale reported in many lakes, (iii) it had been already investigated and interpreted by

Reyt (2000, 2002) as a biblical legacy. So far Del Rosso has not published his thesis, except as a brief summary of *Pavin stories* (Del Rosso-d’Hers 2010). We argued, in a preliminary analysis (Meybeck 2010), that Pavin had been greatly feared in the past, that the so-called “Pavin stories” could be related to past degassing events and that local religious history- the famous Vassivière pilgrimage- could be linked to Pavin.

Our interpretation of the legends, stories, religious history and iconography at Pavin has then been checked in folkloric registers in which lake tales are common. Many of them have been collected, reported and partially analyzed by Paul Sébillot (1843–1918), the French ethnographer and folklorist, in his *Tales on the Earth and Underground World* (1904–1906) which analyses 15,000–16,000 items and has a chapter dedicated to *Still Waters*, by the American Stith Thompson (1855–1975), the founder of the international Motiv-Index of Folk Literature, the *Thompson register of folk tales* (1955–1958), a master register collecting a thousand of items (tales, legends, fabliaux, etc.) and by Van Gennep in his “*Manuel de folklore français*” (1949). Lakes have also long been mentioned for their association with religious practices: according to Lavroff (1872), “*Cicero and Strabon reported that there was a sacred lake near Toulouse where local tribes were offering gold and silver offerings and Gregorius also mentioned a sacred lake*”. [As all other original citations in French, this text has been translated by us].

Pavin legends are first compared and discussed here one by one with similar legends from other locations, adopting a reversed chronological order from the most recent sources to the older ones, which are often more difficult to interpret. The first analyzed legend is the *Sunken City*, a contemporary legend, then the *Thrown Stone* story and the *Whirl and storm*, reported many times during the XIXth century. These legends are now often jumbled in Auvergne presentations, as those written by Henri Pourrat (1935) (see quote above) as well as in guidebooks (see Chap. 2).

The core of our research concerns the re-attribution to Pavin of texts that have been known to historians, scholars and folklorists for a long time and that have been re-analyzed on the basis of the typology of sensory perception of degassing (See Table 1.2) as well as their historical context (See Chap. 2). The analysis of beliefs and religious iconography is conducted on the Besse church, built from the XIth to the XVIIth century, and on the nearby Vassivière pilgrimage, initiated by a miracle in 1547. Finally Pavin legends and religious history are discussed in parallel with the rich Antiquity and Christian era history found for several other maar-lakes in Latium (Italy) and in Eifel (Germany).

3.3 The Principal Pavin Legends, as Recognized Today

3.3.1 The *Sunken City* and Other Similar Tales at Pavin (Late XIXth Century) and Other Lakes

3.3.1.1 The Progressive Elaboration of the Tale at Pavin (1871–1935)

Until 1875 there was no indication of a sunken city tale at Pavin: out of the dozens of mentions of Pavin stories found since 1566 there is only one featuring this theme (Monnet 1788). However it was present at the Tazenat Lake, another Auvergne crater lake north of Clermont where such tales were commonly reported to visitors (Nadeau 1862). For instance, neither Nodier et al. (1829) nor Sébillot (1904–06) mention this particular tale at Pavin.

The *Sunken City* tale was gradually forged for Pavin at the end of the XIXth century. When Pavin access was opened to tourism by Lecoq, the major Auvergne naturalist (see Sects. 1.4.2 and 2.3.6), visitors sailing on the lake soon discovered in its waters a massive sunken carved stone of about 250 kg, the *Treasure Stone*, taken for a proof of a sunken settlement (Eusebio and Reynouard 1925). The stone is now recognized as an antique millstone (Fig. 2.1). Meanwhile, in his last book on *Waters of Massif Central* (1871), Henri Lecoq qualifies Pavin as the *Auvergne Dead Sea*, due to its original absence of fish before 1859. In 1875 Alfred Assolant in his novel located at Pavin (*The Puy de Montchalm*, 1875) features a big castle with immodest lords who terrify the country (see Sect. 2.3.6). At the end of the novel the castle and its residents are sunk into the lake, the gate of inferno. Soon after Pavin is termed the *Sodom and Gomorrah of Auvergne* by Berthoule, a Besse mayor (1890, 1896), and Vimont (1874), the head of Clermont public library. In turn, Ajalbert, a writer, makes a detailed description of Pavin (1896), featuring the Besse city sunk into the lake for misconduct, according to local belief. Thus does a *Sunken City* tale start to spread among the local people.

A mixed Pavin tale is finally formalized by Emile Roux-Parassac (1874–1940), poet, writer, journalist and local tourism promoter, in his guidebook for automobile drivers on the Couze Pavin and Couze Chambon valleys (Roux-Parassac 1910). Pavin legend appears under the title: “*the Lake of Terror*” (Le Lac de l’épouvante), a direct transcription of its latin name, *lacus pavens* (see Sect. 2.3.3). The volcanic crater is due to the anger of Lucifer defeated by God, glaciers recovered the land then melted. Lucifer raging tears filled the crater. There, terrible storms and whirls may occur. In an article published in *La Montagne d’Auvergne*, a local tourism magazine, Roux-Parassac adds (1910): “*Its name means the terror...In this place demons are coming by the inferno*

abyss, they bathe and their black souls trouble its waters. Their cursed breath lift storms while leaves are not moved on branches, and their breath attracts the careless who would dare to venture on the abyss”. Here Roux-Parassac mixes here several elements of Lecoq’s Pavin stories – the whirl – with other elements such as the specific odour emitted by Pavin or the leaves that do not move during those storms, an indication that the storm originates from the deep waters, as mentioned in the Godivel II manuscript (mid-XVIIth), just published by Jaloustre (1884) and probably known by Roux-Parassac. Another similar version of the tale will be developed by Murat-Vaché (1925), then by Henri Pourrat (1887–1959), the Auvergne writer, in 1935 (see above quote). One notes the multiple references to deep underground influences on Pavin, including the origins of its waters, an influence largely recognized today by scientists (see this volume) but unknown in 1910.

Today, this complex tale is largely mixed with the sunken city and is presented in most guidebooks as the original and only legend (see Sect. 2.4) so that, when Reyt made his analysis of Pavin legends, among others lake legends in France (Reyt 2000, 2002), he only found and analyzed the *Sunken City* in which the lake misconduct has been gradually replaced by the people misconduct.

3.3.1.2 Other *Sunken City* Tales in Auvergne

Sébillot, the initiator of folkloric studies in France, quotes a dozen of sunken cities tales in his 88-page chapter on still waters (1904–1906). In Auvergne three other crater lakes are mentioned for their sunken cities tales by Sébillot, Annette Lauras-Pourrat (1973) and Graveline (2011): (i) Issarlés, (ii) du Bouchet with its central whirl and its early evangelisators: a bucket dropped into its deep waters would be retrieved full of blood and (iii) Tazenat where a petrified woman rock is shown to visitors, “a proof of this Auvergne Sodom” (Nadeau 1863). The Pavin absence in Sébillot confirms that the *Sunken City* tale was not the tradition at Pavin before the end of the XIXth century.

For Sébillot these sunken city legends can be classified under the “*impiety penalty, in relation to the tradition of corrupted Dead Sea Cities*”. This interpretation shared later by Reyt (2002), a geographer of religious history: the Sodom and Gomorrah myth spreads during the Middle Age across Europe as *exemplum* containing four themes: transgression, punishment, purification and renaissance of a better society through the survival of the Righteous. They were then transposed into the *Sunken City* tale, found in many French lakes, e.g. St. Point Lake in Jura (Defrasne 1951). Reyt notes that wind and/or storm occurrence is always found together with supernatural phenomena related to evil forces. This myth provides a sense and a dimension to lake landscapes.

3.3.1.3 Destroyed Cities on Lake Geneva, Albano Lake and Totenmaar: Precursors of Sunken Cities Tales?

Tauredunum Event on Léman lake (563 AD)

The fear of lakes sinking cities may be grounded on several natural phenomena. A text from Gregorius of Tours (Florentius Georgius Gregorius, around 539–596), well known for his history of the first Christian preachers in Gaul, reports in much detail a catastrophic event, the Tauredunum event, followed by a giant wave, which suddenly destroyed all riparian cities (Lausanne, Geneva) around *Lacus Lemanus* (Geneva Lake) in 563 AD. This event, still told in the XIXth century by Léman people, has been thoroughly analyzed by F.A. Forel (1892, vol 3, chap IV, pp 496–507). But the founder of limnology and lake physics specialist could not find any phenomenon that would generate waves higher than 0.5–1 m. He concluded that the catastrophic event was very overstated by Gregorius. Recent investigations by Geneva limnologists (Kremer et al. 2012), seem to end this long-lasting mystery. They propose an exceptional giant lake tsunami, 13 m high in Lausanne and 8 m in Geneva, caused by a massive delta landslide generated by the earthquake associated with the Tauredunum landslide, which occurred in the Upper Rhône Valley, making Gregorius description perfectly coherent with this event. Geneva authorities are now assessing this new type of risk, occurring very rarely but with devastating consequences. Forel also described sudden destructions of villages associated with the collapse of lake dams in alpine valleys. It must be noted that Forel's concern for lake history is very rare, only shared by a handful of limnologists such as G.E. Hutchinson who studied the paleolimnology of an Italian lake during Roman times (Hutchinson and Cowgill 1970).

Albano Lake Overspill (398 AD)

The Lake Albano rise by 70 m in 2 months which occurred in 398 BC (Funicello et al. 2002, 2003, 2010) certainly flooded all Human settlements within this large crater and threatened Rome (see Sect. 1.6.2.1). This catastrophic event, which had an enormous impact- the Delphi Sybil was consulted- could be another origin of the widespread Sunken City legend. This type of event could have occurred again 2000 years later in Eifel, destroying riparian villages at Toten Maar (see further).

The Sunken Castle and the Lake of the Deaths (Toten Maar) (1562 Degassing Event?)

According to Alois Mayer, the specialist of Eifel legends (2008), where one finds today the gentle surface of Lake Weinfelder there was in the old times a landscape and a beautiful castle, ruled by a rich but good hearted count but his wife's heart was as hard as stone ...

One day the countess refuses charity on a poor starving old man and she unleashes her ferocious dogs on him. Meanwhile the count was hunting in the forest with his horse, Falchert, away from his castle. Suddenly the sky over the town turned black. From these dark clouds lightnings were bursting out and thunder was rolling. With a deafening noise the ground splitted. An incredible mass of water was spurting and entered the castle. The castle people, full of fear, took refuge under the roof and the countess climbed rapidly the steps to the dungeon. But any escape was useless. The flow continued to rise and completely sunk the castle. The count sends his squire to get his forgotten hunting glove at the castle. The squire does not find any castle but a water body. He comes back and reports "Master, your castle has vanished, now there is a deep lake". The count was struck, he could not believe it: "You are talking non sense. What you say is impossible. Where could the water come from in such sandy and rocky place? It is like if my horse Falchert, on which I am standing now, was able to generate a spring while stamping on the ground. As soon he pronounced these words, the horse starts to stamp the ground and soon a new spring came by. The count rushes to his castle and only finds one survivor, his baby floating in his cradle. The count goes to a monastery for expiation. The spring at the corner of the forest still continues to fizz and is now called Falchertborn by the local people. (abridged version of the tale)

This is a typical legend of a city sunk for misconduct, which can be re-interpreted as a sudden and violent spillover of the Weinfelder Lake possibly due to the degassing of this meromictic maar-lake. The lake is known today as Totensee, the lake of the Dead. According to historians the Weinfelder village and its population have been totally destroyed in 1562, allegedly by the Plague. This should be checked as "the plague" could be another representation of massive damages caused at maar-lakes by CO₂ degassing to riparian populations, as observed at Lake Nyos (See Sect. 1.6.1). There is an explicit mention of lake overspill and lightnings and storms are precursors of the event, as quoted many times (See Table 1.2). The earth is split, with deafening noise, suggesting that the overspill was associated with an earthquake. Bubbles are still mentioned today at the Falchertborn spring.

Finally, Sunken Cities tales can also originate from: (i) the bursting of natural lake dams, in alpine valleys (Forel 1892) and in the Middle Rhine (Park and Schmincke 1997), (ii) the presence of Neolithic and Bronze ages materials found underwater in many Jura lakes at very low water stands.

3.3.2 The Thrown Stone Story at Pavin (XIXth) and in Other Mountain Lakes

3.3.2.1 Pavin Thrown Stone and Whirl and Storm Stories as Reported to Lecoq (1835)

When Lecoq makes his first visit to Pavin in July 1831, he reports what he hears from local people (Lecoq and Bouillet 1831; Lecoq 1835a; see Sect. 2.3.6). This legend will be qualified as the *Whirl and Storm* story by Eusebio and Reynouard (1925) (Fig. 3.1): "No boat or wherry is crossing these deep waters. No one would dare to linger on this liquid plain. In the middle there is a whirl that would swallow the daredevil

who would lead his boat there. A stone thrown far enough into the lake would make the water boil and produce a storm. The sounding lead would melt in the middle of the lake and its depth has no limit. These are the absurd stories we were told while asking for a boat to cross the lake” (Lecoq 1835a).

The first occurrence of the *Thrown Stone* story, actually much older, is found in Belleforest’s *Cosmographia* (1575):

“...Near this Mont D’or stands the city of Besse, at a half quarter league from which one can see a great lake located nearly on top of a mountain, without a measurable depth and without any water inlet. Actually it is both admirable and terrible to see as, if a stone is thrown into it, it is ascertained that soon thunder, lightning, rainstorm and hail would occur”. This is most probably an actual description of Pavin at that time, which will be copied for the next 200 years by many geographers and scholars (see Sect. 2.3.2).

Some of the many Pavin mysteries (lake depth, origin of waters) were resolved in 1770 by Chevalier’s exploration of the lake (See Sect. 1.4.1). Others, as the whirl, the boiling waters, the absence of fish, the sudden thunder and lightning, the sulfur odour and the aggressive waters can be compared to the grid of sensory degassing indicators (see Table 1.2). They actually correspond to various forms and intensities of Pavin Lake degassing, as described in the XVIth and early XVIIth centuries, which so far had not been identified as such (Chap. 2).

The descriptions of the lake by Ajalbert (1896) and by Henri Pourrat (1935), one of the prominent Auvergne writ-

ers, are excellent examples of the literary version of *Pavin stories* (see Pourrat’s quote at the head of this chapter).

3.3.2.2 Other Thrown Stones Lake Stories (Lucerne, Canigou and a German Lake)

This story of the throwing of a stone into a lake triggering thunder and storms is not specific to Pavin. Similar stories are found in Catalonia, Switzerland and in Germany. Sébillot himself, quoting Felieu de la Pena (1609), makes the comparison between “the lake near Besse” (Pavin) and a similar story told about the Nohedes Lake in the Canigou Mountain (Pyrenees) (Sébillot 1904–1906). Actually the original description of this other marvelous lake is much older and already found in Gervais of Tilbury (Gervasius Tilberiensis (115?–122?) in his *Otia Imperialia, Liber de Mirabilis Mundi*, the Encyclopedic Miscellany of Wonders (1215). In chapter LXVI, a wonderful lake is described in the Canigou Mountain, which is so high that it is inhabitable. There, in the bottomless Blackwater Lake, “one can find a fallen castle inhabited by devils. When a stone or any other solid material is thrown into the lake a big storm gets out of it as if the devils were angry”. The Nohedes Lake is part of several mountain lakes in the Canigou Mountain region, probably of glacial origins, certainly not maar-lakes. Their mixing status is undetermined. Lakes boiling, emitted vapors, typical of degassing lakes, are very difficult to conceive at Nohedes, unless they are a re-use of anterior legends, possibly in maar-lakes, such as Lake Albano or Lake Averno. Some of the details of the Nohedes legend are similar to the description of Enaeus descend in Inferno, described by Virgil. A sunken castle is featured at Nohedes, as in Assolant’s novel.

Another Thrown Stone story, told before Belleforest Pavin description, is found for a diminutive mountain lake, Pilatus, which gave its name to a famous alpine summit near Lucerne (Switzerland). According to a long tradition from the XVth century, the lake could suddenly change its color to red, *i.e.* the blood of Christ on Pilatus’ hands that he finally managed to wash there (Cuvelier 1934; Seewer 2013). Other Pilatus stories reported by Gaspar Schott, assistant to the great German scholar Athanasius Kircher (1601–1680), feature winged dragons (Schott, *Physica Curiosa*, 1662) and a “dragonstone”, still kept in a Swiss museum. Lucerne authorities officially forbid access to the lake to visitors for centuries (Seewer 2013). Pilatus Lake legends show some similarities with Nohedes and Pavin: this small lake is near the top of a mountain, has no depth and may change its colour. It is also feared for centuries by local people even far away down in the valley and local religious and political authorities, backed by Jesuits, are well aware of its recurrent misconduct events, featured as dragons either winged or of the river type. However Pilatus Lake is not in a volcanic region. It was drained by the Lucerne people, so that its possible meromictic character is difficult to assess.

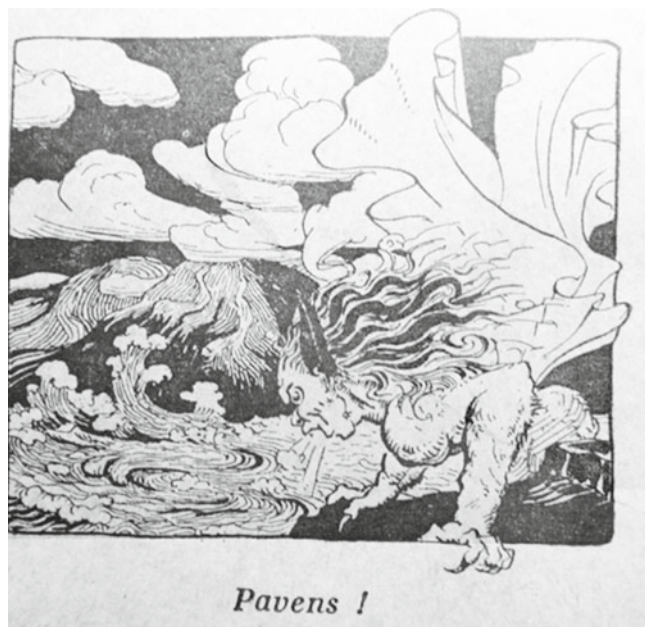


Fig. 3.1 The representation of Pavin Whirl and Storm legend, featuring Satan, in Eusebio and Reynouard Pavin guide (1925) (Author’s collection)

Another unknown lake in Germany, associated with a similar Thrown Stone story, is described by Louis de Mailly (1657–1724) in his *Principal Wonders of Nature* (1723):

In Baden principality, at four leagues from the Prince's residence, there is a lake and when someone dips something heavy into it, at once the sky becomes overcast and a storm with thunder and lightning occurs causing great damages to the surroundings. Some foreign Jesuits having reached the Baden Collegium heard about this wonder and got curious to see it. They came with some bourgeois of the city with a water hunting dog. As he would not enter the lake they threw him by force but he escaped with great scream. After having thrown blessed wax, they threw stones: they did not see any change, even after hours of waiting. In the evening came a terrible storm with thunder, rain and lightning, which lasted fifteen days (Gasp. Scott, Physica Curiosa). There is in Auvergne a lake on a mountain that does the same.

The original quote is also from Schott, the Kircher's assistant (1662). De Mailly adds the comparison between the German lake and an Auvergne lake on a mountain. According to Canon Audigier (1720) Kircher attributed this Thrown Stone story to Pavin. The period is around 1600s, as the Society of Jesus was already funded. The misconduct signs of both German and Auvergne lakes are very similar: thrown stone resulting in thunder, lightning and storm that devastate the surroundings. We learn here that the German lake was feared in this time by local authorities who enlisted the help of foreign Jesuits to try to understand this wonder. They used the blessed wax as a possible form of exorcism and the poor dog probably encountered corrosive water or sulfurous gaz traces (Table 1.2; Sect. 2.3.3). The Jesuits also experimented with throwing stones into the lake, as was done at Pavin. Although the exact location of the German lake is not given and neither is the exact date of this visit, it could be located in Eifel (Weinfelder Maar, Ulmen Maar, Laacher See?), the volcanic region where meromictic maar-lakes and legends of lake catastrophs are common but which does not belong to the Prince of Baden. This lake description is nearly identical to the one made by Gregorius of Tours about a lake in Auvergne mountains, worshipped with presents and producing thunder, rain and lightning (see further).

Sébillot in his book on *Folklore of France* (1904–1906) which analyses 15,000–16,000 items observes in chapter V (*Still Waters*, p. 205–293) that: “people living near lakes and ponds think that one should not throw anything into these water bodies so as not to irritate the spirits living there or to trigger a storm. This belief was reported by Gervaise of Tilbury in the XIIIth century and is stated by Belleforest at the XVIth century”. The references to Nohedes Lake and Pavin are there however Sébillot does not give any clue to the Thrown Stone story.

The CO₂ degassing of near-saturated maar-lakes can be triggered by a minor disruption of the lake surface, as a thrown stone, as experienced by volcanologists at the

Monoun crater lake in Cameroun (See Sect. 1.6.1). Such process could have been witnessed very occasionally in few European maar-lakes, in Latium, Eifel and Pavin, kept in local memories for very long and these marvelous and frightening lake response, gradually applied to lakes of similar aspects, as at Nohedes and Pilatus, spreading the Thrown stone legend.

3.4 Encounters with Fantastic Cratures at Pavin and Other Maar Lakes

These encounters generally found in older sources, are not explicit about lake disorders, poorly contextualized, use metaphors and have been missed by modern historians. Many of these texts, known to historians, scholars and folklorists, placed within their historical context (See Chap. 2), can be re-analyzed on the basis of possible degassing events (Table 1.2). Many of them are presented along with fantastic and threatening creatures. Their attribution to the *Lacus pavens*, the terrifying lake, is first discussed then each type is compared to similar stories, beliefs or perception, regarding other European maar-lakes. Four texts are presented in an inverse chronological order: a fantastic dragon story of 1632, the *Gloomy Lake Dragon*, two legends collected during the XIXth century featuring pre-Christian fairies and dragon stories, the *Fairy Garden*, and the *Fairy Dance*, and two texts by Gregorius of Tours (late VIth century). They provide important potential information on past state of Pavin, particularly during Antiquity.

3.4.1 Dragon Encounter at Pavin (Pavin event, May 1632?)

This fantastic story entitled “Le Dragon du lac Ténébreux” (*Dragon of the Gloomy Lake*), authored by de Beaufort, was published in Paris in 1632 by Matthieu Colombel (Fig. 3.2). It is a 16-page story presented by its author as “to expose actions that belong to marvels and going beyond the ordinary displays of nature”, i.e. it should be regarded as another detailed reporting of a kind of *prodigium*, as defined in Antique Rome (Lycosthenes 1557; Rasmussen 2003) which brings precious new elements on Pavin behavior.

The first three pages present a complex personal background of the hero, Jean de La Brière. Then the action is presented: it takes place near the town of Besse in Auvergne, at a village named Chauffour (“hot oven” which could be a transposition of the volcanic crater that is topping Pavin, the Montchal, “hot mountain”) on the way to the famous mountain pilgrimage of “Notre Dame d’Orsival where numerous miracles are produced”, a clear transposition of the nearby Vassivière pilgrimage (see Chap. 2). The action can be dated

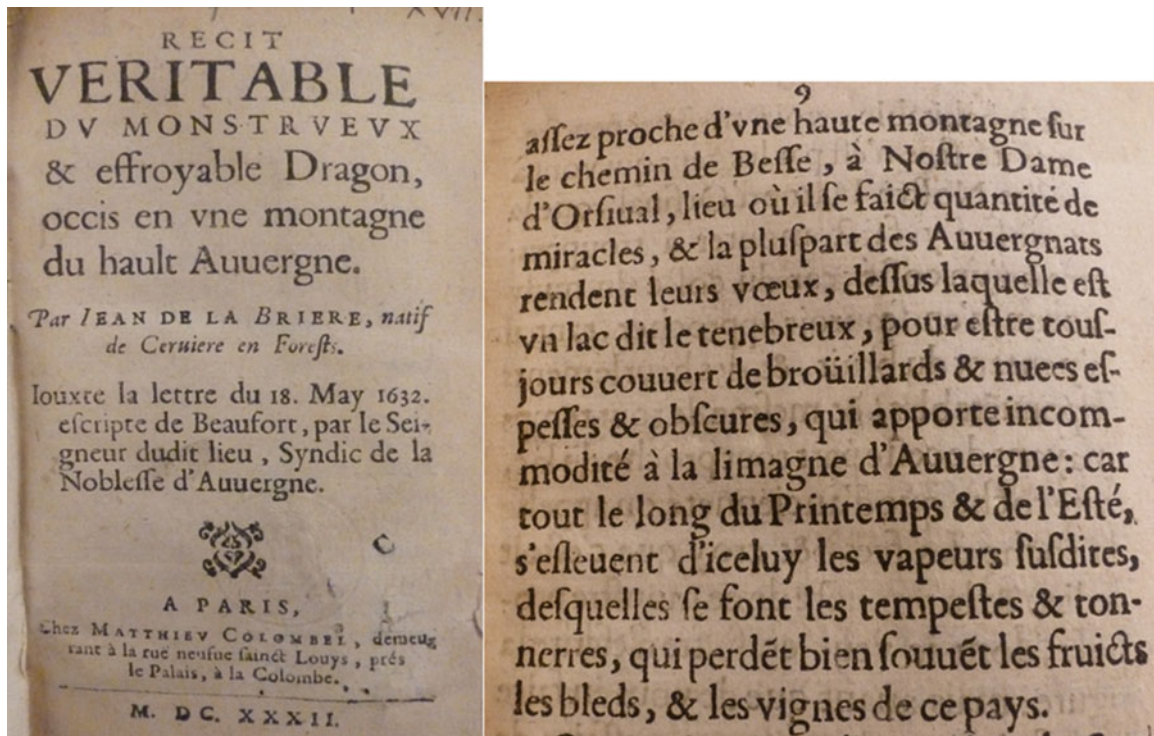


Fig. 3.2 The Gloomy Lake dragon story published by de Beaufort in 1632 at Paris, so far not attributed to Pavin, describes with precision a sudden mudflow, one of the multiple misbehaviour of *lacus pavens*.

(Bibliothèque Ste Geneviève, Paris). It has been re-published again in 1832. It was not attributed so far to Pavin by folklorists

between the mid-XVIth, since it refers to the pilgrimage, and 1632 and it is located by the narrator exactly at the outlet of the Lac Ténébreux (Gloomy Lake), an obvious transposition of *Lacus pavens*. The action can be abridged into several parts:

- (i) *“There is a lake, 2½ leagues from Besse, named “Ténébreux” because it is always covered with fog and thick and dark clouds that bring damages to the limagne [valleys] of Auvergne: because during the whole spring and summer, these vapours escape from the lake, causing storms and thunder that very often damage fruits, grains and vineyards in this country...”*

This description features thunder, storms and damages on crops, including lowland vineyards that are far downstream of Pavin, in the valleys (limagne) (Fig. 1.2b, c). All these Pavin attributes are already present in several other witnessed accounts of Pavin misbehaviour between 1551 and the mid-XVIIth century (See Sects. 2.3.3 and 2.3.4). The storm is not triggered by a thrown stone in this story.

- (ii) *“The Ténébreux Lake is wide and its water is green as spring grass and its sand is as verdigris. There are monster fishes that have never been fished because this place is inaccessible and uninhabitable, and only visited by the pilgrims attracted by their curiosity; however [they come] on one side only, since on the south side [of the valley, where the lake outlet is] no one would dare to come, as one can hear such terrible sound and screams, from immemorial time”.*

The grass-green water colour is an unusual colour for common lakes but it is observed today in some acidic volcanic lakes. The inaccessibility and inhabitability of this place is outlined. Pilgrims fearing the terrible lake sounds and screams, avoid the direct route from Besse to the Vassivière mountain (see schematic pathway on Fig. 1.2c). The cascading lake outlet and the pathway between Besse and Vassivière are represented in the 1575 picture of the Land Register of Besse (Godivel I 1579a) (Chap. 2).

- (iii) *“From the beginning of time there is, adjacent to the lake, a rock named the Fairies Rock (Roche des fées) which is believed to be the hiding place of the monster which I will describe”.*

The Fairies Rock refers to the Montchal volcano, *i.e.* the burning mountain, adjacent to Pavin. At this stage the story becomes fantastical with the dragon encounter, dated on the “15th of last May”, possibly in 1632, at midnight when La Brière comes back from Chaufour to Besse.

- (iv) *“The monster has an excessive length ...a head like an ox...but longer. His eyes are sky-blue with red like a turkey cock crest, with peacock feather between the horns and white feather wings like a swan; his neck is 3 to 4 feet long...his back is covered with strong scales...the tail is 15 to 16 feet long; he has big claws”, etc.*

This dragon portrait is an archetype combining multiple attributes: as long like a snake, powerful as an ox, rapid and



Fig. 3.3 Fantastic creatures which may be associated with degassing maar-lakes misbehaviours. (left): The fight against the dragon (Schott 1662)(Bibliothèque Ste Geneviève, Paris): several types of dragons are described at Pavin, the major one with ferocious eyes shining and terrible teeth grinding, is located in the *lacus pavens* (Fairies Garden legend), another is assaulting the passer-by at the lake outlet (Fairies

Garden legend, Dragon of the Gloomy Lake story). (right): Giant fishes described at Ulmen Lake, Eifel (*Ulmu lacus in quo piscis magnus spectatus aliquando*, Münster 1566) (library of the Faculté de pharmacie, Paris). Such “monster fishes”, also described at Pavin (de Beaufort, 1632), are interpreted here as water fountain

winged like a bird, ferocious with mighty claws, and has a rugged surface. There is no image of the dragon in this 1632 version, but the dragon picture presented by Schott (1662) fits well with this description (see Fig. 3.3a). Attacked, La Brière fights back and breaks his sword on the ferocious monster; he is nearly engulfed by the animal. At this moment, he remembers the miracles that Notre Dame [of Vassivière] makes “almost every day”: he seizes the animal by its neck and squeezes it strongly, shouting for help, but he is finally overwhelmed by the dragon.

(v) On the morning after, La Brière is found by four herdsmen “*under the dreadful snake; they unload on him the wood they brought and take him out from beneath this weighty mass*”.

He can only be rescued with wood pieces unloaded by the four shepherds.

(vi) La Brière story is not yet over:

He is brought breathless to the Chapelle des Transis... he is showing buboes and pimples, similar to those caused by the Plague.

This dragon encounter most probably refers to a sudden mudflow generated by a lake surge of the lake. One must note, as in other stories of river dragons, the scaly body, possibly referring to the much debris found at the surface of mudflows. Wood brought by peasants seems appropriate to approach and rescue the victim from the fresh mud. In some alpine passes, *Transis* chapels refers to repositories of dead

corpses found after winter in the mountain; here it refers to the one of Vassivière and could be related to the natural violence of this area (Ph. Reyt, pers.com, 2013). The strange skin diseases found on the rescued La Brière, referred here as the Plague [*l’Epidémie*], are similar to the pimples mentioned at Pavin in 1783 by Godivel IV, after his son had soaked his hand in Pavin waters, during another misconduct event and by Nodier et al. (1829) (see Sect. 2.3.5). Buboes and loss of consciousness have been reported about victims and/or survivors of the CO₂ degassing at Nyos (Baxter et al 1989) (see Sect. 1.6.1).

This description of *Lac Ténébreux* is very precise-e.g.describing pilgrims pathway in the Couze valley-suggesting that the author has either witnessed the event on May 15th 1632, or is someone with perfect knowledge of the area. The style is similar to those of “canards”, small brochures of few pages distributed door-to-door, reporting extraordinary events during the XVIth and XVIIth. They were occasional publications that prefigured future newspapers. It is published when fear of Pavin is at its maximum. This story, re-printed in Lyon in 1832, for unknown reasons, has not been attributed to Pavin, excepted by Reynouard (1910a, b). It is found today in a few registers of Auvergne tales in the dragon sections (Lacouche 1994) and has been presented by the writer Samivel as a typical mountain dragon story in his chapter on mountain myths in the reference book *La Montagne* (Samivel 1956). Pavin’s spillovers and mudflows are now documented by scientists, but not yet for this period (see Chap. 1).

3.4.1.1 River Dragons

The dragon metaphor is widely used during the Middle Age to represent dangerous river events (Reyt 2002) such as floods and/or mudflows. These dragons are elongated, powerful, they have scales, they move in valleys and they should not be confused with winged dragons, which move through the air (although river dragons may occasionally be represented with wings). The archetype of river dragons is the *Tarasque*, found in the Rhone River valley, at Tarascon (France) where the torrential rivers coming from the Cevennes may generate monstrous floods. The *Tarasque* is said to have been defeated by Santa Martha, the patron saint of Tarascon, according to the Golden Legend tradition reported by Jacobus Voragine (1265). Another river dragon attack is well documented; it occurred in 1304 at the famous Murbach Abbey, located in the steep Belchental valley (Alsace), during a terrible storm: “on the waters was floating a dreadful dragon...when the flood retired the reptile was stranded on the ground, [few villages downstream], where again it caused damages among people and livestock... finally courageous men attacked it and killed it after many efforts” (Legin 2003). It refers most probably to a river mud flow, it shows how populations could describe rare and terrifying events they could not understand, as for the 1632 Pavin dragon.

Dragons were already common in Antiquity: Conrad Lycosthenus, the Alsatian encyclopaedist (1518–1561) who transcribed Julius Obsequens *prodigii* observed during the Republican period of Roma, mentions several of them in his *Prodigiorum ac ostentorum chronicon* (1557). Dragon representation in art and literature is particularly developed from the XIVth to the XVIIth as illustrated by Schott in 1662 (Fig. 3.3a).

River dragons stories and representations lasted until the XIXth century: one Epinal image publisher (Pellerin 1829) is still featuring a dramatic flood event, that occurred on October 6th 1829 at Fagna in Chile, as a dragon: “the amphibian monster came...He was covered with scales, bullets were bouncing off him...He devastated the town claiming 80 human victims and many bulls, cow, pigs”. Then the “Fagna harpy” jumps in a lake and is finally caught: it is 23 ft long, has a bull’s head, a scaly body, wings and two tails. The coloured representation on this famous Pellerin image, circulating door-to-door in French villages in the XIXth century, is close to the classic representation of the *Tarasque* defeated by Santa Martha.

3.4.2 Monster Fishes Observed at Pavin (1632) and in Ulmen Maar, Eifel (Münster 1566)

The Dragon of the Gloomy Lake story mentions that the lake holds “monster fishes actually never fished”. This should be

interpreted as fountains of degassing waters, *i.e.* little spouting geysers as those produced by blowing whales. Such degassing figures have been observed by scientists at Monticchio Lakes and at Nyos (Table 1.2). Another “encounter with whales” in crater lakes is reported and illustrated (Fig. 3.3b) in 1556 by Sebastian Münster (1458–1552) at Ulmen Maar, one of the many Eifel maar-lakes. In his *Cosmographia Universalis*, 1430 pages, the first ever to describe and map the New World, Münster develops the description of *Eyfallia* lakes:

“In Eifel there are two big lakes, one near Ulmen castle [Ulmen Maar], and the other near the Laach monastery [Laacher See]: both are very deep although they have no water inlets but outlets. They are called locally maars and are rich in fishes... It is said that at Ulmen one finds a fish, or if you want, a whale, which has been seen by several people, one 30 feet long, the other one 12 feet. And when they appear it is a certain sign, as they said, that one of the children of the place named Gannerben will die, and they maintain that they have experienced this several times. They also write that Ulmen is so deep that one cannot find its depth, even after having sent the sounding line for three hundred fathoms.”

Münster illustrates his Eifel description by a wood engraving of a blowing whale (Fig. 3.3b) with open mouth, with the legend: “*Ulmu lacus in quo piscis magnus spectatus aliquando*” [Ulmen Lake where a great fish can be seen].

Ulmen Maar today is meromictic, at least since 1912 when it was first studied by Thienemann, the founder of German limnology (Thienemann 1914–1915). It has neither aerial inlet nor outlet. Close to the lake there is a spring in which Celtic and Roman votive artifacts have been found. For centuries this place was frequented by woman praying for healthy children. It is important to note that the occurrence of monster fishes is connected, according to Münster, to the death of children in the vicinity, which could be interpreted as damages caused to those sleeping on the ground during such degassing events. There are at least three Eifel maar-lakes where damage to Humans have been reported: Weinfelder Maar (Totensee), Ulmen Maar and Pulver Maar (see further).

3.4.3 The Fairies Dance Legend: Past Fumaroles at Pavin-Montchal?

The *Fairies Dance* tale has been collected and published in 1856 by de Ribier du Chatelet (1779–1844), the historian of Haute-Auvergne, now Cantal. It features a young boy in the mountain in early or pre-Christian times:

Irald is passing below the Fairies Lake at 11 at night...He sees on the summit aerial beings. He comes close to the dance without being noticed but the dance is stopped and he is invited by two fairies. The boy rushes but when his hands join those of the beautiful creatures, something dry and icy catches him in a vice. Then starts an infernal round dance. Irald is pulled away

at great speed...he falls down. The dance is going on and on. At midnight the moon is unveiled and the beautiful girls are transformed into ugly skeletons whose empty skulls are throwing flames. The rotten body of a child, dead before having been baptized, is brought in and the hideous group makes a terrible feast. Irald recommends himself to St. Geraud and soon the infernal band is disrupted. The fairy that was once the most seducing exhales on him an inflamed breath, the fire burns his hair and prints on his cheeks a stigma in shades of blood. Irald lost conscience...when he woke up the mountain got its normal aspect back but he kept his wounds. [abridged version].

Taking into account that the Fairies Lake and the Fairies Mountain correspond to the Pavin-Montchal ensemble (see Sect. 3.4.1) and that Pavin area has been subject to past degassing activity (Chap. 1 and 2) the following re-interpretation can be proposed: (i) The *aerial beings*, seen when looking up towards the Fairies lake, correspond to gas exhalations from Pavin area, (ii) the fairy, suddenly catching the hero in a *dry and icy vice which makes him loose conscience* can be interpreted as a loss of consciousness, as observed on Nyos survivors (see Sect. 1.6.1), (iii) dead babies brought to the place can represent young victims of this deadly place – as in Eifel – and/or human sacrifices during pagan times, (iv) the *ugly skeletons whose empty skulls are throwing flames and the flame-exhaling fairy* could be fumaroles on the adjacent Montchal, i.e. the *scorching mountain* for local people, according to volcanologist Lacoste de Plaisance (1803). After the victory of the Christian preacher the place gradually went back to normal but remained bareland and without snow.

This legend is localized by de Ribier (1856), a specialist of the Haute Auvergne history, at the Chamaroux Mountain, a barren volcanic cone without any lake (1476 m), some 30 km South of Pavin, at the limit between Puy-de-Dôme and Cantal (i.e. between Haute and Basse Auvergne). In this legend fumaroles/fairies lasted at least until St. Géraud's time (855–909), the founder of Aurillac Abbey in Cantal.

3.4.4 The Fairies Garden Legend: The Original Description of Maleficent Pavens at Pagan Times

This legend is published 50 years after the *Fairy Dance* by Ludovic Soubrier (1846–1880), a Cantal priest and local folklorist publishing under the pseudonym of Louis Boissière (Moulier 2010), in his 27 tales and legends from the Haute Auvergne (1893) (Fig. 3.4). Soubrier possibly found this one in church archives as he notes that “*this tale has been transmitted thanks to the religious care with which our fathers were keeping memories from the past*”. His legend features with much details the Fairies Garden as a marvellous and terrifying place:

(i) “*a wonderful palace with ramparts that seemed to be forged into incandescent cast iron...a flow of molten gold was running in ditches...everywhere marvelous waters were spurting from huge silver ponds. Morning and night an extraordinary breeze was softly affecting the trees, shaking the spurting water plumes and its voice was covering the sound of nature. This was the Fairies Garden, left by them in winter...*”

(ii) “*Nearby people were bowing down in front of this wonder as if they were bowing in front of their gods. Fairies were accepting with pride this sacrilegious worship. Those invoking the fairies could see, when raising their heads, a white phantom smiling at them while continuing his flight*: it was the fairy. The surrounding wall was indeed stopping any daredevil: it was an *immense dragon curled three times around the mountain. From far away one could see his monstrous rump, his ferocious eyes shining and terrible teeth grinding. The monster was voracious and, when someone was passing under in the plain, a fairy rushed forward in the air, ran to meet the misfortunate one, enthralled him and misled him. Then the monster was loosening its many coils, rushed suddenly on his victim in a cast-iron noise and, after a rough roar, went back to its observer position...*”

(iii) “*To calm him down and to please the fairies, in charge of his subsistence, people used to offer him human victims. Each month, during the short sleep of the monster, a young boy was left at the bottom of the mountain where the dragon came to eat him when waking up...*”

(iv) “*For hundreds of years the hydra was fed with children until the coming of one preacher of a new god. He reproached them for their idolatry and promised, in the name of God, to get them rid of the dragon. He takes a spear and walks to the mountain. The dragon opens a terrible mouth, rolls his blood-injected eyes, slides down on the grass slopes, smashing everything on his way and making sinister roars. At few feet from him, the apostle raises his hand in the name of Christ and makes the Cross sign, the monster suddenly stops, as if he was hitting a cast-iron wall; the Unknown pushes his spear in the monster head, despite his thick scales that offered him impenetrable body armor. The dragon gave out a terrible cry...he rolls lifeless at the bottom of the mountain. The apostle is winning the heart of the grateful barbarians. Soon the Fairy palace fades out, stops shining, there is only a sterile rock rearing its bald head. Until now the green grass did not dare to overrun this damned place which dries up snow and rain so quickly*”. [abridged version].

The Fairy Garden is left in winter. This toponym has been encountered in the previous legend and the Fairy Rock is also the location of the 1632 dragon story (see Sect. 3.3.2), which certainly corresponds to Pavin. In addition there is a large body of scientific and historical evidences of past Pavin “misbehaviour” (see Chaps. 1 and 2). A re-attribution of the Fairy garden legend to Pavin is therefore proposed, adding precious details on Pavin behaviour and its perception by local people at pagan times:

1. The *dragon* guards the palace, i.e. the lake and its rims. He can be perceived from far away by his *ferocious eyes* (lightning), *grinding teeth* (terrible noise and/or thunder sound, reported many times at Pavin) and *monstrous rump* (possibly the crater wall or the horizontal lava outcrops, as drawn by Lecoq 1835b, see Fig. 2.5). Lightning and thunder, also described at Vassivière in 1551 and at

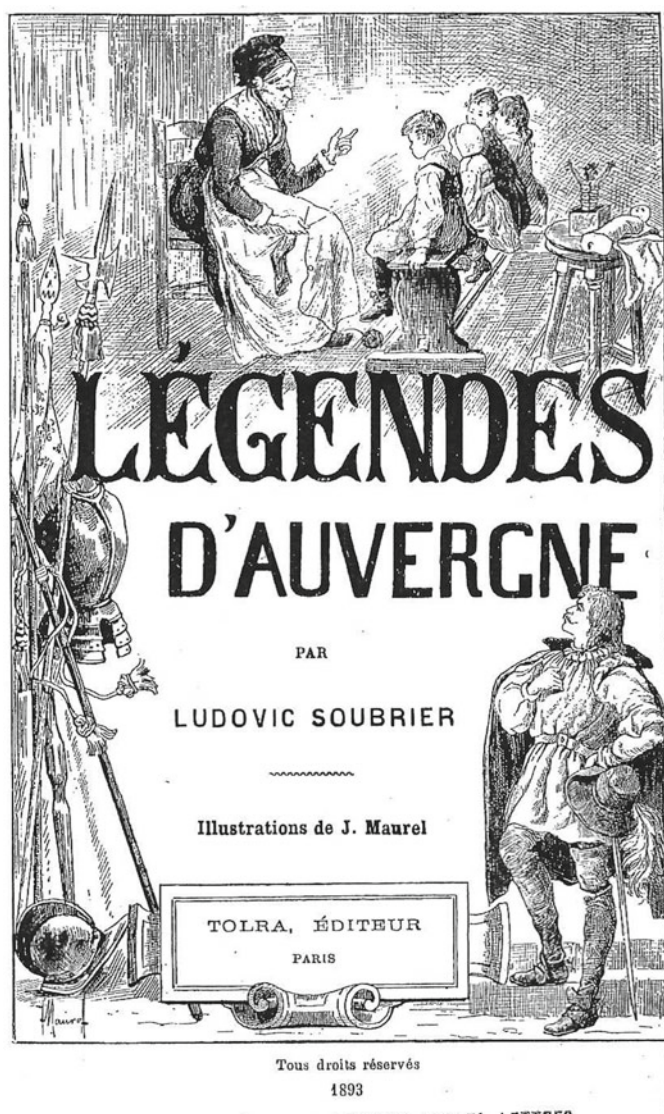


Fig. 3.4 The original and oldest Pavin legend, so far ignored: the Fairies Garden legend (Soubrier 1893) (BCU library, Clermont-Ferrand). It features a maleficent and powerful lake dragon, worshipped



Le Christ qui est mon Dieu, s'écria-t-il, t'ordonne de ne pas toucher à son serviteur. (Page 192.)

Nyos in 1986, are the story-motiv of Belleforest's description of Pavin (see Sect. 3.3.2).

2. The *marvelous spurting waters* associated with soft breeze are the water fountains, taken for the water blown by giant fishes also present in the 1632 dragon story (see Sect. 3.3.2).
3. The walls of the castle, with their *incandescent cast-iron* and *molten gold* colours could be hydrothermal springs rich in oxides and sulfur-rich vents, as found today in some active acidic maar-lakes. [These could have been interpreted by Del Rosso (2009b) as lava flows, a hypothesis strongly debated among volcanologists at the 2009 Besse meeting.]
4. A regular breeze or fog occurs in the morning and in the evening. Such permanent fog, characteristic of active

by pagan cult for centuries then defeated by the first local evangelisator, i.e. around the Vth century. The legend details Pavin misbehavior, i.e. various forms of degassing, during Antiquity

degassing, is also described at Pavin by Godivel II in the mid-XVIIth (see Sect. 2.3.4) and in the 1632 dragon story (Sect. 3.3.2).

5. The *fairy who rushes forward in the air, runs to meet, under the lake, the misfortunate one, fascinates him*, and misleads him, also present in the previous legend and in the 1632 dragon story, is interpreted as CO₂ overflow and related loss of conscience of victims.
6. The *powerful dragon* slides from the mountain with a cast-iron noise, destructing everything, and stops after a rough roar, also featured in the 1632 dragon story, could correspond to major water spillovers and/or mudflows event observed by geologists and paleolimnologists (Lavina and Del Rosso 2009; Chapron et al. 2012; Chap. 23).

7. Regular (monthly?) pagan cults and human sacrifices of young boy were performed at the lake. Such lake cult has also been performed in Antiquity at the Albano Lake (See further).
8. The terrifying monster and its associated cult have been active for “hundred of years”. Then they are stopped by a predicator – as in the previous legend. In Pavin area the first Christian predicators are *Stremonius* – now Saint Austremoine – in Issoire, *Baudimius* and *Sennectarius* in Saint-Nectaire, all in the IVth century. Auvergne ermit Caluppa, who encountered two dragons before his death in 594, according to Gregorius of Tours, could also be the predicator who defeated this dragon (See further).
9. After the defeat of the dragon the rock is left sterile, as in the previous legend. Until 1830 the Montchal volcano was a baren ground (see Lecoq’s drawing, Fig. 2.5).

The Fairies Garden appears to be the original and oldest legend on Pavin. It is very detailed and fully coherent with what we have learnt so far about the lake. Ironically it is still totally ignored from folklorists, historians and scientists. In *Tales on the Earth and Underground World*, section 3 on Lakes and fairies, 1904–1906, Paul Sébillot only mentions the *Fairies Dance* (A 920 1.7), actually not attributed to Pavin, but not the *Fairies Garden*, published in 1893, nor “*the Lake of Terror*” published in 1910 by Roux-Parassac. These three tales are now present in the remarkable register of Auvergne tales collected by Gilbert Laconche (1994) where only *the Lake of Terror* is attributed to Pavin while the Dragon of the Gloomy Lake is in the section on “Stories of animals, wolves and dragons”. The Thompson world register of folk tales (1955–1958), which does not mention any of these Pavin tales, quotes only one legend concerning a village under a lake (F. 725.5.1) out of thirty lake legends. Lake dragon is also very rare in Thompson with only one occurrence (B.117.2) out of 60 dragon occurrences, for an Irish lake that presents many similarities with the Pavin Fairies Garden tale. In conclusion, neither Sébillot nor Stith Thompson or Van Gennep (1949) featured and/or interpreted the three Pavin legends and stories. The comparison of Pavin legends with myths and legends collected from other maar-lakes has greatly facilitated their interpretation, an approach confirmed by the consideration of religious cults at these lakes during pagan then Christian times.

3.5 Pre/ Early Christian Lake Cults in Maar-Lakes, Pavin, Averno, Albano and Nemi

The Fairies Garden legend presents multisecular pagan lake cult at Pavin. A famous text by Gregorius, the first historian of Merovingians (538–594) features a recurrent lake cult during Pagan times, which could be re-attributed to Pavin. Very

important cults were also taking place during Greek colony and Roman times in Averno, Albano and Nemi maar-lakes

3.5.1 Gregorius’ Famous Lake Cult in Gevaudan: A Re-attribution to Pavin?

Gregory of Tours, already mentioned for his account of the Tauredunum event on Léman, is born in *Urs Averno* – now Clermont-Ferrand – at 50 km from Pavin. He describes in his famous account of the life of Saint Hilarius from Poitiers – written in the late VIth century- the very unusual behaviour of one lake in Auvergne (Gregorius 600s):

“At this time there was in Gevaudan, on a mountain named Helanus, a big lake. There, sometimes ago, a crowd coming from the countryside was celebrating this place; they threw man’s pieces of cloth and fabrics, others wool fleeces; most of them were throwing cheeses, candles, and various artifacts, according to their wealth, that would be too long to account. They were coming with chariots, bringing food and drink, slaughtering cattle and were feasting during three days. The fourth day, when they were about to leave, they were assaulted by a big storm with thunder and immense lightning and from heaven there came an intense storm of rain and hail, so violent that everybody doubted they would escape . This happened every year and the superstition was deeply present in these mindless people. After a long period came a priest, made bishop at the city. He preached the crowd not to celebrate this anymore or they will be hit by heaven’s anger but his preaching was not affecting these simple-minded people. Then the man of God, inspired by Him, built, away from the lake shore, a chapel dedicated to the blessed Hilarius of Poitiers and placed the relics of the holy person into it, saying to the people: “Have fear, my sons, fear to sin in front of our Lord for there is nothing to be venerated in this lake”. These people were deeply touched, converted themselves and quit the lake. What they used to offer they brought it to the holy place and were freed from their errors”. (our translation from a French version of *De La Gloire des Confesseurs*, Livre VII, *De St Hilaire*, <http://remacle.org/blood-wolf/historiens/gregoire/miracles3.htm>)

This text features pagan times when a lake, localized in the Gabales people territory, here attributed to Gevaudan, was worshipped each year by local people, partaking in three-day feast, presenting offerings and sacrificing animals. Their worship is interrupted by sudden storm with thunder and lightning of unusual size and type, and an intense rainstorm with hail is mentioned. The continuous cult and the lake misbehavior are finally interrupted by a Christian predicator who builds a chapel dedicated to Saint Hilarius. The storm description is very close to a violent lake degassing event (Table 1.2).

Traditionally (e.g. Sébillot 1904–1906, chapter V, p. 286) this text is not attributed to Pavin but to another lake, Saint Andéol, in Gevaudan, some 150 km away. Saint Andéol Lake is another isolated high plateau lake, at 1223 m; it is shallow, probably originates from glacial scour on crystalline rocks and is not meromictic. As for the Vassivière pilgrimage at 1.5 km from Pavin, another famous mountain

pilgrimage has been active at this lake until 1867. Its origin is uncertain but ancient: on July 8, 1640 there were 4 000 pilgrims on the mountain; the cult implied to go around the lake up to three times for sins expiation and it lasted until 1867 (Ténèze 1978). The 1950s excavations near the lake found the ruins of a Gallo-roman temple. Recent research confirms the existence of a proto historical lake cult, a confirmation for archeologists that Gregorius lake is indeed localized at St. Andéol, an interpretation which originates at least from the XVIIIth, as discussed in Fau et al. (2010). Gregorius text is also now reported as a Gevaudan legend (Ténèze 1978).

A re-attribution of Gregorius text to Pavin is however proposed here for the following reasons: (i) there are striking similarities concerning the description of lake cults in this text and in the *Fairies Garden* legend, attributed to Pavin, (ii) the exceptional storm with thunder, lightning and hail described by Gregorius is much similar to the many degassing descriptions made at Pavin between 1551 and 1650) (see Sects. 2.3.3 and 2.3.4), (iii) St. Andéol Lake does not present any of the characteristics of other degassing lakes, *i.e.* deep meromictic maars or crater lakes (*e.g.* Albano, Averno, Monticchio, Pulver, Nyos), (iv) There is no other historical sources of violent events at St Andéol, in contrast to Pavin, although it must be recognized that “normal” thunder and storms occur each summer on Gevaudan plateau.

Such re-attribution is coherent with what we now know on Pavin: (i) Pavin has been settled during Antiquity, as evidenced by the Pompeian millstone found in its waters (Fig. 2.1), (ii) a pagan celebration at Pavin is evoked in 1615 by Jesuit Father Coyssard in his first record of the new Vassivière pilgrimage (in Cladière 1688): the XVIth crowd throwing coins into the sacred spring of Vassivière “*were continuing the rites of Gaul people, stopping by the Pavin shore to offer to its water silver coins and precious vases*”. According to Jean Baptiste Bouillet, the XIXth century archeologist, several families from Besse possessed antique artifacts retrieved from the lake, although these have not been described (Bouillet, manuscript, 1875), (iii) Such pagan lake cult, *i.e.* before the V-VIth century, could explain the original Latin name of Pavin, *Lacus pavens* (Banc 1605; Godivel II, 1650s), (iv) Hilarius (c300–c368) is the first bishop of Poitiers who Christianized the Aquitania province to which the Pavin area was a part of in the IVth, (v) the construction of a chapel by the Christian preacher, away from the lake, could correspond to the early Christian settlement at Vassivière (see location on Fig. 1.3c), mentioned by Jaloustre (1910): “*authors thought that this place could be the Celtic sanctuary offered to the Clamouze River deity. People should go there for celebrations. When Christianity was established the worship of the Virgin replaced the one of springs...It is likely that a small Christian parish succeeded to the Gallic settlement*

established close to the sacred springs”. Jaloustre adds that, when the present chapel was built, huge logs – 10 m long and 80 cm in diameter – were found in peat, in addition to the ruins of the medieval church, destructed in 1321. So far no archeological excavation has been realized at Vassivière.

Archeological research at Pavin and in the Vassivière Mountain, as the one that is currently made with success at St Andéol, could confirm our hypothesis and establish possible connexions between St Andéol and Pavin pagan lake cults. This association has been already stated by a reknown historian of Gaul, Camille Julian (1859–1933), who made a direct parallel between pre-Christian lake cults at Averno-Cumeo in Italy, at Pavin and at “a lake in Gevaudan” (Julian 1901):

“The worshipping of Pavin and a lake in Gevaudan, by Gaul Arverns people, in the same way that Averno Lake, where the famous Cuma Sybilla was standing in lake vapours, was worshipped by pre-Roman people, near Naples” and: “In Auvergne, as in Campania, lakes have attracted the fearful imaginations since a long time ago. I do not know if the Gauls were seeing shadows going out from the bottomless Pavin Lake, as the Greeks from Cuma were invoking shadows on the Lake Averno shore, but these people were placing in these silent and hypocrite waters the impregnable asylum of a chthonic deity that should not be disturbed, only with presents. For three consecutive days, on the shores of a Gevaudan lake, the peasant people were gathered to make libations and sacrifices: they were throwing into the waters fabrics, sheep fleeces, wax cakes, bread, not to mention more costly presents. And during three days they were feasting and having orgy, finally interrupted by the angry god. Gregorius of Tours stated that a holy predicator ended this superstition”.

Julian statement pushes for a re-analysis of all the pre-Christian lake cults, particularly for maar-lakes, in consideration of the new hypothesis of possible violent lake degassing. A preliminary analysis in Italy provides promising results.

3.5.2 Hermit Caluppa Defeats Two Dragons: A Record of the Catastrophic Pavin Event (590s)?

The story of hermit Caluppa dragon is also reported by Gregorius (*Vitae Patrum*, 11), as a remarkable encounter with the evil. Caluppa was a hermit living in a grotto at the “Monasterium Melitinsin, in a 500 foot cliff in Auvergne”. The story has been unearthed in 1975 by Fournier, an Auvergne historian. At the end of his life Caluppa, who died in 594 according to Fournier (1975), is attacked by two powerful dragons, which can be summed up as such:

Two dragons of enormous size progressed in his direction and stopped very close. One of them was stronger than the other. His chest was projected forward, his face close from the Saint’s face. He rose to speak to him softer. The Saint,

terrified, icy and stiffened as if he was in bronze, could not move any limb, even raising his hand to sign himself. As both remain immobile for a long time, the Saint prays in his heart then manage to move one hand, signs in the name of the cross and addresses pious words to the main dragon. At each word the dragon went deeper into the ground. Meanwhile the other dragon gradually coiled around Caluppa's legs by surprise. The Saint says to him: "go away, Satan", and the dragon withdraws at the sill of the hermit's cell, emit by its lower part an astounding noise and fills the cell with an unbearable stench that could not be attributed to anyone but to the devil himself. (our summary of Fournier's version of Gregorius text)

Fournier does not propose any explanation to the dragons encounter. He locates the monasterium at Meallet in Cantal, the Haute Auvergne, South of Pavin (Fig. 1.2b). Another location and interpretation are proposed here. The cliff with the hermit cell, is the Jonas caves, a famous and unique ensemble of caves, dug-out by man in a 150 m high cliff, allegedly occupied for about 2000 years and located a dozen km downstream Pavin in the Couze Pavin thalweg (Fig. 1.2c).

This account, very detailed indeed and probably transcribed by witnesses, may be Caluppa himself, can be re-interpreted as the enormous Pavin Lake overflow, dated around 600 AD, which is evidenced in the paleosediment records of the lake (Chassiot et al. 2016; Chap. 2.3). The volume of water emitted by the lake is estimated to 4 millions m³, and the maximum outlet discharge to 1500 m³/s. It generated an enormous mud flow which could have reached the foot of the Jonas cave. The first dragon could be attributed to the CO₂ flow along the valley floor, causing the sudden and long-lasting paralysis, as in other degassing events (Table 1.2). The second one could be the mud flow with a sulfurous smell, also common at other degassing events and perceived near Pavin at other occasions. The sound of the explosion could be heard very far away. The degassing and overflow event could have been triggered by a major earthquake that occurred in 582 AD in the Pyrénées and felt in Auvergne, according to Lecoq (1835), or to a less known earthquake in 580 AD near Angers.

3.5.3 Lake Cults at Italian Maar-Lakes in Antiquity: Entrance to Hades, *Feriae Latinae*, *Diana Nemorensis*

Lake cults in Antiquity are described by several Antiquity historians as Strabon, according to Lavroff (1872) who connected the Sunken City legends to these customs. At

least three Italian maar-lakes of Latium (Albano and Nemi) and Campania (Averno) had specific deities and cults that have lasted throughout the Antiquity. The new outlook on degassing lakes, started by Italian earth scientists, fosters a new vision on these celebrations, some of which were very similar to the one described in Auvergne by Gregorius.

3.5.3.1 Averno Lake, the Greek Entrance to Hades

The *lake without birds* for its Greek settlers is a small meromictic maar-lake located in the Phlegrean Fields, near Naples (see Chap. 1). Averno was a very famous site during the Greek colonization of Italy. Latin authors as Virgil describe Averno as a lake with constant fog and vapours, hence its permanent absence of birds. Averno Lake is one of the smallest geographic features represented on Peutinger map, attributed to 350 AD. Ruins of a temple, possibly dedicated to Mephitis, the goddess of noxious vapors, are still visible today on the lake shore. It has been visited by many travelers such as the French cosmographer Thevet (1575) who reports: "*It was the entrance to Inferno, its waters were sulfur-rich and the Ancient thought they came from where the souls of evil persons were tormented..., it was named Paluz-Acherusia where in the past humans were immolated to Inferno gods*". Ephraim Chambers (1680–1740) describes the "Averni sites" "in his encyclopedia (1741) as such:

"Certain lakes, grottos, places which infect the Air with poisonous Steams or Vapours also called Mephites...Birds could not fly over them but dropped down dead". The most celebrated, Avernus, was a lake near Baya in Campania, by Strabo called the Lucrina Lake and by Italian geographers, Lago di Tripergola...The Circumstance combined with the great depth of the lake occasioned them to take it for the Gateway of to Hell and, accordingly, Virgil makes Aeneas descend this way to the Inferi. Vibius Sequester says there was no bottom to be found of it: "Immensa altitudinis cujus ima part apprehendi non potest".

3.5.3.2 Albano Lake and the Long Lasting *Feriae Latinae* Celebrations (700s BC- 400s AD)

The biggest European maar-lake at 30 km south of Rome (Table 1.1) has been the location of a major and long-lasting cult, the *Feriae Latinae* which celebrated the major god of Latium, *Jupiter Latiaris*, "the one that triggers storms". His temple was located on Monte Cavo (950 m a.s.l.), the highest portion of the rim between Albano and Nemi Lakes. According to the Dictionary of Greek and Roman Antiquities of Charles Daremberg and Edmond Saglio (1877–1919, p. 1066) this annual celebration in Monte Cavo lasted 3 days, bringing in people from all Latium League cities. The first 2

days were festive, every one forgetting who they were, master or slave. Each city was represented and praying, people were bringing milk, cheese, any kind of food, including lambs. The last day a white bull was sacrificed and its meat was shared among people from each city. The *Feriae Latinae*, established by the Latium League, was one of the earliest celebrations and remained the most important one during at least twelve centuries, from the destruction of Alba Longa, in 665 BC, to 400s AD when it was stopped by the Christian Emperor Theodose. This cult may already have existed when Alba Longa was first established, around 1200 BC according to the tradition. The *thunder and lightning* were the major attributes of *Jupiter Latiarius*, *tempestatum divinarium potens* [the one who could predict storms]. According to some authors human blood was also used in the ceremonies, although this point is now being contested (Mahieu 2010). Jupiter Latiaris has been the most and longest worshipped god in Italy, requiring the greatest number of human sacrifices.

Lake Albano anger was known and feared since at least its catastrophic overflow in 398 BC (see Sect. 1.6.2.1): few years later the Romans excavated a tunnel through the lake rim to prevent such surges. This technical response, an engineering marvel (Castellani and Dragoni 1997), was 1450 m long, 1.2 m wide and 2 m high. It remained in operation for more than 2300 years, maintaining the lake level at 70 m below the ridge. It can be considered as the “first prevention device” in overflow risk management (De Benedetti et al. 2008).

The many similarities between the pagan lake cults described by Gregorius of Tours and in the Fairies Garden legend – and the *Feriae Latinae* are striking: yearly gathering of all local populations, 3-day feast, type of offerings, thunder and lightning. The Roman builders of the Mons Aureus thermal baths (Mont Dore) were certainly aware of the famous Latium celebration, held each year on the rim of a round, deep and frightening lake, very similar to Pavin. Lake cult celebrations at Pavin, evoked by several authors, which are to be confirmed, may have been influenced by the *Feriae Latinae*.

3.5.3.3 The Terrible Pit-Dragon Defeated by Pope Silvester: Another Degassing Event at Albano, 330s AD?

Many dragons are present in Jacobus Voragine's *Golden Legend* (1260–1275) which details the life of early Christian saints and has been widely used throughout the Catholic Church. Many of these early preachers are fighting against pagan cults and some of them are also presented as dragon killers or *sauroctonus* saints who defeat the supernatural forces in the name of the Cross. About forty of such saints have been described (Sergent 1997), the most famous ones being today Santa Martha and Saint Georges. The story of

Saint Silvester, pope of Rome (314–335) under Constantine emperor, features his conversion of pagan priests after defeating a pit-dragon:

“In this time it happened that there was in Rome a dragon in a pit which every day slew with his breath more than three hundred men. Then came the bishops of the idols unto the emperor [Constantine] and said unto him: “O thou most holy emperor, sith the time that thou hast received Christian faith the dragon which is in yonder fosse or pit ...” Then S. Silvester seeks advice from S. Peter how to defeat the dragon.

“When [S. Silvester] came to the pit, he descended down one hundred and fifty steps, bearing with him two lanterns, and found the dragon, and said the words that S. Peter had said to him, and bound his mouth with the thread, and sealed it, and after returned, and as he came upward again he met with two enchanters...which were almost dead of the stench of the dragon, whom he brought with him whole and sound, which anon were baptized, with a great multitude of people with them. Thus was the city of Rome delivered from double death that was from the culture and worshipping of false idols, and from the venom of the dragon”.

As for the Caluppa dragon story a re-interpretation can be proposed. The dragon is living in a pit, i.e. a crater. It is worshipped since long by local people in a dedicated sanctuary. It is venomous, expelling a noxious and stinking breath; the emitted gases are probably sulfurous, which produces at this moment, massive casualties, killing 300 people each day. The catastrophic event forces the pagan priests to seek help from Emperor Constantine, recently converted to Christian faith, who mandates Silvester, the leader of Rome Christian community, to solve this pressing issue. The latter enters the crater with lanterns [so that he could determine if the CO₂ was present or not], and protects himself by a thread. When coming back from the deep crater, Silvester rescues two pagan priests – the enchanters – who are in a state of shock [same symptom as Caluppa]. They recover and are baptized at once, soon followed by many other worshippers of the false idols.

This story is similar to a degassing event. The exact location is not given but it took place near Rome. Lake Albano, already mentioned for its misbehavior, is a likely candidate: there a catastrophic lake surge already occurred seven centuries before, in 398 BC (see Sect. 1.6.2.1). If the pit-dragon event is correctly attributed by Voragine to Silvester, according to the tradition, it would have happened around 330 AD. At this epoch the *Feriae Latinae* was still celebrated on the lake rim at Monte Cavo. If this re-interpretation is confirmed, Lake Albano and its degassing would have played a certain role in the conversion of local people to Christian faith and this major degassing event should be added to the 398 BC event. In 330s AD the lake level could have been some 20 m higher than today, judging by the 150 ft descends of Silvester.

This story presents great similarities with the Gregorius lake cult text, with the *Fairy Garden* legend, and with the

Caluppa dragon encounter: all highlight the conversion of local people to Christian faith and present the lake disorders dragons as the evil, defeated by the Christian faith.

3.5.3.4 Nemi Lake, Home of Diana and Its Giant Roman Vessels

Few kilometers south of Albano, was the location of another important early Roman sanctuary – fifth century BC – devoted to *Diana Nemorensis*, living by maar- lake Nemi in her sacred wood (Bersani and Castellani 2005). The presence at Nemi of another tunnel, built around the IVth-Vth BC through the crater rim (Castellani and Dragoni 1997), suggests the prevention of a lake surge, as for Lake Albano (see Sect. 1.6.2.1). Nemi is also famous for its giant Roman sunken ships containing bronze artifacts: their retrieval was attempted as early as 1538 as well as in the late 1800s, both in vain. In 1928–1932, the lake level was artificially lowered by 23 m using pumps to allow for the archeological exploration during which a second giant wooden ship was found. In 1943 the lake level was re-established and a museum was built on the lake shore but was burnt during the German retreat in 1945. The Nemi Roman ships, built under Emperor Caligula (37–41 AD), are exceptional by their size, 70 m×20 m for the *Prima Nave* and 73 m×24 m for the *Secunda Nave* as well in their decoration which includes precious marbles, many bronze artifacts as lions and wolves heads and one *Medusa* head, which survived the fire and are now kept at the National Roman Museum in Rome. The ships, among the greatest wooden ships ever produced, were probably sunk after Caligula assassination. The *Prima Nave*, which had no visible means of propulsion, was likely towed to the center of the lake when needed. The distribution of its super-structures gives the ship a discontinuous look and is radically different from any other ancient construction. The exact function of the Nemi ships is still debated. Given that Latium people have witnessed lake disorders and catastrophic events at Albano and possibly at Nemi itself, five centuries before, the Nemi ships could well be connected to celebrations for the prevention of such events.

3.6 Christian Celebrations Protect Populations from Pavin Misbehavior

Pavin is located between Besse medieval city and the Vassivière Mountain, a religious site of regional importance, the some 1.5 km from the lake, at the same altitude – about 1350 m – but away from its possible disorders. Besse, about one thousand inhabitants at medieval times, is 3 km from Pavin (See Fig. 1.2c). Its St. André Church dates from the XIth–XIIth century. During the Middle Age there was a small church at Vassivière, which was dismantled in 1321 (see Sect. 2.3.2). Then a famous pilgrimage was started in

the mid-XVIth century after a remarkable miracle which took place in 1547 near Pavin. Already in the XIIth there was at Besse a college of 20–30 priests at Besse, which was increased to 60 priests in 1498 by a Papal bull from Alexander VI (Boyer-Vidal 1888; Blot 1910; Gomis 2006). Such density of clergymen in this remote Auvergne village, of difficult access during the 4 to 5-months-long winter, is striking and it is likely that a great number of masses were celebrated each day. A re-interpretation of rich religious iconography and history of Besse-Vassivière, taking into account the latent fear in Pavin area and the historical sources of Pavin degassing misbehavior (Chap. 2) is proposed here in a chronological order.

3.6.1 Besse Church Medieval Capitals (XIIth Century) Present Violent Scenes

The rich Romanesque iconography of Besse Church is still intact. The capitals considered as one of the most various and vigorous suite in Auvergne are well described by Blot (1924). The capitals “denominations” by de Bussac (1961), are complemented here (*in parenthesis*) by other possible interpretations: (i) “Eagles grabbing sheeps in their claws” (*loss of sheeps during degassing events*), (ii) “Drunkar damnation”: a man with a great beard lying in a bed with closed eyes. His right hand is taken by a horned devil which is holding a young man upside down. This young man is also seized by a second evil holding his arm and leg. In the middle a third evil is compressing his chest. Under the bed, a snake and a small wine keg are featured (Blot 1924), (*a figuration of someone taken by Pavin death in his sleep?*), (iii) “Ox sacrifice scene” (*figuration of former pagan rites at Pavin*), (iv) “Horned centaurs with *Minorta Urs* inscription (minotaurus)” (*another metaphoric representation of Pavin threats*). This new interpretation is still very hypothetical as other Auvergne Romanesque capitals often feature similar creatures, such as centaurus (Guyon 2010), but the representation of many fantastic beings, attacks by animals and humans or animal sacrifices is striking.

3.6.2 The First Vassière Miracle and the Ensuing Pilgrimage (June 1547 Pavin Degassing Event?)

In 1547 a miracle is observed between Pavin and the Vassivière Mountain, some 1.5 km away from the lake. At this time the Catholic faith is threatened by the Reform, very present at Issoire, some 40 km from Besse, so that the event is reported at once to the Catholic religious authorities, archived with the witnesses’ names and declared as a miracle illustrating the power of the Virgin. Father Coyssard, a Jesuit

born in Besse that year (1547–1623) and famous musicographer of his time, has gathered in 1615 the information about this miracle and the many others that followed. His detailed account is very precise and has been reproduced many times by the Vassivière historians (Cladière 1688; Chaix 1869; Jaloustre 1910; Pourreyron 1935; Auserve 2004, 2013):

“In June 1547 a few Besse merchants going to the LaTour market were following the path which, across the mountain, lies very close to Vassivière [i.e. near Pavin, see Fig. 1.2, Chap. 1]. They stop in front of the venerated image [a small statue of the Virgin, left after the destruction of a previous church, see Chap. 2] to pay their tribute. One of them stays aside...Pierre Guelf goes on his way and reaches the streamlet which, very close from there, flows in a ravine, but as he arrived there he cannot go further. He has suddenly lost his sight. His comrades gather around him, trying to rescue him, in vain. Pierre understands, retraces his steps to the image of Notre Dame, and there faith fully and with repentance, he cries his misery, confesses his fault and promises to fix his mistake: immediately he is able to see again”.

The first part of this event is reported in details (date, name of person, context, location): although it is not stated, it most probably occurred in the Couze River thalweg at the Pavin outlet ravine. It is a sudden phenomenon and the victim is somewhat stunned and loses his sight. The rapidity of the phenomenon, the loss of consciousness of the victim, already mentioned here many times, his temporary loss of sight with recovery, have also been documented for the Nyos survivors (Baxter et al. 1989; see Sect. 1.6.1). In the context of a multisecular Pavin fear, it is not surprising that this recovery was immediately interpreted as a miracle operated by the Virgin, particularly within the exceptional priests' community of Besse, when considering the major and violent religious conflict between Catholics and Protestants.

Soon after the 1547 miracle a chapel is re-built on the Vassivière Mountain between 1551 and 1555, with the authorization of the Queen Mother Catherine de Medicis, and with funds collected from the whole Province of Auvergne, as other miracles have followed. This pilgrimage, dedicated to Notre-Dame and one of the major Marial celebrations in Auvergne, links Besse to the Pavin area. Twice a year, processions carrying the statue of the Virgin across the mountain, first from the town church to the mountain chapel in early July and then back at the end of September where the Virgin rests in winter. In the XVIIIth century the pilgrimage reached its highest attendance, 6000 people including delegates from all nearby villages in a 20 km radius (Cladière 1688; Ajalbert 1896). The success of this ceremony is a measure of the gratitude felt by the people for the defeat of the local evil. The remaining funds permitted to build a new church choir in St André and equip the church with the magnificent stalls, soon followed by the Santa Martha chapel. The modern Christian pilgrimage, particularly cele-

brated in the second half of the XIXth century (Ajaltbert 1896; Jaloustre 1910, Fig. 3.6b) has been in place for the last 460 years, possibly succeeding to 1500 years of local cult.

Until now, neither the Vassivière pilgrimage nor the local religious history and iconography have not been connected to Pavin, except in our preliminary paper (Meybeck 2010) and in the “*Voyages pittoresques et romantiques dans l'ancienne France*” (1829) where Nodier, Taylor and Cailleux report, although not explicitly (p. 130), how “tradition” clearly connects Pavin to the Vassivière pilgrimage:

“Some would also tell you that if she [the Vassivière Virgin] was not brought back [from Besse to Vassivière], one could see at once a luminous vapour surging from the earth and wrap the church, with gliding cherubs, musicians archangels and all Christian mythology spirits, who bring her back with pomp in her uninhabited land”. This “luminous vapour”, reported in 1551 in the Vassivière register, is described in other lake degassing events (Table 1.2). Today the Vassivière pilgrimage, still very active, attracts pilgrims with multiple motivations, some of them still quoting celtic roots for this peculiar celebration (Bernard, 2013).

3.6.3 Besse Church Misericords (1570s): A Unique Set of Fairies, Dragon and Amazed Human Heads

The St. André Church in Besse holds 29 remarkable carved misericords (Fig. 3.5), i.e. the lower part of church stalls, dating from the late XVIth century (Blot 1924). Misericords usually “contain a wealth of information on the lives and the beliefs of people who created them and those for whom they were designed”, according to Elaine Block (2003) in her comprehensive analysis of French stalls. Misericords very seldom represent religious iconography, since priests sit on them, and popular and local scenes are commonly depicted.

Taking into account the Pavin legends, previously presented, and what we know of the damages suffered by victims of CO₂ intoxication (Baxter et al. 1989) and of the degassing misbehavior processes at Pavin, as analysed here and in Chap. 2, we can add to Block's “denominations” the following interpretations: impaired vision (as for the 1547 Vassivière miracle), child with buboes and skin diseases, amazement of victims, sleep of death, fairies who lure passers-by (Fig. 3.5a), amazed Medusa head, face affected by CO₂ intoxication (Fig. 3.5c, d), loss of consciousness, dragon (Fig. 3.5b) etc.

As for the capitals, these tentative re-interpretations have now to be discussed by specialists, taking into account the latent fear present in Pavin-Besse area and the Pavin misconducts during that period. Block (2003) lists 1437 French credences in which she found only 16 devils figures. None of the 1200 figures she has reproduced is similar to those of Besse which are definitely very peculiar, except for the village craftsmen



Fig. 3.5 Misericords of Saint André Church (Besse, late XVIth) with fantastic creatures, bizarre and suffering heads. This exceptional set is re-attributed to representations of Pavin misbehavior representation

(upper pictures), and fear and damages (lower pictures) to Humans. (Author's photographs)

(Block, SB03 to SB06 and SH01 to SH03). She mentions another “monster figure swallowing a man” in Lautenbach credences in Alsace, where a flood-dragon has also been reported (Leggin, 2003) (see previously). The Besse Abbé Blot, in his description of the church (1924), had an inkling that these stalls were uncommon, describing “*bizarre heads with closed eyelids, bulging eyes, mouth dilated by pain, scaly tongue and also a flying woman without arms, an allured flying woman*”, [the NB07, Block].

3.6.4 The Santa Martha Chapel, in Besse: Another Protection Against Pavin Disorders (1670)

The Santa Martha chapel was built in 1670 in St. André Church. There, her statue, about 1 m high, was originally standing in the middle of a dedicated wooden altar, reproduced by Blot (1924) (Fig. 3.6a). Santa Martha can be easily identified by the defeated Tarasque lying at her feet.

Santa Martha is often found in churches of cities along major rivers: she is one of the most prominent sauroctonous saints and is commonly invoked against river floods and other water disorders (Reyt 2000, 2002). As the city of Besse was built high above the thalweg of the Couze Pavin, in the headwaters area, the flood risk is limited and her presence most likely guarantees protection against the catastrophic events produced by the lake as the dragon featured in the Gloomy Lake Dragon story (Section 3.4.1) dated 1632.

3.7 Social Responses to Maar-Lakes Disorders

The social responses to lake disorders generate a second set of indicators of past maar-lakes degassing and their related latent fear. They are also very diverse and include specific constructions, still visible and/or functioning today, lake cults with specific deities and Christian communities, lake-related legends and fantastic stories featuring fantastic ani-



Fig. 3.6 Christian protection against Pavin misbehavior. (a) Santa Martha from Tarascon present at Besse Saint André church (1670) (Author's photograph). The Provence saint is a major sauroctonous – dragon-killer saint. (b). The Vassivière mountain pilgrimage in 1900 (Jaloustre 1910) (BCU library, Clermont-Ferrand). Its

modern tradition started with the June 1547 miracle event that occurred below Pavin outlet, 1.5 km from here. This site has probably been an antique pagan cult (Jaloustre 1910), possibly described by Gregorius of Tours (600 AD)

mals, as dragons, and/or marvelous events. They complement the paleolimnological approach (e.g. Chap. 23) and the historical approach (See Chap. 2).

fully at Nyos after the 1986 event follows this remediation approach (Halbwachs et al. 2004).

3.7.1 The Technical Response: Tunnels and Canals

The technical response, through tunnels or canals, generated some engineering marvels (Castellani and Dragoni 1997). In Latium, as early as 400–500 BC, repeated catastrophic lake surges and overflows during degassing were avoided by tunnels constructed across crater rims at Albano and Nemi. At Albano the tunnel excavated in 394 BC is a technical master of its time and remained in operation for more than 2300 years, maintaining the lake level at 70 m below the ridge. It can be considered as the “first prevention device” in risk management (de Benedetti et al. 2008). At Nemi a similar antique tunnel was re-used in the 1930s to lower the lake level, suggesting a similar lake overflow threat around Vth BC. The Laachersee tunnel in Eifel, dated around 1 100 AD, has a construction similar with the previous ones and serves the same function (Leidinger 2007). Other tunnels and a canal have been constructed at Averno during Antiquity, but their exact function is debated. Lake Monticchio outlet has also been connected to the nearby river by a canal excavated through the crater rim and several Eifel maars have canals (Scharf et Björk 1992). The degassing pipe installed success-

3.7.2 Lake Cults and Other Religious Responses

The pre-Christian worshipping response has been important in Italy during Antiquity. Long before the birth of Rome, in the VIIth century BC, there were major sanctuaries in the Lake Nemi lake crater, dedicated to *Diana Nemorensis*, and on the rim between Nemi and Albano craters another temple was dedicated to *Jupiter Latiaris* (Carandini 1997). There, the 3 day *Feriae Latinae* was celebrated each year by all Latium cities and sacrifices were made to the master of thunders and lightning. Considering the possible occurrence of lake disorders at Nemi, the famous gigantic Nemi ships built by Emperor Caligula could also have had a cultural function. The Averno-Cumeo site, presented as an entrance to the Hades, was also an early sanctuary and place of the Sibyl divination, which lasted from the Greek colonization of Italy to Imperial Rome. On the shores of Monticchio Piccolo Lake antique ex-votos have been found in San Michele grotto. Celtic archeological artifacts have been found on the shores of some Eifel lakes and their relation to lake cult could be checked. At Pavin pre-Christian cults and offerings are mentioned by some XIXth century authors, possibly described by Gregorius and present in the Fairies Garden legend; they remain to be found by archeological exploration.

The Christian reaction is in continuity with the previous one. Sanctuaries are also established, as early as 700s AD within the Monticchio crater. At Vassivière – Pavin an early Middle – Ages sanctuary existed. The Maria- Laach abbey was founded at Laacher See in 1093, also within the crater (Leidinger 2007). Other maar-lakes with reported disorders should be checked for such early Christian sanctuaries. They are dedicated to new powerful protectors, Santa Maria and Saint Michael. The Supreme Seraphin's miraculous attributes, lightning and thunder, were inscribed in heaven at Monticchio in the VIIIth century, according to the tradition, it could be associated with degassing events. The protection of populations is also ensured by Round-the-lake yearly celebrations at Monticchio until today and at Pulver Maar in the past (Middle Ages?), according to the Shepherd Legend, Mayer 2008, 2013; Projekt Gutenberg 2016) which can be compared to the bi- annual procession of the Virgin between Besse and Pavin. When celebrations are stopped the disorders start again (Pulver). The memory of the lake damages is also preserved for the next generations through the religious iconography as with the Besse church.

3.7.3 Maar-Lakes, one Possible Origin of Dragon Myths and Legends in Western World

Past maar- lake disorders are often personalized through fantastic creatures in legends and myths, as for other natural disorders, e.g. volcanic eruptions, tsunamis (Piccardi and Masse 2007; Vittoni et al. 2007). Lake disorders can combine atmospheric, aquatic and telluric processes; therefore they are represented by various dreadful and powerful creatures, each of them having a peculiar character and/or power.

Dragons, which combine these attributes, are commonly featured. They are powerful, they hit their victims hard, often silently and without any notice. In some cases lake degassing can produce atmospheric lightnings or methane ignition that could be taken for the famous dragon flames, a point which should be further investigated. We found at least two dragons living in maar-lake (Pavin, and possibly Albano). They may present aerial or telluric features (Caluppa's dragons). Lake dragons are still featured in 1632 at Pavin (aerial, aquatic and telluric dragon). In the early Christian tradition dragons representing Satan are defeated by the first Christian evangelisator, the saurochtonous saint. The Voragine's Silvester dragon is defeated by Silvester – around 330 AD – which generates a mass conversion of the local pagan people, still worshipping their idols (*Jupiter Latiaris* cult?), to the new Christian faith. Conversion events by a saurochtonous predicator are reported at Pavin, in the Fairies Garden legend and possibly in the lake-cult story reported by Gregorius. Near 590 AD the hermit Caluppa defeats two dragons in Auvergne, according to Gregorius, a story most likely related to a major Pavin overspill.

Saint George's dragon is probably also a maar-lake dragon: according to the *Legenda Aurea* of Voragine (1265), it was living in a lake, had a poisonous breath and had many times killed every one close to him, threatening the nearby local town. To calm the furor of the beast, the people made everyday animal and human sacrifices... The daughter of the king is chosen to be sacrificed... Suddenly the monster raised its head above the lake ... but Georges went up on his horse and, with the sign of the Cross, wound the monster with his lance. The young girl adopts the Christian faith, tames the dragon and carries him by her belt as a lead. The similarities with the known maar-lake dragons are striking; however the action is not fully dated or located by Voragine. This opens perspectives on the re-interpretation of some dragon-killer stories at the transition between pagan and Christian times. A similar dragon story is found in the Rhine Valley tales, featuring the conversion of pagan people to Christian faith, although its connexion with Eifel maars is not made.

During our analysis other fantastic creatures were found in descriptions and/or iconography: *Medusa* (Nemi, Pavin-Besse), *Hydra* (Pavin-Besse), *Mephytes* (Averno), fairies, griffons, centaurs and minotaurus (Pavin-Besse), giant fishes (Pavin, Ulmen). They could also be various representations of lake misbehaviors

3.7.4 Legends

Legends about lake disorders have a memorial function; they are the long term transcription of past disorders and another way for succeeding generations to remember lake misbehaviours and their catastrophic events. They are sometimes converted to Christian legends involving saurochtonous saints (Saint Silvester, Saint Georges). The oldest ones (e.g. Pavin Fairy garden), which refer to fantastic creatures as fairies and dragons, are more than fifteen centuries old. When lake misbehaviors occurred later during the Christian times, legends do not any more feature fantastic creatures but simply marvelous descriptions, as in Eifel maars (Pulver, Weinfeld-Toten).

The original *Pavin legends*, the Fairies Garden and Fairy Dance, are no longer fulfilling a memorial function, despite their terrifying descriptions, including Human victims: they are not localized at Pavin any more, are forgotten and even absent from all Auvergne guidebooks (see Chap. 2). In contrast, the *Pavin stories* fulfilled this remembrance function until the late XIXth century, when they were replaced by the Sunken City tale. This transfer of the past lake disorders to Besse people disorders has nearly erased Pavin's risk history and its awareness potential. In Eifel, many legends can be interpreted as maar-lakes misbehaviours as "Der Schäfer am pilvermaar" (Projekt Gutenberg #14), "Der versunkene Schloss" (Toten Maar) (#110) and "von Ulmener Maar" (#109). A systematic review of these Eifel and Rhine legends would probably reveal more of them.

3.8 General Conclusions

3.8.1 Perception and Representation of Pavin Misbehavior

3.8.1.1 Present Pavin Legends and Stories Can Be Disentangled

“*Pavin stories*” widely reported throughout the XIXth century actually results from observations made earlier, during periods of permanent degassing, such as the XVIth and early XVIIth centuries and, possibly, during singular degassing events. They included the *Thrown Stone* story and the *Whirl and Storm* story, still related by local population to visitors until the mid-XIXth century, at a time when there was no more permanent degassing evidence. These stories never called any fantastic creatures, divine or evil interventions, but instead presented sets of marvelous Pavin attributes that made this lake unique, at least in the XVIth and XVIIth centuries: a lake on top of a mountain, the absence of fish and birds, the permanent fog, the occasional boiling of water, the sudden storms with thunder and lightning triggered or not by a stone thrown into the lake. Some of them were refuted by Chevalier in 1770, such as the “bottomless” lake and the “lake fed by unknown waters inputs”, then by scholars and authorities who started to label these stories as tales and legends, and dismantled them one by one. All ignored the rare misbehaviour event officially reported in 1783 by chatelain Godivel. This position will be endorsed by all visitors to Pavin, may they be guidebooks authors, famous geographers or encyclopaedists during the XIXth century. Absolute refutation of all Pavin stories was achieved through the introduction of fish by Lecoq in 1859 and the uncessful Thrown stone experiment, performed since the late XVIIth until the mid-XIXth centuries and presented as absolute proofs of the fallacy of all Pavin stories.

The *Sunken City*, the most commonly quoted Pavin legend today is very recent; it is absent from Sébillot’s main work on French folklore (1904–1906). Prompted by the absence of fish in this “Auvergne Dead Sea” (Lecoq 1871), by the findings of a carved stone within the lake and by a historical novel featuring a former castle on the lakeshore, it was generated in the early 1900s and rapidly promoted in guidebooks as a touristic asset. In this legend the lake misconduct has been shifted to the people misconduct. Sébillot and others after him (Reyt 2000, 2002) postulated that this tale, common in many lakes, refers to the biblical myth of Sodom and Gomorrah being punished for their transgressions. Our analysis shows *Sunken Cities* tales may also be grounded on other natural phenomena.

The *Thrown Stone* that triggers thunder, lightning and storms at Pavin, as reported by cosmographer Belleforest in 1575, is the most quoted Pavin story during the XVIIth and XVIIIth century. When comparing with other available his-

torical sources on Pavin, this description fits well with the state of the lake at the time, probably close to CO₂ saturation. However, Belleforest used a stereotyped story-motif that appears to be much older, used for at least two high mountain lakes, very different from maar-lakes: in Canigou (Pyrenees) by Gervaise of Tilbury (c. 1155–1234) and Pilatus in the XVth century (Swiss Alps). The occurrence of the Thrown stone story in these lakes remains to be further addressed.

The *Dragon of the Gloomy Lake* (1632), which describes, in a remarkable fantastic tone, the encounter of a passer-by with a dragon can be precisely located near the Pavin outlet ravine, as probably for the 1547 founding miracle of Vassivière. The details of this encounter, the rescue of the hero and the buboes legacy are very coherent with a sudden lake overspill and a mudflow emitted by the lake, here represented as a furious dragon, a representation of river disorders and other natural risks still wide-spread at that time. It could be a “canard”, the short-stories that pre-figured newspapers.

3.8.1.2 Pavin Fairies and Dragons Are Anchored in Pre and Early Christian Times

Two original Pavin legends have been found: the *Fairies Dance* and the *Fairies Garden*. Both present Pavin and its area before the Christian era. They report its marvelous events as fantastic creatures, fairies and dragon. The *Fairies Garden*, kept in church archives (Soubrier 1893), appears to be the genuine Pavin legend. It remained so far un-analysed. It describes Pavin with great details, although with a fantastic tone appropriate to the pre-Christian period: the lake crater was an extraordinary castle guarded by different sorts of fairies and a powerful dragons, each of them corresponding to various intensities of degassing processes: permanent vapours, water fountains, gas emission, lake overflows through the lake outlet of toxic gas, water and mud (a fairy followed by a dragon). Other famous Pavin attributes, as thunder and lightning, are also present as the grinding teeth and ferocious eyes of the dragon. The castle and its creatures were much feared and were worshipped each year by local people for hundred of years through offerings and human sacrifices, until the first evangelisator in this area puts an end to this pagan cult. The *Fairy Dance* legend features only fairies, some lure then enthralls the passer-by (possibly the CO₂ emission through the outlet), while others with flaming heads, can cause burns, suggesting fumaroles which could have given its name to *Montchal* volcano adjacent to Pavin (scorching mountain).

The *Caluppa dragons* encounter, dated around 580–590 AD and reported by Gregorius of Tours refers to a major overspill of Pavin, probably triggered by an earthquake and recorded in sedimentary archives (Chap. 23). The encounter location could be the Jonas cave. The first

dragon corresponds to the CO₂ cloud, followed by the mud-flow (second dragon).

The *Pagan Lake Cult* text by Gregorius of Tours (600s AD) features a worshipped lake in Helanus Mountain in the Gabbales territory. There, the lake cult, performed each year by all local people over 3 days, with offerings and feasting, ends with great thunder, lightning and storm. Until now this well-known text was attributed to Lake St. Andéol, a high plateau lake in Gevaudan, some 150 km away from Pavin, not likely to have any lake disorders, but where Lake Cult has also been performed. Many arguments can be raised to re-attribute it to Pavin. If so, this text could correspond to Pavin celebrations during Antiquity, as mentioned by Father Coysard (1615) and by historians at the end of the XIXth century (Julian 1901; Jaloustre 1910) and would be very coherent with the Fairies Garden legend.

This type of lake cult at Pavin is very similar to the *Feriae Latinae* held each year by all Latium cities, from the VIIth century BC to the IVth century AD, at the *Jupiter Latiaris* temple located at Monte Cavo, on the rim between two Albano and Nemi maar- Lakes, near Rome. There, in Latium, Jupiter's attributes are thunder and lightning, also frequently mentioned at Pavin. The connection between the *Feriae Latinae*, certainly known in Auvergne by the Roman builders of the *Mons Aureus* baths (now Mont Dore), with a lake cult at Pavin during the Roman period remains to be investigated. It is likely that *Lacus pavens*, the terrible lake, the ancient original name of Pavin since a long time, according to Banc (1605) and Godivel II (1650s), has acquired its reputation during the Roman period.

3.8.1.3 Pavin Fear Is Omni-Present in the Besse-Vassivière Christian Tradition

The peculiar history and iconography of the Besse-Vassivière Christian sanctuaries are probably in continuity of an early pagan cult of Pavin. At Vassivière mountain, 1.5 km from Pavin (1300 m asl elevation), there was an early Christian sanctuary, dismantled in 1321 AD by the local lord of La Tour due to its "profane" use. According to some XIXth century historians it could have been built on previous celtic settlement, although this hypothesis, not retained by contemporary historians, should be confirmed by archaeological research. If the Gregorius lake cult text is re-attributed to Pavin, this first chapel could correspond to the one built "away from the lake". During the Middle Ages few dozens of priests were present in the small city of Besse, about one thousand inhabitants, 4 km from Pavin. They were authorized to grow to sixty in 1498, by Pope Alexander VI, a possible sign of the religious importance for this area.

In June 1547 a degassing event occurring at Pavin lake outlet – in our interpretation – shocked one person blind (he recovered his sight later). At a time of regional tension

between Protestants and Catholics, this was quickly considered as a miracle which permitted the construction of a chapel on Vassivière Mountain in the 1550s and the start of a famous pilgrimage, recognized by the Queen Catherine de Medicis and still attended today. From 1547 to the Revolution the ecclesiastic authorities kept a register of all "miracles" attributed to the Vassivière Virgin. Some of these miracles, highly contextualized, feature odd events near Pavin and/or damages to populations that can be linked to Pavin disorders.

The iconography of Besse Saint André Church (XIIth–XVIIth century) features many brutal, bizarre or fantastic scenes that can be re-interpreted in light of Pavin rich and violent history. Its set of misericords (1570s) is unique in France, featuring various damages to Humans, a set of suffering heads, while other present fantastic creatures, flying or terrestrial, some described previously by scholars as *Medusa* and *Hydra, Tarasque* (the dragon of aquatic disorders), all possible metaphors of Pavin disorders. The chapel dedicated to Santa Martha (1670s), the patron saint against natural aquatic disorders, completes the protection package. The close relation between Pavin, the Vassivière pilgrimage and Besse was still told by local people to Taylor and Nodier in 1823, but remained undescribed in latter Pavin descriptions.

3.8.1.4 New Insight on Pavin State and Behaviour: Antiquity and Middle Age

Legends and religious iconography add new information on Pavin state during the Antiquity and Middle Ages, and confirm the historical sources (Chap. 2). There is a convergence of independent sources indicating that *Lacus pavens* was already a dreadful place in Antiquity, possibly before the conquest of Gaul by the Romans and most certainly after. Major storm events were taking place at that time, together with some periods of quiescence: when Pompeian-type millstones were extracted within the crater. However it did not last long when considering the major catastrophic event – the Caluppa dragons' encounter – around 590 AD.

The "Profane celebrations" which took place at Vassivière, resulting in the early church being dismantled in 1321 AD by order of the local lord, could be related to some re-activation of Pagan rites following the major lake overflow -dated around 1300- and observed in paleolimnology records and from the Couze Pavin valley mudflow sediments. The analysis of Besse and Couze Pavin valley archives for the Middle Ages period remains to be realized.

The Vassivière register lists multiple events that could be related to Pavin disorders (e.g. 1547, 1551). The 1632 fantastic dragon story complements the list. They are in coherence with the historical sources describing Pavin for that period dated 1566, 1575, 1605, and mid-XVIIth century (Godivel manuscript). For more than 100 years Pavin had a continu-

ous, although not so violent, degassing activity: daily emission of vapors, frequent thunder and lightning and occasionally (1632?) an overspill in the Couze Pavin outlet.

3.8.2 Pavin Multiple Patrimonial Value

We have already pointed out the Pavin naturalness (Meybeck 2010), its prominent position in the development of French limnology (see Chap. 1) and its specificity among all other Auvergne lakes (Chaps. 1 and 2). In comparison to the Eifel and Latium lakes, the Pavin basin is still in a subpristine condition, but it is now impacted by recent nutrient inputs. Monticchio lakes present a limited Human impact but are more eutrophic than Pavin. Other exceptional characteristics of Pavin are unveiled in this volume: maar-lake origin, very “hollow” lake, water budget dominated by rain and groundwater inputs, near-total absence of detrital material input, very simple trophic networks, meromixis, sub-lacustrine hydrothermal inputs of CO₂ and dissolved salts, inversed temperature gradient in deep waters, stable and complex chemoclines, specific Archaea and Bacteria communities, laminated diatomite etc.

The extraordinary position of Pavin-Vassivière within local Auvergne history, culture, religion, science and folklore adds another dimension to the exceptional importance of this area. This high patrimonial value at the European level, as a natural and cultural site, is not recognized so far. Today, Pavin is only mentioned in regional guidebooks for its beautiful landscape, its fish and its forged Sunken City legend. The scientific and/or cultural richness of Pavin, highly celebrated 100 years ago (Ajalbert 1896; Cany et al. 1916; Pourrat 1935), is now omitted. Pavin is not even recognized as a geological marvel: it is absent from most national geological and/or volcanological registers established in France (de Wever et al. 2006) and from international geotourism registers (Newsome and Dowling 2010). The marvelous Fairies Garden legend or the Dragon of the Gloomy Lake story should be recognized and replace the Sunken city tale. Pavin classification as a remarkable European natural and cultural site has been proposed (Meybeck 2010).

3.8.3 Ancient Descriptions of Maar-Lakes Events Should Be Considered in Present Risk Analysis

Our study registered or postulated Lake misconducts in a dozen volcanic maar-lakes, in Italy (five lakes), Germany (Eifel, four lakes) and in Auvergne (Pavin), and in Cameroun (Monoun and Nyos) *i.e.* of the order of one lake out of 10 000 in Europe. At each of these locations past lake “misbehaviors”, *i.e.* a threatening deviation from the normal functioning of a still water body (Shanklin 1989), have been perceived,

reported, and often memorized across ages. These disorders present a great variability of symptoms, intensity and temporality. They can be frequent or permanent, with vapour emissions such as in Averno’s case and/or with small water fountains, as at Ulmen. Sometimes these disorders are sudden, powerful or violent causing great damages in the riparian and/or downstream populations, their settlements, crops or live-stocks, as is noted at Albano, Pavin and Pulver. When possible, the Longue durée analysis (1000 years) shows evidence of long secular periods of quiescence between periods of activity and/or sudden burst. These past lake misconducts have been described, sometimes not explicitly, over 2000 years by many major European authors: Plutarch, Virgil, Julius Obsequens, Gregorius, Jacobus de Voragine, Belleforest, Münster etc. Most of the time they simply presented lake disorders, as Nature *prodigii* or “marvels”. Sometimes they featured them as powerful fantastic creatures.

Modern scientists and historians have so far failed to collect, compare or explain these extra-ordinary behaviors which occurred rarely, at different periods and in different places over 2500 years or more. Even the best volcanologists of their times, the Naples scientists, did not make the relation between lake legends and myths at Averno or Albano and the degassing they were observing at the Monticchio lakes, between 1770 and 1830. When they stopped their studies on Monticchio lakes, their observations were gradually forgotten. When the Nios event occurred in 1986, there was no scientific ground to interpret lake misbehaviors (the 1984 Monoun event analysis by Sigurdson was still in press): limnology and volcanology textbooks were totally ignorant of limnic eruptions and other degassing processes before 2000s and contemporary historians ignored, unanalyzed or untrusted the past lake stories, as for Pavin, until some of them were unearthed in the 2000s by Italian Earth scientists (De Benedetti et al. 2008).

3.8.4 The Necessary Interdisciplinary Interpretation in Maar-Lakes Study

The historical research on maar-lakes is necessary. In 2009, Caracausi, a volcanologists from INVG in Palermo working on Monticchio lakes concluded: “*Our historical investigations have allowed us more completely to assess the gas-hazard scenario of this [Monticchio] area, and we have come to the conclusion that triggering processes totally different from a landslide and/or a seismic shock should also be taken into due consideration. In fact, there have been gas bursts in both the Monticchio Lakes up to no later than 200 years ago, which indicates that they have a recurring character, even if the temporal intervals have not been constant...The possibilities of gas eruption, triggered by crustal accumulation of mantle-derived CO₂ and/or the resuming of explosive volcanic activity*

cannot be ruled out. For those reasons, in our opinion, further investigations are strongly recommended. Therefore, we hope that our results will draw attention towards all those crater lakes located in volcanic areas apparently no longer active with a special attention to those situated in areas of tourist interest, where gas risk is probably underestimated or even ignored” (Caracausi et al. 2009).

Our research on Pavin Longue Durée evolution and its perception by local people has mixed various disciplinary approaches and we are away of its limitations, being untrained in many of them. Our analysis greatly benefitted from the inter-comparison between Pavin and other maar-lakes: all of them present evidence or suspicion of past misbehavior! We also greatly benefited from the findings, in the last 3 years, of paleolimnologists (See Chap. 23), which confirmed our 2010 hypothesis on Pavin misbehavior and vice-versa (Chassiot et al. 2016).

The Pavin case study is also an illustration of the importance of geomorphology in maar-lakes. The folklore historians of the XIXth and XXth centuries who collected lake legends (e.g. Soubrier, De Ribier, Reynouard, Pourrat in Auvergne, Sébillot in France, Thompson, Van Gennep in Europe), could not interpret them as signs of past lake disorders, as these were discovered only after 1986. Until recently (Piccardi and Masse 2007) lake scientists had no shared interest nor means communication of with folklore specialists or historians and vice-versa. An interdisciplinary approach is therefore needed. It was initiated in the hydrology field by Back (1981) and gave remarkable results for the analysis of descriptions of the marvelous coastal freshwater springs in Antique Greece (karsts inputs) (Clendenon 2009a, b, 2010) and started to be used at Nyos (Le Guern et al. 1992; Shanklin 1989, 2007). Geomorphology is now well developed in Italy (e.g. Piccardi 2005; Funicello et al. 2003). Such interdisciplinary approach has already been used with great success in other fields as the ethno-botanical and ethno-pharmaceutical research.

The systematic analysis of maar-lakes legends, myths, folklore, religious history and their associated fears, beliefs and representations should now be continued in Europe and also in Oceania, South America, Asia, and East Africa. It would probably bring evidence of past lake disorders in these regions and therefore of their degassing risks and processes. This needs an interdisciplinary approach and intercomparisons across time and space.

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