

Georgius Agricola, *De Animantibus Subterraneis*, 1549 and 1556: A Translation of a Renaissance Essay in Zoology and Natural History

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Georgius Agricola (1494–1555) is well known for his geological publications, especially his masterpiece, *De Re Metallica* (1556), over 500 pages of text illustrated with more than 250 beautiful and instructive woodcuts. Historians of medicines also have studied him for his work on disease. But in 1549, he published a short treatise on animals known to exist in the subsurface. This essay is a compendium of what Greek, Latin, and medieval authorities wrote about these animals, but, unlike many of his contemporaries, Agricola supplemented those writings with his own observations, and he posed questions about the existence of some of the fanciful beasts described by his forbearers. Of special interest to paleontologists and zoologists is an “index” at the end where Agricola groups animals by their form of locomotion—walking, crawling, swimming, flying, burrowing—as well as the occasional use of binomens, following in the footsteps of several contemporary herbalists. *De Animantibus Subterraneis* appeared again as an appendix to *De Re Metallica*, an updated reprint of the 1549 work set in a folio format. Curiously, when Lou Henry Hoover and Herbert Hoover published their masterful annotated English translation of *De Re Metallica* in 1912, they did not include the essay on animals. Consequently, it is not well known to English-speaking scholars, although it was cited by some of Agricola’s contemporaries, including Conrad Gessner. Then why has Agricola been ignored? Agricola’s *De Re Metallica* was copiously illustrated, as were the works of Gessner and Ulisse Aldrovandi. Thus, even those not fluent in Latin could, with some effort, understand these authors’ intentions by reference to the pictures. But not so with Agricola’s *De Animantibus Subterraneis*, which was not illustrated. However, neglecting *De Animantibus Subterraneis* makes Agricola too much of a specialist, whereas as a Renaissance scholar his interests spanned many disciplines. To increase the awareness of Agricola’s essay on subterranean animals among English-speaking zoologists and historians of science, we offer a functional translation of the 1556 version of his work, which represents his final contribution to the field of biology.

In 1912, Lou Henry Hoover and Herbert Clark Hoover published an annotated translation of Georgius Agricola’s *De Re Metallica* (1556), a masterpiece on Renaissance mining. They included facsimiles of the approximately one hundred woodcuts, making a very attractive volume of which 3,000 copies were printed (a Dover reprint of their edition appeared in 1950, further increasing the knowledge and availability of Agricola’s work).

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The Hoovers did not include all of the 1556 book, however. The original, as its last chapter, also contained *De Animantibus Subterraneis* (hereafter DAS), a revised edition of Agricola's essay on underground animals that first appeared in 1549 as a separate treatise. DAS was also not included in the 1557 translation of *De Re Metallica* from Latin to German, but in the modern German compilation and translation of all of Agricola's publications, the editors prepared a German translation for the first time (1961) to our knowledge. In the following pages, Lindsay Sears, a graduate student in Classics at Cornell University, presents the first translation of DAS into English. Although she had the German translation available to her, she translated directly from a photocopy of the 1556 Latin version that is in the Rare Book Room of the United States Library of Congress.

The English text that appears below belongs to the functional tradition of translation; it is designed to be of use to today's zoologists and historians of science. We are well aware of the limitations of this style, as outlined by translation theorists such as Andre LeFevre (1992) and Maria Tymoczko (1999). In preparing for a modern readership, one must be on guard not to alter the text to make Agricola into a 21st century, or even an 18th century, zoologist. Also, in following the rules of modern English, we have changed Agricola's language in ways that do not reflect Renaissance style, for example, by eliminating the double negatives that were considered a hallmark of elegant writing in his day. Having said this, we did do some light editing, such as substituting "that" for "which," in line with present-day rules of English grammar, and selecting of several more appropriate English synonyms for such Latin terms as *At*, meaning but, yet, on the contrary, at least, and *contra*, meaning against, opposite to, on the contrary, otherwise, on the other hand, this to render the text more readable. We include a facsimile of the 1556 text for those who prefer the original Latin.

GEORGIUS AGRICOLA: A BIOGRAPHICAL SKETCH

Georgius Agricola Latinized his name as an adult; he was born as Georg Bauer or Pauer in Glauchau, Germany on 24 March 1494. His father was a master cloth maker; one of Agricola's



BASILEAE M D LVI

Cum Priuilegio Imperatoris in annos v.
& Galliarum Regis ad Sexennium.

FIGURE 1. Title page of Agricola, *De Re Metallica* (1556), with the reference to the DAS chapter shaded (by the authors for reference).

brothers continued in that trade and another became a priest. Details of his early schooling are not definitively known but he attended Latin schools in the region before enrolling at the University of Leipzig, 1514–1518. In those years, the most intense new scholarship at Leipzig centered on Greek and Hebrew; Agricola learned Greek and as a schoolmaster in Zwickau (1518–1522), started instruction in the language there and published his first work, a Latin grammar. When Lutheran reformers made life for the Catholic schoolmaster uncomfortable, Agricola returned briefly to Leipzig to start training as a physician and then departed for Italy (1523–1526), where he studied medicine and also worked with an international group of scholars translating and editing works by Galen and Hippocrates. In 1526, he set up as a physician and apothecary in the silver mining town of Joachimstahl, Czechoslovakia. There he began his life's work on recovering ancient knowledge of science and technology as applied to the underground, mostly to mining but also to the topic at hand, subterranean animals. (Hannaway 1992.)

In 1530, Agricola published *Bermannus*, a dialogue among two physicians and a mining expert discussing mining methods and the ailments of miners and how to treat them. The book brought ancient texts in Greek and Latin to bear on the problem, merging that knowledge with modern experience. Thanks in part to a letter of endorsement by Erasmus, whom Agricola had met years earlier, it was published in Basel by a printer with an international distribution. Shortly thereafter, Agricola moved to the mining city of Chemitz as town physician. He successfully invested in mining partnerships, building the wealth that supported his life as a scholar. He continued to publish books that merged ancient and contemporary knowledge of mining, mineralogy, and paleontology, culminating in his masterpiece, *De Re Metallica* (1556), a book that included the revised version of DAS. During the 1540s and 1550s, he also became involved in civic and political life on the municipal, regional, and national level. This included his heroic work as a physician during the plague epidemic in Saxony in 1552–1553, memorialized in his one medical book, *De Peste* (1554). He died in Chemitz on November 21, 1555. (Dibner 1958; Wolsdorf 1970.)



FIGURE 2. Woodcut image of Georgius Agricola.

DAS IN THE CONTEXT OF ITS DAY

DAS is Agricola's compendium of ancient (Greek and Latin, plus a few medieval compilers) knowledge about animals that live underground for at least part of their lives. He had spent a life time immersing himself in ancient texts, but brought a critical view and his own observations to bear on what he learned from them.

Agricola's essay differed from two earlier traditions of writing about animals. Medieval bestiaries were manuscripts, not printed books, and thus limited to local readership. They were a form of allegorical Christian literature in which the stories about animals illustrated moral lessons and the handiwork of God. Bestiaries were often beautifully illustrated with carefully executed hand-painted drawings in full color. On the other hand, there are no pictures in DAS, even though *De Re Metallica* was richly endowed with images of mining. DAS also differed from medieval encyclo-

TABLE 1. Agricola's List of Authorities⁴ for *De Animantibus Subterraneis*¹

Claudius Aelianus, 175–235, Roman rhetorician
Albertus Magnus, 1206–1280, German theologian
Alexander Aphrodisianus, fl. 190–220, Greek philosopher
Ammonius, 435–517, Greek philosopher
⁵ Aratus, 315–206 BC, Greek poet
Aristotle, 384–322 BC, Greek philosopher
Aristophanes, 446–386 BC, Greek dramatist
Athenaeus, fl. 190–210, Greek grammarian
⁵ John Cassianus, 360–435, Roman theologian
Flavius Charisius, fl. 4 th century AD, Latin grammarian
Cicero, 106–43 BC, Roman statesman and orator
Lucius Columella, 4–70, Roman agricultural writer
Cornelius Tacitus, 56–117, Roman historian
Pedanius Dioscorides, 40–90, Greek physician and botanist in Rome
Galen, 129–200, Roman physician
Homer, 8 th c. BC Greek poet(s)
Horace, 65–8 BC, Roman poet
Jornandes, 6 th c. Roman historian
Lucanus [Lucan], 39–65, Roman poet
Martialis, ca. 40–105, Roman poet
Nicander, 2 nd c. BC, Greek physician
Oppianus, 2 nd /3 rd c. AD, Greek poet on fishing and hunting
Ovid, 43 BC–17 AD, Roman poet
Plautus, 254–184 BC, Roman playwright
Pliny the Elder, 23–79, Roman naturalist
Michael Psellos, 1017(or 18)–(after) 1078, Byzantine writer
Seneca, 4 BC–65 AD, Roman humanist
⁵ Servius, fl. 420 AD, Latin grammarian
Strabo, 63 BC–24 AD, Greek geographer
Theophrastus, 370–285 BC, Greek philosopher
Marcus Varro, 116–27 BC, Roman historian
Virgil, 70–19 BC, Roman poet
Xenophon, 431–355 BC, Greek historian

⁴ Names have been modernized and Anglicized to permit searching. Dates are from Web sources and may not be reliable; AD is assumed unless otherwise mentioned. ⁵ Listed in 1556 edition but not in 1549

pedias, which were reference works that were usually alphabetically arranged without attempts at classification schemes.

His respect for ancient texts led Agricola into some problems in DAS. For one, he reported uncritically on some fables about animals, such as foxes that fish with their tails (Fig. 3). This legend can be traced back at least to Claudius Aelianus (Gudger 1955), who is one of his sources. Second, his text is dotted with fabulous animals — dragons, basilisks, footless birds — that were also common in other 16th century zoological works, such as those by Conrad Gesner [also as Gessner] and Ulysses Aldrovandi (Fig. 4). Mystical beasts were not eliminated from zoological writings until those books came to include only animals that had been observed by the naturalist. (Nigg 1999.)

Sometimes Agricola reports on beasts in such a way that the reader senses he is paraphrasing sources but not necessarily endorsing the idea. Consider, for example, his discussion of devils that live underground, a notion he attributes to theologians without further comment. (A good Catholic,

Agricola wrote this essay and his other books in such a way as to receive the Church's imprimatur, an aid to their acceptance that did not always come to Aldrovandi [Gould 2003]). In other cases, throughout the essay, he supplements with his own observations, even contradicting what his forebearers had said (e.g., Lucanus, p. 497, para. 1; Nicander, p. 496, para. 4; Pliny, p. 496, para. 4; Theophrastus, p. 501, para. 6). As Owen Hannaway (1992) said of all of Agricola's writing, he combined humanistic, literary scholarship with scientific, observational study.

Agricola categorized underground animals into those who stay in the earth during the day or night, those that live underground, or at least under cover, such as in hollows in trees, during part of the year to avoid heat or cold, and those that are under the surface all of the time. There was some overlap among these categories. He then arranges the animals into loosely connected groups, such as weasels, owls, and fish. Humans are discussed as animals through the book. In describing individual animals, Agricola remarks on their behavior — feeding, prey/predator relationships, hibernation, migration, habitat choices and changes, and some observations on reproduction — but not for all his cases. In dealing with morphology, he notes shape, size, and color, but adds little about physiology or internal organs. He does not list all features for each beast; this was not a reference work, but an essay. DAS approaches a modern natural history, but it is more discursive and in that sense closer to the storytelling tradition of the medieval bestiary. With its focus on one environment, the underground, and attention to the actions among animals, DAS has the feel of an ecological approach. Agricola wrote in a lively style, drawing good word pictures of animals and enjoying puns on their names.

In his other publications, Agricola had included classification schemes for natural materials such as minerals and ores. As for zoology, histories of classification tend to go from Aristotle to Linnaeus nonstop, with the important exception of Hunemorder (1983). That makes it hard to position DAS, which is not primarily a work of taxonomy in the first place. However, the way Agricola indexed animals in the back of DAS provides clues as to how he classified them (see below). One such list was of Latin names with their German counterparts alongside. As Hammaway (1992) remarked, this was a common feature in most of Agricola's books and provided a way for the read-



FIGURE 3. From Olaus Magnus (1555), a fox fishing with its tail (after Gudger 1953).

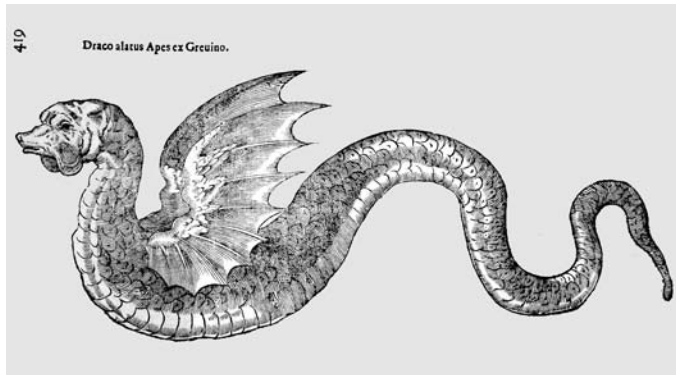


FIGURE 4. *Draco alatus* (from Aldrovandi, 1640, ex Greuini, 1571).

er to go from the ancient to the contemporary, from words and language to things and observation, from humanities to science.

Another index grouped animals by locomotion, those that walked, flew, swam, or crawled. Two other groups, worms and dragons, were listed separately. Aristotle had tried a scheme based on motion and abandoned it (Pellegrin 1982). Agricola's system ran into some problems, notably with reptiles and amphibians. Frogs and crocodiles swim and walk, sea snakes swim but other snakes slither about on land. Many of the shifts in where beasts appeared on the list between the 1549 edition of DAS and the 1556 version occurred in these groups, reflecting Agricola's awareness of the problem. Another issue arose with bats, which flew but were otherwise akin to mice and other rodents. And, although Agricola carefully details how much more closely bats resemble mammals, i.e., "mice," than birds, he lists them among the "flying" animals in his Index and groups them with birds on page 485. It was not until the 17th century that the assignment of bats to mammals was settled by John Willoughby.

Agricola's lists demonstrate a casual and partial use of binomial and trinomial names (e.g., *Mus alpinus*, *Mus araneus*, *Mus agrestis*, *Mustela domestica*, *Mustela sylvestris*, *Rana rubeta*, *Rana temporaria*, and others (see below)). Binomialism was gradually introduced well before the 18th century. Philosophers of science do not agree on whether Aristotle conceived of what are now termed genus and species (Pellegrin 1982). Isidore, for instance, employed some binomens in the 7th century, and by the 16th century (Hunemörder 1983), they were as common in Gesner and Aldrovandi as in Agricola. Nevertheless, the most important breakthrough occurred with Linnaeus, who applied the concept of genus and species not here and there but systematically throughout the entire plant and animal community.

DAS's influence on subsequent zoology was modest. Because he wrote of underground animals, he emphasized groups that had been relatively neglected in earlier works. George and Yapp (1991) document the scant attention given these animals in medieval bestiaries. Gesner and Aldrovandi both referred to Agricola's essay in their major compendia. Linnaeus did not cite Agricola, but he did cite the other two. DAS did not attract wide attention in part because, unlike the other Renaissance zoologies, for instance, Gesner, Greuini, and Aldrovandi, it was not illustrated. This contrasts sharply to the widespread recognition afforded *De Re Metallica*, with its numerous beautiful and instructive woodcuts. Historians of science will appreciate DAS for the new dimension it gives to Agricola. When added back to *De Re Metallica*, the treatise changes Agricola from a geologist to an earth scientist — a scholar who studied the animals as well as physical structure of the earth.



FIGURE 5. Images of amphibians and reptiles (from Gesner, 1560).

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[NB: Librarians give Agricola's first name variously as Georg, Georgii, Georgio, and Georgius. His name on the title pages of his works is given as Georgius Agricola, which is correct, but if it is cited as Agricola, then Georgius is correct.]

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Editors' note: In using page breaks (numbers in [xxx]), it must be borne in mind that the breaks may not exactly coincide with the original Latin text because of the translation and reordering of words. Thus, several words of Latin text may, in fact, appear on the following page and not precisely where the break is indicated. However, this should not be a problem inasmuch as the "spill over" never exceeds a half dozen words. Also, it must be noted that paragraph breaks are based on "best estimates" to enhance readability; there are relatively few clear-cut paragraph breaks in Agricola's *De Animantibus Subterraneis*. Lastly, we have included in brackets and boldfaced [xxxxx] cross-references to Agricola's Index for animal names; in several instances, we have added a present-day common or vernacular name in brackets. The latter are identified by "eds." appended to the addition. Also in brackets, but not boldfaced, are comments indicating our uncertainty as to what animal Agricola had in mind because we have been unable to trace the identity. Furthermore, Agricola often used colons, not semicolons (which did not come into use until 1644) or periods, where in modern English, one or the other would be more appropriate. In this translation, we have retained Agricola's colons in places where semicolons would be more appropriate but for readability have introduced periods to end a sentence.

De Animantibus Subterraneis

Translation of G. Agricola, *De Animantibus Subterraneis* (1556 edition)
by Lindsay L. Sears, July-August 2007

Letter of Dedication

Georgius Agricola sends greetings to Georgius Fabricius

[478] Although Aristotle wrote two books on plants, nevertheless these did not deter his student Theophrastus from explaining his own thoughts concerning these same plants in many books. And Theophrastus himself did not extinguish the zeal and ardor for Dioscorides by means of such great knowledge and such great abundance, but in service to posterity, he entrusted the features and powers of certain trees and plants, learned by long and extensive practice, to the pages of literature. For his studies would have held him poorly, if it had been permitted for people living in later ages to add nothing to those things that had been discovered by the ancestors. Certainly if the Greeks had accepted this unfair rule, no skill, no knowledge, and no discipline could have been carried out. For this reason, although Aristotle put forth many books, in which he pursued the natures, parts, and origins of animals by way of reason, nevertheless he was unwilling to take away those things already dedicated to philosophy, nor should he have, not only out of the zeal for seeking knowledge and revealing to later generations the natures of these animals, about which he wrote little or nothing, but also a zeal for discussing places, which he had not explained enough in these books. 478

And in this way, even among the Greeks, Oppianus wrote about fish, and Porphyrius and Aelianus wrote about the nature of animals. Likewise among the Romans, Ovid wrote about fish, and Pliny wrote about almost all of the animals. I am following in the footsteps of these writers, since I have explained in many books those subterranean things that lack life, so that I might sum up the established reasoning, as much as it can be done, and I have also described the subterranean animals: not only those which live in the earth almost all the time, but also those that are accustomed to hide in the earth during certain seasons of the year. Moreover, in the same way, I wished to explain more extensively both the forms of certain animals either unknown to Aristotle and others or explained very little, and the place where these animals hide themselves during the winter months. If I show this book to you who are learned in the early literature of the Greeks and Romans, you will examine carefully the natures of animals and you have already grasped the knowledge of many of them, and I will show this more easily, as I hope, to others who especially enjoy the study of secret matters. Farewell from Chemnitz, written on the Ides of August in the year 1548.

De Animantibus Subterraneis

479 [479] A subterranean body, as the name itself demonstrates, is classified into the animate and inanimate. Moreover, what is void of life is subdivided into that which spontaneously erupts from the earth under its own power, and that which is dug out of the earth. I have spoken about the former inanimate class in four books written about the nature of those things which flow from the earth: I have spoken about the latter in ten books written about the nature of fossils [which in the classic sense included minerals and their extraction from the earth, i.e., mining].

Now I will speak about subterranean creatures. Because the entire class of animate beings is actually based on four elements, and inasmuch as wet and dry material, i.e. water and earth, are available to be used, it is necessary that these two elements themselves be the physical basis of animate matter. From this fact, it follows, moreover, by a certain necessity of nature, that every animal is born either in the water or on land, dwells in both places and enjoys life. For instance, flying creatures, if they fly everywhere through the air, nevertheless construct nests on land, either in plants growing from the earth, or on buildings situated above it, and either the earth or the water supplies them with food. For instance, so that they might be named correctly, certain rare birds which are not very big, which have long wings, and which are distinguished by their somewhat pale yellow coloring, the sultan of Turkey wears on the highest part of his crown which is adorned with many precious gems, so that they live out the course of their lives perpetually in the air. He accommodates the female, which lays her eggs upon the curved back of the male, similarly the eggs, placed there, lie on her curved stomach, and she prevents the chicks, not yet alive, from touching the earth with feet, which are very small and hidden among their plumage. Nevertheless, they do not seem to be able to be nourished only in the air, nor are they able to develop fully, but they enjoy these things.

And truly even beasties [insects], which are named by the Greeks *purigonoi* [those generated by fire], because they are born in that terrestrial fire, lack neither earth nor water. Moreover, they are born, as Aristotle writes, in the very furnaces of Cyprus, in which copper ore is smelted for many days: and they are winged and a little larger than the great gadflies. In the fire, they wander and jump about, but they die as soon as they are separated from it.

Some of the animals, on the contrary, even if they are accustomed to hide, do not come up through cracks in the earth, nor through holes, nor caves: these are not among the number of subterranean creatures: some are active by night or during the day in subterranean caverns, some at a certain time of the year: both of these are considered subterranean animals on that very day or at that time of the year that they are under the earth's surface, and they can be referred to as such. Some generally hide in the earth in perpetual secrecy: these are subterranean and are always so, and are appropriately called "subterranean animals."

But in order that the matter might become clearer and better explained, I will begin a little higher. Since by nature all animals are aware of the change of the seasons, the majority, for the sake of avoiding cold or heat, either change their region or specific location, or they enter their respective dwellings — trees that are either hollow or carved out — or they descend into the earth. Moreover, of those which change their region [migrate], some, having left, never even return once, others return habitually: they are accustomed never to return as sharers of the property: humankind belong to this group. And as a matter of fact these establish their residence elsewhere not only for
480 the sake of avoiding cold or heat, [480] but they also move away from those regions which are poor and produce nothing to lands which are better and fertile, or if such a great number of people are born that the region cannot comfortably provide enough nourishment, some go elsewhere to live.

Certainly in this way, one area or part of the earth often lays aside the burden by which it is

being crushed [over-population migration] onto another region. For these reasons, Scandia, the greatest of all the peninsulas, once sent out a great abundance of Goths together with their wives and children into Sarmatia and Dacia. To be sure, the floods of the sea drove out the Cymbri and the Teutoni from the farthest shores of Northern Gaul, where they had emigrated to from Germany. The inhabitants from Aenaria, whom Hiero, the tyrant of Syracuse, had sent there, were driven out by the same floods, as well as earthquakes, volcanic eruptions, and geysers of hot water. And generally for these reasons the conquered peoples who emigrated from these places were driven out and flung from their own homes and property, and in turn, they themselves even invaded foreign territories and overtook them. Those subjugated and overpowered by war were either slaves to their conquerors, or they were so defeated that the victors occupy that very region with a general condition of freedom.

In a similar way, animals that are lacking reason, especially birds, never gather to return to lands that are foreign from those where they were born and became accustomed to live. This occurs only very rarely. In this way, six years ago, the locust plague, devastating to grass, legumes, grain, and woody plants, which they destroy, in a flock descended upon the city of Pannonia, in Dacia, upon the ancient region of the Marcomannian people, and upon Lygia, just as formerly they often descended from Africa on the other European countries. In fact, sometimes when a single man disappears in remote regions, and does not ever come back from there, in the same way, one single animal: in this way, nearly 20 years ago an animal was captured in Noricus that was covered in the shaggy hair of a dog: whose front feet, like on Ethiopian goblets, were similar to human hands and its back feet to human feet. And two animals were caught in the Slavic forests in the time of Albertus Magnus, one male and one female, whose front feet did indeed resemble human hands and whose back feet resembled human feet. Truly Albertus himself thought them to belong to the ape family. And Pliny recorded from recollection the Egyptian ibis, seen in the Alps by the Prefect Marcus Ignatius Calvinus. We also know that the Northusian eagle died in Thuringia, since it had grown old there. Even in this year, which is the 28th year of the rule of Charles the Fifth, a certain butcher from Dyncelspyhelensis, having subdued an eagle, killed it and brought it as a gift to the Senate. On the day before Epiphany, the eagle flew at the man seated on his horse near the town of Rotelis with so violent a force that he was in danger of losing his life. In the same way, it even seems true that some fish, when they leave the sea behind one time, enter into streams, which flow through remote regions, and never return to the same sea.

Till now I have spoken about the kinds of animals that do not return to the region from which they have left. Now I will talk about those which are accustomed to return: these are also the same animals, and they generally move out of a region where they live for the same reason: most definitely to avoid heat and cold. And indeed, in the summer they stay in cold places and in the winter in warm. As a matter of fact, humans who pay attention to their good health, so that they might protect themselves from the heat, are in summer quarters [i.e., their airy villas in the countryside or on the coast], and in order to protect themselves from the cold, are in winter quarters: which was the custom among the first Romans. And even kings and rulers of many citizens went away into other lands in the summer, to others in the winter. For the kings of the Persians once spent the winter season in Babylon, the spring in Sufi, and the summer in Ekbatana. In the same way, [481] flying animals and aquatic animals change their region and withdraw. Of these animals, some are used to seeking cold in the summer and heat in the winter in those very regions and lands in which they are accustomed to spend their lives. Others do so in remote and far-off places. And generally they fly, swim, and walk in order to inhabit these places in which the weather is so temperate that it produces or furnishes sustenance. The earth, when it grows numb with cold or it dries up from heat, withdraws from them the ability to produce food: water is not available to them when it has frozen.

In fact, certain birds generally abide in the woods during hot weather and in barns and out-buildings during wintry weather: for example, the magpie, the crow, and the sickly yellow bird which the Greeks call *iktorou* [*ixtegog*] [identity uncertain], the Latin-speakers call the galgulum [an oriole {or small bird}]. Certain birds spend time in the woods during the summer, they migrate to neighboring sunny places in the winter, having sought out recesses in the mountains: for example, vultures, kites, starlings, thrushes, blackbirds, wood-pigeons, and hoopoes. Aquatic creatures as well as birds gather during the wintry seasons at lakes and rivers situated in southern regions, which do not freeze in the cold, or they gather in some part of the rivers that does not freeze up entirely: for example, herons, gulls, water cormorants, pelicans, coots, savage ducks, and teals. Some birds scatter as if from one end of the earth to the other: for example cranes. And indeed, as Aristotle explains, they set out from the plains of Scythia to the higher marshes in Egypt, from where the Nile flows forth. Swans, storks, and wild geese go even farther. However, a few birds remain in the woods during the winter, such as grouses and hazel-hens: very few of the many birds remain in the fields, but among the number of these are partridges.

Likewise, some fish, in order to avoid the heat of the sun, during the summer go from the shores to deeper water, and on the other hand, so that they might be able to seek mild warmth, during the following season, they emerge from the deep water in which they had immersed themselves and return to the shore: for example, dolphins. Others move from one sea into another, such as tunny-fish, [which] during the winter season goes from the Black Sea to the Great Sea [Mediterranean], and likewise, in the spring from the Great Sea to the Black Sea. Others, in the same season go to the rivers, such as salmon, tuna, and sturgeon.

And these cannot be called subterranean animals: just as any others that do not enter into caves in the earth cannot be so called, even if they are concealed and lie hidden during the winter months for the sake of avoiding the cold, or during the summer for the sake of avoiding the heat. Such creatures include humans who primarily inhabit either cold or hot regions: for those who inhabit the former hide in their homes during the winter season, and those who inhabit the latter hide in their homes during hot weather. For indeed, among the quadrupeds, hedgehogs hide themselves in hollow trees, in which they collected apples during autumn. Similarly, dormice and mice from the Black Sea, and certain snakes hide themselves in hollow trees, but they themselves go into crevices in the rock for the majority of the time, as I will explain later.

Even certain roaches and wood-lice conceal themselves in the cracks of walls or hiding places in houses. Likewise ants are buried in ant-hills, in which piles they expend much of their work and labor during the spring and summer. In the same way, domestic bees enter their hives, wild bees enter either hollows of trees, holes in the earth, or into old walls. Likewise wild hornets enter crevices, just as they enter certain nests in trees: wasps enter nests in trees or houses, which they constructed in the summer. Similarly, in the winter a few birds do not hide in hollow trees: for example, the cuckoo, the woodpecker, a raven whose head is stained with a red mark, and who is called by the Greeks *purrokorax* [a crow with a red beak] for this very reason, and the hoopoe. But swallows, as native as country peasants, withdraw to nearby places that have more mild climates. These birds, if they lack milder places, bury themselves in narrow, confined places in the mountains, in which starlings, wood-pigeons, turtle-doves, blackbirds, thrushes, crested larks, and
 482 hoopoes are also sometimes accustomed to hide. Similarly, they lie hidden either [482] in trees or in the mountains, and for this reason in the spring, they are accustomed to be visible without feathers.

I have said a sufficient amount, and perhaps even more than the established subject requires, concerning those animals which do not enter either cracks or holes in the earth, or caves for the sake of avoiding cold or heat. Nevertheless these things which have been said adhere so closely in

nature with the things which follow, that once separated, they are scarcely able to be properly explained. Therefore, there are three classes of those animals about which I have undertaken, by the grace of the almighty, the labor of writing this work. For indeed, certain animals enter caves in the earth either at night or during the day, and they hide or sleep in these caves. But a good many animals and even all of them come out during the winter to find food. Some animals, at a certain time of the year, enter subterranean caves, and spend [hibernate] several months overwhelmed by deep sleep. Certain animals generally hide in the earth in perpetual secrecy. Among those in the first class are not only terrestrial animals, but also birds: however, I will pursue a discussion of the earthly creatures first.

Among the number of creatures who descend into caves are, indeed, humans who, for this very reason, are called troglodytes [from Troglodytae, a race of people centered around the Sudan and said to be cave-dwellers]. Some of these go into these caves for the sake of avoiding the heat, like the African and Syrian peoples who live near the Red Sea. Others go into caves for the sake of avoiding the cold, like those who inhabit the plateau in Asia behind Mt. Caucasus, which is situated near the northern territories, and the Scythian peoples, and the wild men, who are hostile to sailors at night and live in the Scirfennian region of Scandia. They drive the sailors away with flaming funeral pyres. And indeed, in the greater part of Armenia, as the illustrious author Xenophon writes, the homes are subterranean, of which the narrow doorways are in the form of wells, the portion below the earth is broad, the trench-like approaches are made by mules, and men descend into them by stairs. In fact, on the island of Tenedos, fisherman nowadays use caves in the cliff faces as homes, just as the robber, Cacus, once used a cave between the Aventine mountain and Salinas [a district of Rome]. He covered his fearful face and made it inaccessible to the rays of the sun: just as the Sibyl [a prophetic female] in that Cumaean grotto near Lake Avernus, as distinguished for her work as a muse as she was respected for her predictions. And Circe, a woman famous for her spells, lived *en spessi glaphuroisi* [in hollow grottoes], as Homer tells. Indeed, among the Seduni [a Gallic tribe] in the region of Sittensis near the Bremisa district, the entire monastery was built from the edge of the cut-out cliff face with wooden beams and any tree trunks. In that place there is a temple, an inner shrine, a bedroom, a kitchen, and a wine cellar. Similarly, in the high mountains, subterranean citadels are in evidence: like that one in the Alps called Cavolum, to which neither cavalry nor footsoldiers are able to ascend, but when men ascend there they bring along to that place everything which is necessary for survival. Another is on a steep cliff in Sicily, not far off from Mt. Eryx, joined by a little bridge with Cape Drepanum, by which land it can be approached. A third is in Saxony between Blankenburg and Halberstadt. Yet another is in Thuringia between Weimar and Blankenhain, near the Melligen plain: the ancient name of the place in Saxony is Reinestein, while the name of the one in Thuringia is Pufhard, and it is four miles from Weimar. Each of these is now deserted and empty of inhabitants: each has cut into the rock a hypocaustic underground heating system, chambers, steps, stables, stalls, doors, and windows. In fact, the place in Saxony even has a temple, which the inhabitants built above the watch-tower, which structure alone was built up to the horizon. This temple is in the form of a tortoise, and is marked with a round funerary monument in the middle, all the rest are square. The Saxonian mountain itself is steep on all sides, except the one by which it can be ascended. On the plateau of this mountain a lofty hill rises gradually, which looks at the plateau from that side, and is surrounded by a deep enough and broad enough ditch. From this hill that citadel was constructed with cut rock that is sandy and partly red. [483] The citadel has many large windows, and in fact, there are subterranean cellars at the foot of the mountain itself along with the horse stables. Each citadel has created a familiar riddle for the Saxons and the Toringi: 483

Tell in which lands a citadel is built on a high mountain,
where a thousand sheep can wander through the building.

Also, Hoenstein, which is a citadel in Mycenea, on the other side of Albis, has stables for the horses cut into the rock. And the Praenestian subterranean trenches are glorified in literature: Caius Marius was besieged in one of these, and he perished there. And moreover, it is evident from the writings of the comic poets that Greek women who made a living publicly as prostitutes lived in subterranean apartments: *chamaitupeia* [brothels] are named for these women. And the translator from Terentium thinks a gluttonous eating house is called *apo gas* [out of the earth], because it is in the earth. There were even such cellars in Rome, and indeed they were frequently within the Circus Maximus, where it extended for the mock sea-battles into the villages of Subaranus, Summaenianus, and Thuscus. In fact, in Rome, there were subterranean altars to Dis [Pluto] and a subterranean temple to Consi [an ancient Italian god]. And we gathered to dig out subterranean ditches for the ancient underworld gods and caverns for the nymphs. And, in fact, in certain maritime cities in Germany, just as in Prussian Danzig and in Saxon Lubec, a good portion of the population lives underground in movable sheds, above which magnificent homes were built, which are inhabited by the lords.

In the same way rabbits, foxes, beavers, otters, badgers, and perhaps certain other creatures enter burrows [or dens] but they leave to find food even during the winter. And indeed the rabbit [*Cuniculus*] digs many holes and drives the earthly rabbits into the hills: from this behavior the rabbit gets its name. It comes out in the morning and in the evening, but it generally remains hidden the rest of the time. Moreover, it covers some holes with dirt so that they can't be found by predators. But the ferret and certain small dogs, whose noses are keen at investigating, [when] sent into the holes and against the rabbit, find it, and [hunters then] pour boiling liquid in on it: they force the rabbit, [which is] put to flight and driven out of its hole, into the snares, by which it is captured. Moreover, there is not [just] one single color in rabbits: in fact, a rabbit is either dark, like ashes, or in a certain measure similar to a hare, or it is spotted, for example: they are white, speckled with either black or yellow spots.

The fox [*Vulpes*], however, first and foremost clever at trickery, does not dig holes itself as much as it seizes those burrows hollowed out by other animals. And it drives off the badger from its stolen hole with its foul stench, because it stains its mouth with manure. It hunts hares, rabbits, mice, hens, birds, and little fish. In fact, it does everything craftily. As a matter of fact, it often seizes unprotected hares and rabbits, while pretending that it wants to play with them, just as cats do with mice, and it is accustomed to lie in ambush. At night, in secret, having entered the chicken coop, it seizes hens and carries them away. It kills and devours birds which approach it while it deceitfully pretends to be dead. Lying on its back on the ground, it wards off the attack of an eagle with its feet until it can tear apart the captured bird. The tail, which for this animal nature made large and dense with shaggy hair, lowered down from the banks into a river, catches little fish swimming in that river. And when it pulls itself up a little bit from the bank, vibrating its tail violently, it shakes off the captured fish onto the ground and devours them. Furthermore, it approaches a wasp's nest by walking toward it backwards, because it fears that it will be stung by them. And if it sends [sticks] its tail into the nest, it wards off the wasps. Soon, drawing out the tail, crowded with these very insects, the fox dashes it against a nearby rock, or tree, or house wall, or garden wall. In this way, with all of the wasps crushed and killed, it empties and destroys the nest. Likewise, a dog, led this way and that by its own mouth, when it pursues its tail, is eluded by it. But the hedgehog [*Erinaceus*], which because [484] of fear rolls up in a ball, so that it is able to defend itself on all sides with its spines, is urinated upon by a fox, and in this way suffocates it. And indeed, on account of the urine flowing into its mouth, it has no power to draw breath. In fact, this

is the way of the fox, which is the size of an average dog. Moreover, it is often a red color, yet the coat is whiter in the forequarters. Rarely, it is pure white, even more rarely, pure black.

Furthermore, the beaver [**Fiber: Castor**] and the otter [**Lutra**] come out of burrows in river banks, in which they hide themselves, and immerse themselves in rivers, and capture fish, on which they feed. But they also eat the fruit and the bark of trees. Moreover, the otter is named from washing [the verb *luo* means to wash]. And indeed, when it frequently bathes in the waters for the sake of catching fish, often it immerses itself entirely in the depths of the waters. And Varro thinks that this name [the otter] comes from the Greeks, and he thinks that the otter was therefore named for a ransom [*lytra*], because it is said to cut down the branches of trees into the water, and to destroy them. Moreover, it can generally swim underwater and travel quickly for as great a distance as a taut bow is able to loose an arrow before rising up again into the air to draw breath. If it cannot breathe this air, just like other animals that walk on land, it suffocates. Its body is broader and longer than that of a cat, its feet short and its teeth sharp. It is different from the beaver with respect to its tail, its rear feet, and its hair. For the otter has a tail which is long and similar to that of the other quadrupeds: yet the beaver has a tail which is covered with fishy scales, exceedingly thick, about one palm wide, and $\frac{3}{4}$ of a palm long. If it lies on a slope, it sends down its tail and hind feet into the river when it is not frozen from the cold. When it swims, it is accustomed to move its tail as if it were rowing. Moreover, all of the feet of an otter are similar to those of dogs: the front legs of a beaver are like those of a dog, and the rear are like those of a goose. For in fact, there are certain membranes lying between the toes. In this way, the latter legs are more designed and suited for swimming and the former for walking, for it lives both in the water and on land. Also, the hair of the beaver is white mingled with gray and uneven in length, for everywhere there are hairs that are twice as long as the shorter hairs. But the dusky-colored coat of the otter deviates in only a small measure from that of a chestnut tree, and is short and uniform. And certainly the hair of each is shining and soft, hence they are accustomed to adorn the edges of garments made for nobles from their pelts with cut hairs of each of these animals. Although the coat of an otter is far better than that of a beaver, nevertheless, the coats of beavers differ a lot in color among themselves, for some more than others are made up less of black, some of red. And indeed, the more black ones are far better than the rest: they have less black on the middle of the body, and they are somewhat red on their lowest parts.

The beaver, however, is first and foremost thoughtful and ingenious: for indeed, with the shrubs and small trees cut down with its teeth as if by a sword, it constructs certain small dwellings facing holes in river banks, and into these it constructs two or three steps, as if into certain vaulted rooms, so that when the rising water of the river overflows the banks, it can ascend into its home, and it can climb out when the abating water remains level. And indeed, now when it generally cuts down a tree, as often as it makes a blow, it sits down looking at whether the tree is about to fall. For the beaver fears lest, if the tree should fall from that blow, the defenseless animal, unable to run away from the place before it fell, should be crushed by it. Certainly it is no less steadfast in its lifestyle than it is clever: for first it chooses which tree on the banks should be cut down, and it does not change its mind, even if it cannot cut it into pieces for a long space of time. This animal sends out a sound like that of an infant: moreover, we hunt it not only because of the tail, which we eat and the hide, which we wear, but also because of its testicles, which we use as medicine, preferably those belonging to beavers from the Black Sea, since they have the greatest potency. These testicles I say that they call *castor* [an aromatic secretion from the beaver that is used medicinally]. For the Greeks call the beaver *kasora* [a beaver]. But the beaver was named by the author Varro from the outer right and left banks of a river, where it is generally accustomed to be seen, [485] for the ancients called the beaver an outsider.

But the badger [**Meles**] goes out of burrows and wanders in the woods no differently than the wolf, the wolverine, the wild boar, the deer, the antelope, the reindeer, the elk, the wide-horned stag, the roe-deer, the ibex, the mountain goat, the gazelle, and many others. In fact, the former animals sleep in the woods, yet the latter sleep on lofty rocks and cliffs in the mountains. Moreover, the badger greedily eats honey, from which it gets this name. It is the size of a fox or an ordinary dog, but for the most part presents the appearance of a dog. For there are two classes of badger. One has toes like a dog, which they call canine: the other has cloven feet, like pigs, which therefore they call pig-like. Moreover, the legs of all badgers are short, the back is broad, the skin is thick, and by stretching it out, puffed up in fear, I use the words of Pliny, they defend themselves against the blows of men and the bites of dogs, but nevertheless, if ever they fight with dogs, they bite viciously. They are covered in rough, shaggy hair, which is either white or black, and the back especially has a large amount of black hair, while the rest of the body has white, with the exception of the head, which by turns is decorated with stripes of black and white drawn from the highest part of the head to the jaws. Moreover, badgers are not coarse, yet they are fat. Their fat, anointed or poured on with garlic, calms the pains of the kidneys. From this animal, collars are made with their hides, which are called *melia* [collars] by Varro for this reason.

Furthermore, kingfishers [**Halycon**] build nests on the banks of rivers and lakes: and it was unknown to Aristotle that they climb in streams, but they are not hidden in the winter. This bird is not much larger than a sparrow. Moreover, since the whole body of the marine kingfisher is distinguished by mixed colors: blue, green and dark red, to such a degree that neither the neck nor the wings are lacking any of these and it has a long, thin, greenish beak: the chest of either the river-dwelling species or the bank-dwelling species is dark red, the neck and back are blue mixed with green, the wings are dusky-colored, and the beak, like the feet, is ash-colored. It eats fish and worms.

Likewise, the ptarmigan [**Lagopus**] builds nests and sleeps in caves of the lofty Alps near the ice field, which is never totally melted by the heat of the summer sun, and is even extended in other seasons of the year by rainfall. It takes its name from its feet, which are covered with shaggy white fur, like a hare, as opposed to feathers. It is the size of a pigeon. Its color is white in the winter, and ashy mixed with white in the summer. It does not fly far off, but stays in the Alps. It does not survive in captivity, and even less likely is it to be tamed. The flesh of this bird is good for a healthy palate, and health-giving for a sick one.

But the birds, whose eyes are weak during the day, are keen and sharp by night: they are accustomed to hide during the day, to fly from their hiding places by night, and to come out to find food: these, therefore they call nocturnal. Of this sort are the bat [**Vespertilio**], the horned owl [**Bubo**], the screech owl [**Ulua**], the little owl [**Noctua**], and the night raven [**Corvus nocturnus**]. In fact, the latter hide not only in dark places of the mountains and in caves in the cliffs, but even in hollow trees, in deserted buildings, and under the roofs of magnificent homes and temples and towers, which men rarely climb. Moreover, the bat hunts gnats and flies: it consumes ham, and other pig meat hung from the rafters. Other nocturnal birds pursue mice, swallows, birds, beetles, bees, wasps, and hornets. But the horned owl [**Bubo**], however, snatches young hares and rabbits. It seems to me that these greatest of all the nocturnal birds got its name from the sound, indeed the deep groan, which they emit. It has a huge head: the head is the size of a goose's, yet it is short and blunt and varied in color. The beak is curved, the talons are hooked, and the eyes are massive. A screech owl [**Ulua**] is not much different than this bird, except smaller. Likewise it derives this name from its shrieking call.

486 [486] Little owls [**Noctua**] are related to these two kinds, but they differ in their call. For indeed, they do not shriek, but they produce a sound which Aristophanes called *kikkabau* (a cry in

imitation of an owl's call). There are four kinds of these owls. One, whose feathers stand out especially over the ears, and which is the greatest of the four, is called the little horned owl. The second, with outstanding white plumage on its throat and stomach, is distinguished as well for its alternating white and yellow spots. The third is small, and for this reason, as follows, bird-catchers hunt these birds. The fourth is smaller than the third, which dwells in cliffs and rock faces. This one, just as the previous kind, is marked with alternating ash-colored and white spots. In contrast, the *nycticorax* (night raven), which is a nocturnal raven, is black, like ravens of another class, but it is smaller and more common than those.

But the bat [*Vespertilio*], which gets its name from its habit of flying out in the evening [vesper], is to a certain extent similar to a mouse, hence the excellent Varro wrote: "I was made a bat, and I do not fit among mice or birds." For it has wings and flies, so it does not fit among mice, but it gives birth to living offspring, not eggs, for which reason it does not fit in by nature with birds, and it nourishes its young with milk from its teats, while birds seek out food from all around, which they put into the mouths of their chicks. In addition, bats have teeth, which birds lack. Moreover, the bat has a similar head to a mouse or a dog: generally they have two ears, rarely four, and serrated teeth. Their bodies are covered with a coat of tawny hair, yet their snout is black, as well as their ears. Bats have two wings, which, like those of a dragon or a flying fish, are not known for their feathers, but for their membranes and are also black. On each side, in fact, the wing has a finger, on which there is a talon. The bat has a broad tail, which is membrane-like in the same way as the wings, on which there are two feet, each of which has five toes armed with curved claws, with which it hangs from the walls and cracks of caverns. For indeed, it either hangs, or flies, or sleeps. Because, in fact, the feet do not come directly from the body, but from the tail, it is said that it only has one hip. It does not produce a sharp sound like a mouse, but it almost yips like a puppy. Moreover, according to Pliny, it flies around grasping its two offspring and it carries them along with it. It lives for several days with its tail joined to its wings. In fact, in the same way, the *Troglodytae* [the cave-dwelling people], who live in Africa, during the day, especially at midday, hide in their caves.

This is enough concerning creatures of the first class, which hide or sleep in caves in the earth either during the day or at night. I proceed to the animals of the second class, which, as I have said, enter into subterranean dens at a certain time of the year, and in these dens, pressed by heavy sleep they spend [hibernate for] several months without food, as if dead, and they hide continuously till the end of the season, when, awoken from the ground by the warmth of spring, they come to life again, and they remember food, which they had forgotten to consume for such a long time. Although I have already spoken about these animals, there are even some, as there are certain animals of every class, in the number of the following creatures, as I will explain at this time.

There are, for instance, some earthly creatures, or birds, or aquatic animals, whose lives are spent equally on earth and in the water: but at this time I will first explain the earthly creatures. Along these lines, many quadrupeds bury themselves in burrows during the season of winter or summer. And indeed, Alpine mice [*Mus alpinus*] enter burrows during the autumn, in which they are accustomed to sleep during the summer heat. For in these burrows, they build up nests from hay, straw, and twigs, in which, rolled up like hedgehogs, they hide themselves and sleep for the whole winter up till spring. In one cave there are often seven, or nine, or 11 or 13 mice. Indeed, they have marvelous skill and cleverness when they gather hay and scraps. In fact, one lies prostrate on its back on the ground with all of its feet stiff, while on its body, as if on [487] a certain wagon, the rest pile those things which they gathered, and thus laden, with its tail seized upon by the others' teeth, they drag it to their hole and in the same way they carry it in. It happens in this way, with the result that during this time of the year, they seem to have a raw back. And thus, after

they have made a nest in their burrow, they barricade and stop up the entrance itself and the mouth of the burrow with twigs and earth so that they might be able to be safe from the force of the winds, from the rain, and from the cold. Moreover, they sleep so soundly and heavily that having been dug out and removed from the burrow, they would not awaken before they grew warm from being exposed to the sun or placed near a fire. This mouse derives its name from the Alps, in which it is born. Its color is either dusky, ashy, or red. It is about the size of a hare but it has the appearance and shape of a mouse, for which [reason] it is called a mouse. But, however, it has ears that are stubby as if they were cut short: its front teeth are long and sharp: it has a long tail more than two palms [about 20 cm] long, and feet that are short and covered on top with shaggy hair. It has toes on its feet that are similar to those of a bear, and long claws, with which it digs deep in the ground. It is not accustomed to walk with its back feet alongside one another and turned backward and it sometimes walks on two feet. If food is given to this animal, it grasps it in its front paws, like a squirrel: indeed, just like a squirrel and an erect ape, it always sits on its haunches until it has consumed the food. It does not feed on fruit in this way, but specifically bread, meat, fish, gravy and condiments. Truly it feeds most eagerly on milk, butter and cheese, and, when it consumes these, it emits a sound just like a piglet by sucking with its mouth. It sleeps a lot, but when it is awake, it is always getting something necessary for its bed: straw, hay, strips of linen, and sheer fabric. It fills its mouth so full with these things that it can take up nothing further: it seizes the rest with its paws and drags it. When provoked, the mouse blazes with anger and bites savagely. If ever the Alpine mice [**Mus alpinus**] play amongst themselves like puppies, they make a lot of noise. When they leave the cave, wandering over the mountain to find food, someone of the mice remains next to the entrance of the cave, and is able to keep watch as diligently and as distantly as possible. When this mouse sees a human or a herd of cattle or a wild animal, it makes noise without delay. At this sound, all of the mice from all around run together to the cave. Moreover, the call of these mice is similar to the high-pitched shepherd's pipe and hurts the ears. With this call, they indicate a change in the environment and that enemies are approaching. They have a very fatty back: the other parts of the body are leaner than it, yet it is not possible to say whether it is truly made up of more fat or meat. But as the meat in cows is in the udder [area], among these mice it is somewhere in the middle. This is useful for women after childbirth and for those who are in labor: in fact, for these the fat of mice is beneficial. It is also a good remedy for insomnia.

And similarly, dormice [**Glis**] hide during the winter not only in hollow trees, about which matter I have spoken previously, but also in holes in the earth. Indeed, Aristotle calls the dormouse *eleion*, and it is ash-colored as Albertus [Magnus] writes, with the exception of the stomach, which is white. The dormouse differs very little from the little creature which some Greeks called *kamp-siouron* [bent-tailed one] for this reason: because it turns and bends its tail up in the air. In fact, others called it *skiouron* [shadowy-tailed one] because its tail is covered and abounding with shaggy hairs, just as one is accustomed to cast a shadow over their body with a fan. Still others call it the *mus skiourou* [shadow-tailed mouse] because it also bears a certain similarity to the appearance of a mouse.

This is just like the case with the Fennican squirrel [*sciurus Fennicus*], which does not differ in its tail, nor its shape and features of its whole body, nor in its size, nor in its behavior, but only in its color from our squirrel, for it is ash-colored mixed with white, while our squirrels are either red or black. And yet in that part of Sarmatia, which today we call Polonia, the red color is found mixed with gray on squirrels. Furthermore, for both types of squirrels, [and] this applies as much to Fennican squirrels as to ours, the two last teeth are long: when each class of animal walks, it
 488 drags its tail behind it: when it eats, it takes up the food [488] in its front paws, which it uses, as mice do, in the place of hands. It stands on its hind feet and its haunches. In fact, it eats beech nuts,

chestnuts, Avellian nuts, apples, and similar fruit. In the winter, it eats the cones of fir, spruce, pine, and other trees. Every spring they give birth, and if anyone should put their hand into the nest, they transfer their young into another one, for they make several nests. The feeble babies of both kinds of squirrel eat meat, and because it is disturbing to them to taste a certain unpleasant flavor, they rarely eat sumptuous things. In addition, both kinds dwell in trees, yet they do not bury themselves during the winter. But when they hide like dormice during the winter, sleep takes the place of food and they grow fat during this time of the year. Therefore Martial wrote correctly concerning the dormouse:

The whole winter is slept away by me, and I grow fatter at that
time of the year, in which nothing but sleep nourishes me.

Moreover, the meat of this animal is sweet.

In fact, although dormice live in forests, so that Varro might not make these complaints without cause about the scarcity of these creatures in Fundanius, concerning these admirable creatures: "There is no dormouse in my forest, yet the ancestors had dormice." Which sort they ought to be Varro described in the third book of *De re rustica* [*On country life*]. And today in certain forested locations, the inhabitants dig into the earth so that dormice might be able to live in burrows in it and whenever they wish to seize them, they can use them for food. In fact, among the Romans, Fulvius Hirpinus created enclosures for dormice in large earthenware vessels, according to the writings Pliny left behind.

On the other hand, the Black Sea mouse [**Mus ponticus**], which today they call Hermela, hides alone during the winter in hollow trees, as I described before. It is entirely white like snow, except for the long tail, for half of it and especially the tip are jet black. This animal is the size of a squirrel. It attacks mice and birds, which it eats. Its pelt is among the number of valuable things, just like that of the mouse which they call Lassician. It is white mixed with ash-color and it is not two inches wider than that mouse.

But the gopher [**Mus noricus**], which they call the Citellus [ground squirrel], lives in caves in the earth. Its body, just like that of the native weasel, is long and thin, its tail exceedingly short: the color of its hair, like the hair of certain rabbits, is like ash, but even darker. Just like the mole, it lacks ears, but like a bird, does not lack ear holes in which it receives sound. It has teeth similar to the teeth of a mouse. Indeed, from the coat of this animal, although it is not valuable, clothes are often made.

The Pannonian mouse [**Mus pannonicus**] also goes into burrows in the earth: its color is somewhat green, its appearance like a weasel, its size like a mouse. And the shrew [**Sorex**] buries itself for the winter months in the earth, into which the cavern descends almost to a depth of three feet. Dug out and exposed to the sun, like other animals that sleep during the whole winter, it wakes itself up by moving very slowly. It measures three-quarters of a foot long: its color is reddish in the summer, mixed with dusky color, in the autumn it is gray. Its ears, as Pliny writes, are shaggy [hairy]: the base of its tail, at the lowest part like that of a fish: for it is not totally covered and full of hair, like a squirrel, but in fact, the hairs on its ears are very small. This mouse climbs trees in the forest, like the dormouse and the Pontican mouse and the squirrel. The female eats the fruit of pear trees and Avellian [hazel] nuts, therefore among the Germans she takes her name from the hazel tree. But another mouse of the forest is shorter than the shrew, and it measures half a foot [semipedalis: approx. 12.5 cm]. The color on the back and flanks is a gray-mouse-color, the stomach is white. It digs into the earth at the base of shrubs to a depth of two feet [duum pedū: approx. 50 cm] and a length of four feet [pedes quatuor: approx. 100 cm], and in the bottom of the burrow the whole group gathers a portion of acorns and the fruit of cherry and plum trees, and other fruits,

but especially Abellian nuts, since these are the best. The animal derives its name from that very
 489 kind of nut. [489] It generally makes its nest in the middle of the excavation in the form of a pile
 of leaves from trees, so that if water ever falls in drops on the earth, it falls outside, and the Abel-
 lian mouse sleeps dry inside its nest. Moreover, on the other side of the excavation it has a hole, by
 which it is able to exit the nest when it digs out Abellian nuts

On the other hand the shrew mouse [**Mus araneus**], just like the rest of the domestic mice,
 does not hide in the earth. This mouse, for the following reason, because it instills venom with its
 bite, like a spider, acquired its name among the Latin speakers. Among the Greeks, however, who
 call it *mugalein* [shrew-mouse or field mouse], with respect to its size, as Aetius, who describes it
 briefly, said, it is equal to a mouse, but in color it is similar to a weasel. More specifically, the color
 is reddish mixed with a dusky color, except on the stomach, which is a mottled whitish-gray color:
 it has a long pointed snout. On each jaw, the teeth end in double points and for this reason, animals
 receive quadruple wounds from the bite of this creature. It has beady black eyes and a short tail, on
 which the hair is very short: in warm climates its bite is often pestilential, while in cold areas it is
 not. And moreover, when the shrew mouse is wounded or dismembered, it heals itself by placing
 its own poison on the wound. Cats capture and kill this animal, but shrinking from its venom, they
 do not bite it, just as they do not bite the rat. In fact, although the rat does not hide during the win-
 ter, nevertheless it enters underground burrows in the Ioachimican valley from its most recent home
 and it dwells in these burrows. Otherwise, especially during the cold season it is accustomed to
 wander in our homes. It nearly rivals and is equal in size to the mass of the body of the smallest
 weasel. Its coat is blackish, its tail is long, extremely thin, and totally bare of fur.

But several types of mustellids hide in the earth, and there are many of them. In fact, there is
 the domestic weasel [**Mustela**], which the Greeks call *galeein*, and the Germans call *viselam*
 [*Wiesel*] because of the sound it makes. It is generally reddish yellow on its back and flanks, rarely
 yellow. It is always white on its throat and stomach, but in fact, it is rarely found totally white.* It
 has a body that is slender and long, a short tail, short front teeth, not long like a mouse, and it is
 eager to reproduce. Because it fears danger for its recently born young from humans and several
 other animals, it transfers its offspring every day to another place by grasping them in its mouth. It
 hunts mice, and it fights with snakes, and so that it might be safe from the snake's venom, it eats
 rue first. It bites the udders of cows, and when they are first swollen, they are healed by being
 rubbed with the hide of a weasel. This weasel, if it lives in our house, and if it has its own caves
 does not bury itself for a long time and very often: if it lives in the countryside, it hides in holes
 during the cold season.

The Germans call the second class of weasels *iltiss* [polecat, eds.] from the Greek word *iktis*
 [yellow-breasted marten, eds.], which learned people call the forest-dwelling weasel. Moreover,
 this creature lives in hollows in river banks, where it eats fish captured in the manner of an otter or
 a beaver, and it also dwells in the woods, where it catches birds, and in homes, where it eats hens.
 Therefore Pliny says that it is domestic. It squeezes the blood from these birds, but lest the prey be
 able to protest, first it removes their heads by biting. And it also deprives them of their eggs, which
 it is accustomed to steal, and to gather many of into one pile. The domestic weasel is somewhat
 larger, shorter, and thicker than the forest-dwelling weasel, which is called the marten. It has hair
 that is uneven in length and not of one color. In fact, the short hairs are yellowish, the long hairs
 black. Thus, those black hairs stand out from many parts of the body, with the result that they seem
 to be marked with black spots. But yet, the hair around the mouth is white. When the animal is

* [literal translation] "and in fact, it is not never found totally white, although rarely" in which Agricola uses the the
 double negative. [Eds.]

heavily provoked it smells badly. On account of this, the hide is worthless to us, and they are accustomed to call the hide of this type of marten extremely foul-smelling.

The third class of forest-dwelling weasel sleeps in cracks and caverns in rocks. This animal is called *martes* by Martial, *martarus* [*Marder*] by the Germans. This line of Martial is in the tenth book of Epigrams on Mother Nature: [490] "When the marten is caught, the proud hunter arrives." 490 It is about the size of a cat, but a little longer. In fact, it has shorter legs, and subsequently shorter claws. Its entire body is covered with mixed black and tawny hair, except for its throat, which is white. Similarly to the preceding kind, this weasel enters homes and kills hens, and squeezes out their blood and deprives them of their eggs.

The fourth class of weasel is also forest-dwelling, it lives its life in trees, but it is also called by the name of marten. This weasel only leaves the forest rarely and contrary to its usual behavior, and it differs in this respect from the type of weasel just mentioned most recently. In addition, it differs in that its throat is saffron-colored and the hair on the rest of its body is a darker yellow. They say that there are two classes of this animal: one which lives in beech trees in the woods, another which lives in firs and which is much prettier to look at.

The fifth class of weasels is the handsomest and noblest of all which the Germans call *zobelam* [*Zobel*] (sable-colored). It spends its time in the woods, like the martens about which I have already spoken, it is a little smaller, yet it is entirely a dark tawny yellow color except for the throat which has gray on it. Weasels of the latter three classes stand out much more than all the rest in the degree to which some white hairs are mixed with the yellow ones. Moreover, sable-colored pelts are worth more than cloth woven with gold. For I have heard that a number as great as forty of the best pelts are accustomed to be bound together in one little package and sold together, and they sell for more than a thousand gold coins. Moreover, the entire race of weasels, when stirred by anger, smell like something horrible, but especially that animal which the Germans call *Illtiss* [polecat, eds.]. In addition, the entire filth of the weasel is redolent of musk.

On the other hand, the mink, which also lives in the woods, is the same size as a marten, and it has short hair that is a uniform length and it is about the same color as the hair of an otter, but the pelts of minks are far better than the pelts of otters. And these especially stand out if white hairs are mixed with the rest. This animal is chiefly found in the vast, dense forests which are between Sueva and Vistula. Although it is true that all weasels neither hide during the winter months nor go into the ground, nevertheless I have portrayed the unique features, because as an observer, this would be useful for the future study of natural history.

But the ferret which drives rabbits from their holes is a little larger than the domestic weasel. Its color is generally that of a boxwood tree mixed with white. This animal is bold and ferocious, and hostile to almost the entire animal kingdom: it is unfriendly by nature and drinks the blood of those animals that bite it, but it hardly ever eats the flesh.

The hamster is nearly as ferocious as a destroyer of fields and an enemy of Ceres, which some call *Cricetum* [a hamster]. The inhabitants of Palestine once called it an *arktomun* [bear-mouse, eds.] in Greek and for the reason that it belongs to both the class of mice and that of bears, since it stands upright on its rear legs, on account of which it is seen to have a black stomach. It seems angry and caustic to such a degree that if an unprotected horseman were to pursue it, it is accustomed to leap up and seize on the face of the horse, and if someone were to capture it, it is accustomed to hold on by biting. It lives in caves in the earth, not unlike rabbits, but the caves are narrower and for this reason, skin covers its haunches on both sides, it is bare of fur. It appears a little larger than the domestic weasel: it has exceedingly short legs. The color of the hair on its back is about the same as that of a hare: on its stomach the hair is black and on its sides it is reddish. Moreover, each side is marked by three white spots. The highest part of the head, like the neck, has

the same color as the back: the temples are red, and the throat is white. The tail, which is three inches long from side to side, is the same color as the tail of a hare. Moreover, the hairs cling to the skin, so that it is very difficult to pluck them from it. But the skin, on the other hand, is very easily separated from the meat, and the hairs are removed from the skin by the roots.[491] So for this reason and a variety of others, the pelts of this animal are expensive.

It collects many seeds of grain in its cave, and it holds its cheeks out wide and stretched away from its teeth on both sides and it chews the seeds. Therefore, they call a ravenous person by the name of this animal, just as a squirrel either grooms its ears and face with its front paws, or, standing erect, takes up its food and eats while standing on its hind legs and haunches. The Thuringian field is full of these animals because of the abundance and quality of the grain, but the Misenian field is lacking these animals although they are found in the regions of Pegau and Leipzig.

The lemming [**Vormela**] is smaller than the hamster and more varied in color. Indeed, with the exception of the stomach, which is black, the entire body is marked faintly with white, yellow, red, and tawny spots. In fact, the tail, which is 1.5 palms long, has ash-colored hairs mixed with white, but it has black hairs at the tip.

Up till now I have spoken about the classes of mice and weasels and related animals, of which the greatest part goes into subterranean caves. Now I will talk about the porcupine [**Hystrix**], which does indeed withdraw into caves, but during the summer months, as Albertus writes: and it does this in contrast to the habits of the rest of the animals. Some Greeks call it *akanthochiron* [thorny piglet, eds.] because it bears similarity in appearance to a two-month-old piglet and it is rough with spines like a hedgehog. But yet it has a head similar to that of a hare, ears like those of a human being, and feet like a bear's. Its crest sticks up from the highest part and is white at the top, and the bumps of its skin, which arise from both sides of its face, hold long black bristles growing from them. In fact, the rest of its hairs are also black. The first spines arise from the middle of the back and the flanks, but they are longest on the flanks and at the highest point of the flanks. These individual spines are part black and part white: they are as long as two, or three, or four palms, and if ever it is pleasing, it raises its tail like a peacock, and sends these down into the cave as it is about to enter. When provoked with anger it stretches out its skin, and it fastens missiles on the face of attacking dogs, or it throws a spine with such great force that would stick in wood. It has four long teeth, like a hare, two on the upper jaw, two on the lower. It stays awake during the night, and it sleeps during the day. It eats broken pieces of bread, apples, pears, turnips, and parsnips, and it drinks water, but it greedily guzzles diluted wine. This animal is born in India and Africa, from where it has recently been brought to our country.

During the winter season bears also settle down in hiding places in dens, which their location provides for them. So if the location provides no hiding places, using their front paws as hands, they make burrows from branches and shrubs piled together and constructed so that they do not feel the rain in the dens which they climb into to lie down. And they fear that their tracks, imprinted on the ground, will reveal them to hunters. In addition, the males hide themselves in burrows for 40 days, the females for four months: at which time they give birth to flesh that is white and shapeless, and gradually by licking it they shape it into their own image. Because Ovid was not ignorant about what he wrote:

A cub which a bear has recently given birth to,
but the flesh is scarcely alive, the mother molds into limbs by licking
and she herself restores it to the sort of form which it should occupy.

First of all, they lie hidden and sleep close together for 14 days, and they become so fat from heavy sleep that they settle down and tucking in their front paws they live their lives. And in fact,

they come out of their hiding places again in the spring: the males very fat, the females not as much, because they had given birth during that season, and they free their tight belly by eating the plant of the arum genus. And although the male bears are incredibly eager for slaughter, nevertheless the she-bears will exhibit no savageness if people prostrate themselves before them and turn their faces toward the earth and do not draw breath. [492] But they only leave behind those things 492 that smell like they are dead, which they decide that they dislike.

In addition, there are bears that are not familiar to us humans, for the cold regions give birth to many which are either dark gray or black. Of these animals there are two classes: great and small: the latter climb trees more easily and never grow to as great a size as the former. Both kinds eat meat, honey, the fruit of trees, and plants. In fact, Mysia gives birth to white bears, which capture fish like the otter and the beaver.

The lizard also hides in the earth during the winter months, although there are some who say that the life of this animal does not exceed six months. The lizard is generally accustomed to live for the remaining seasons of the year in bramble thickets and thorn bushes. The tongue of this quadruped is forked and hairy: its feet are small, and in the spring its color is green, while it is a yellow-green in the summer.

The copper lizard [**Lacerta Chalcidica**], named for the copper-colored stripes by which its back is marked also hides itself. This same creature is called a venomous lizard, because the wound putrefies if it should bite someone and it usually flows with foul-smelling pus. The form of its body does not differ from that of a green lizard, but only in the color. The water lizard [**Lacerta aquatilis**], whose life is spent in the water and on land, but it is more often in the water, also hides itself. It is born in shady hollows, which are in rich soil, and in certain ditches around city walls. It is small and in addition it has a dissimilarity in color from other lizards, since it is either ash-colored or dark-gray mixed with ash-color. It moves slowly like a tortoise or a salamander. It grows angry if provoked, raises itself up, gets puffed up in a certain way, stands up on straight legs, and with its mouth wide open in its fearful face it stares fiercely at the one who provoked it. And it slowly releases a foul-smelling, milky white sweat continuously while the lizard itself grows completely white. Established in this position, it moves its tail to leap and it tries to flee, because although it bites viciously, it is unable to win, and it would die immediately, when otherwise, if simply beaten, it lives for a long time.

The chameleon [**Chamaeleon**], born in India and Africa, which, as Aristotle writes, has a body in the same shape and form as a lizard, escapes notice [camouflaged]. In fact, like a fish, the sides of this creature, pointed downward and extending straight back are joined with the stomach, and a spiny ridge overhangs the flanks. The appearance is similar to a monkey, which they call Cebus. The tail is long, which has a very narrow tip, and is a tangle of many round structures in the manner of a rawhide whip. When it stands still, it withdraws higher from the ground than the lizard. It bends its legs no differently than a lizard: each of its feet are divided into two parts, which have as great a space between them as the thumb has from the remaining part of the hand. In fact, even these same individual parts are divided into certain small toes: the inner parts of the front feet into three digits, the outer into two, while the inner parts of the rear feet are divided into two digits and the outer parts into three. Moreover, their toes have toe-nails similar to the claws of other animals which are curved. The whole body is rough like that of a crocodile. The large eyes are positioned in a hollow recess, round, and covered with a membrane similar to the skin on the rest of the body. There is an area remaining between the membrane and the eyes, through which it sees. It never covers the eye over completely with skin. The eye turns in a circle and turns around backward to look in every direction, and in this way it perceives whatever it wants. When puffed up, it changes color, but otherwise the black does not differ much from the color of a crocodile, and like a lizard, it is

yellow-green, yet it is varied with black spots like a leopard. Moreover, the alteration of color is on the whole body. For the color of the eyes and tail does not change differently than that of the rest of the body. Its motion is slow to observe, like that of a tortoise. It grows pale when it dies, and the same color remains in the dead creature as when it was alive. It has a rough throat and neck in the same position as a lizard. On no occasion does it have flesh except on its head and jaws, and indeed, 493 the rest of the body is lacking flesh. In fact, [529{493} typographical error in folio pagination] there are small pieces of flesh on the jaws and tail, and on that part of the body which is connected to these. It only has blood in its brain, in its eyes, in the highest part of the heart, and in the blood-vessels coming from that part, and in these there is very little blood. The brain is positioned a little bit above the eyes, and it is adjacent to these.

However, with the outer skin of the eyes removed, something is enclosed which shines like a thin copper ring. Many thick membranes which surpass those on the rest of the body are spread out over the entirety of the animal's body. Cut open completely, the animal breathes for a long time, because a very small beat is still present in its heart. When it draws together every part of its body, it especially does so with its flanks. It never contains a spleen of the sort which can be observed. And in fact, it is named for being nourished by the breeze: from which Ovid, a poet who was not only charming but learned wrote:

And indeed, that animal which is nourished by the winds and the breeze,
Immediately imitates whatever colors it touches.

Indeed, the gecko hides: its shape is similar to a lizard, its nature to a chameleon. For it lives only on rain water, as well as spiders and honey. This creature, Nicander calls *askalabon* (the spotted lizard), and Aristotle *askalabotein* [the spotted lizard]. For the gecko's back is marked with shining spots in the likeness of stars: for which reason it takes its name among the Latin speakers, and it differs in this respect from the lizard. The same creature is called *galeotes* [lizard] by the Greeks. Like a serpent, in the spring it sheds its winter skin as if it were a snake-skin, and unless it is snatched away first, the gecko devours its skin. Whatever the gecko bites is crushed by a sleepy stupor. In Greece, it is poisonous and pestilential, while in Sicily it is harmless. It is hostile to scorpions: it leads its life in tombs, in vaults, and in the areas around doorways and windows. Enclosed in a glass vessel, it is able to live without any food for longer than half a year. Only its eyes become swollen, but it suffers no other ill effect.

The salamander also hides during the winter months. For in the region of Schneeberg, in February of this year the greatest group of salamanders was found, collected from the neighboring areas, massed together in the largest of the certain hollows, once made in the mountain at Muhlberg, but at that time restored. And in November of last year, a live salamander flowed out of a stream in the neighboring woods through the water pipes into this town. Moreover, rain storms and the subsequent pleasant weather stir salamanders from hollows, fissures, and gaps in rocks. This quadruped, which has the same shape as a lizard, because it walks slowly on account of its short legs, the Germans call by the Greek name *molgein* [Molch, salamander]. The head of this animal is large, its stomach is a yellow color, as is also the tip of the tail. The rest of the body is entirely marked with alternating black and yellow spots like stars. It perishes on account of fire, or cold temperatures no differently than from ice. In this way, in fact, the eggs of snakes are piled together in the flame of a furnace, since they are accustomed to extinguish the flame. But yet the eggs themselves are burned up as much as the salamander. Furthermore, when provoked, the salamander vomits out a milky-white liquid. Some think falsely that the gender of this animal is neither male nor female.

The land tortoise [*Testudo terrestris*] also hides in the earth for the entire winter, and spends

the time pressed with heavy sleep without any food.

Finally, golden scarabs [beetles, eds.] and crickets, which sing primarily at night, dig in dry earth, so that they might sleep in their hollows during the summer. Likewise, domestic crickets sleep during the winter. For, before autumn, scarabs go deep into the earth until the entire summer has passed by. Country crickets enter the earth before winter, just like black spiders, which live in the same way in cracks in the earth.

But the venomous centipede is born and lives in the trunks of trees, or in posts placed on the earth, or in stakes stuck in the earth, when they rot, from which it gets its name. When these objects are moved or shaken, it comes out, [530{494} typographical error in folio pagination] but otherwise it is generally accustomed to hide. It lacks wings, but it has many feet, on account of which some call it by the Latin name *multipede* [many-legged one], others *centipede* [100-legged one], and others *millipede* [1000-legged one]. Whenever it crawls, it bends the middle part of its body like a bow. If it is touched by a stick or some other thing, it draws in upon itself. It is copper-colored, it has a slender body, and three not especially broad, but very long toes, or at the most four. 494

Now bank-dwelling swallows [*Hirundines ripariae*] are among the flying creatures which bury themselves. For indeed, a great number of them hide themselves in nests during the winter months on the banks of rivers, lakes, swamps, and on the shores and rocks of the sea. For this reason, it happens that fishermen sometimes remove them from the water joined together in this way. Moreover, they are called bank-dwelling, because they are accustomed to dig in banks and to construct nests there and to hide. These birds the Greeks call *apodes* [footless ones], not because they are without feet, but because they lack the use of their feet. The Greeks also call them *kupselas* (hollow vessels/boxes), because they bear eggs and they sleep in long hollows made of clay. The entrance to these is narrow, so that at every time of the year they might be able to avoid animals and humans, and to remain safe from the cold in the winter. In this way they differ from both country and domestic swallows [*Hirundines domesticae*], because they have hairy shin-bones. These birds, Pliny says, are those which are seen in the whole sea, and they never go as far toward ships and in a continuous course away from the land as those footless swallows fly. The rest of the class of swallows rest and stop, while these have no rest except in the nest: they either hang in the air or they lie down.

As a matter of fact, during the winter, the following animals about which I have just spoken hide in caves in the mountains, although not only in these: bats, owls, shriek owls, little owls, swallows, starlings, wood-pigeons, turtle-doves, blackbirds, thrushes, crested larks, and hoopoes.

Now, of the class of aquatic animals which hide, some bury themselves during the winter, others during the summer, either in mud or in sand, and indeed they bury themselves in such a way that the entire rest of their body is covered, but the face is free. These fish bury themselves during the winter months: *primadiae* [unknown fish, transl.], the *hippurus* [goldfish or gold mackerel], the Egyptian boliti [*Coracinus*], the moray eel [*Murena*], the sea perch [*Orphus*], the conger eel [*Conger*], the rock-dwelling wrasse [or green wrasse: *Turdus*], the sea wrasse [*Merula*], the perch [*Perca*], the tunny fish [*Thynnus*], the skate [*Raia*], and every species of cartilaginous creature, including snails. On the other hand, the *glaucus* [unknown fish, transl.], the gilt-head and the hake hide themselves during the summer months. The purple murex [*Purpura*], the *buccinum* [whelk], the scallop [*Pecten*], and the dolphin [*Delphinus*] hide for approximately 30 days until they grow old.

Now from the number of animals of which there is life equally on earth and in the water, the aquatic lizard hides during the winter, as I have discussed above. And the crocodile [*Chrocodilus*] also enters its cave for the sake of avoiding the winter weather and it hides there for four months. It endures the bitter cold to such a degree that even when it is not accustomed to hide, it moves

about on the earth during the day and in the water at night. It is rarely reported to be living in Europe nowadays: but drug sellers often hang a dead crocodile from a beam in their offices. Pliny diligently pursued the shape and nature of this creature, he said it is a wicked quadruped, and it is hostile to the earth and rivers equally. This one terrestrial animal is lacking the use of its tongue: the lower jaw imprints a bite by means of the quick upper jaw, and subsequently it is frightening with a row of teeth crowded together like the teeth of a comb. In size it generally exceeds 18 cubits. It lays as many eggs as geese do, and it always incubates them near a predetermined place, to which the Nile flows during the height of the flood season. No other animal grows to a greater size from a smaller beginning. And it is armed with claws, and its skin is impervious to all attacks. A small bird, which in Italy is called the plover, the king of the birds, challenges this animal (the crocodile) when it is well-fed with fish for food and given over to sleep on the shore with a mouth that is fit for eating in order to be open for the sake of its food, first the bird hops in and cleans out the crocodile's mouth, soon its teeth, and even inside its throat by scraping at this sweetness which they are especially greedy for. In this enjoyment, with the crocodile pressed by sleep, the bird catches sight
495 of an ichneumon [mongoose], through these same jaws, and just like a spear sent [531{495} typographical error in folio pagination] in gnaws on the animal's belly. In this way it was a greater curse that nature was content with one enemy for this animal. And in this way dolphins traveling in the Nile, whose backs, just as if for this very use, have knife-shaped fins, repel their prey from them, and since they reign only in their river, and because they themselves are otherwise inferior in numbers, they kill by cunning. The crocodile has soft, tender skin on its stomach, and for that reason dolphins immerse themselves when they are frightened, and going under the crocodile they pierce the belly with their fin. In fact, the human race is also an enemy to these animals in the Nile, called Tentyritae for the island on which they live. The length of them is small, but they are at present amazing for the use of intelligence to such a great degree. This creature is terrible against swift flying beasts, and swift against pursuers. But these animals (humans) alone dare to go against them: in fact, they swim in rivers, and positioned on the crocodiles' backs in the manner of those riding horses, with the head tilted back and the mouth open to bite, they insert a club into the mouth, holding the right and left sides of the stick on either end, and they lead them captive to land like harnessed horses. And with a single call they force frightened men to move fresh bodies to a grave: and in this way crocodiles do not swim up to this island, and by smelling the odor of the human race, like Psyllian serpents, they are put to flight. It is said that this animal has weak eyes in the water, outside of its sharper area of vision. For as long as this one certain animal lives, they believe that it grows: moreover, it lives for a long time.

All frogs [Ranae] also hide during the winter months, with the exception of those very small ephemeral ones, which are pale mixed with a gray-blue color and crawl in roads and on shores. For these, because the male and female do not bring forth from a seed when they are joined in coitus, but they seem to arise from wet dirt during summer rain storms, for a long time they can not be in life. And in this way, this small green creature hides itself, which the Greeks call *kalamitein* [grass or reed frog], because it is accustomed to live in reed-beds, although it also climbs trees, and lives in grass, and which they also call *brexanta* [wet one], because the sound of this species presages a future rainstorm. Nor indeed, even though Pliny thinks otherwise, is it [grass frog] mute and without a voice. On many occasions in the spring it seems to come out of the middle of the earth, and to still hide in the middle of it as well. Green frogs [**Rana viridis**], which live in rivers and pools and these indeed are known for their call and for being edible, hide themselves. Bluish and reddish frogs bury themselves, which live in rivers, lakes, swamps, and pools. Some of these are vocal and edible, some are mute and cannot be eaten. But there is proof that these hide in the earth during the winter months, because in the spring not only their offspring are seen in pools, but even the green

frogs themselves. For this reason, what Pliny wrote is not true: it is remarkable that those which were born are enervated in the mud for six months of their lives with no one knowing they are there, and are born again with the spring waters. Likewise, it happens every year by some secret reason. Moreover, the offspring of these have very little flesh, and they are round and black, then recognizable only by the eyes and the tail, these animals Nicander calls *molouridas* [moving tail] because they move their tail, Aratus calls *gurinas* [tadpole] because they are round, and other Greeks call *batrachides*, as you say, little frogs. Afterwards, the front feet of these are formed from the chest, and the tail is divided into the rear legs. Moreover, pale frogs bury themselves in gardens, and these creatures are not to be eaten and are mute. Finally, the toad [**Rana rubeta**], which gets its name from brambles, buries itself and is accustomed to live under thorn-bushes. The poet calls this a toad [bufonem] and the Greeks *phrunēin* [a toad]. There are two classes of this creature, the second one earthly [*terrena*], which lives in houses and bushes: the former [*palustris*], which emits the call of its species, lives in swamps. Both kinds are poisonous, each, if it is struck repeatedly with a stick, first, with its body puffed up shoots venom a long way from its hindquarters and then perspires. The milky drops of its sweat are of an extremely offensive and foul smell, and it can generally be killed [496] with opium, but it is difficult to kill. Witches use the *Rana rubeta* [toad] 496 for certain poisons.

The water mouse [**Mus aquaticus**] also hides during the winter in the banks of rivers and streams which it inhabits. It is about the same size as the woodland mouse: it often bites the hands of fishermen, when they pull out river crabs from holes in the banks. It devours little fish, like the river dwelling gudgeon or white fish. It eats the young of the pike [**Lucius**], the *salaris* [trout], the river barbel [**Barbus**], and of other fish. For this reason, when this species of mouse is born with great strength, it is accustomed to inflict devastation on streams.

Even the river dwelling crab [**Cancer fluviatilis**] dwells in river banks and hides in these during the winter, it generally moves about during the summer. But the scorpion, which only Germany knows how to import, does not hide in the earth, but nevertheless it dwells in walls and under rocks.

Now finally in the class of snakes, which are for the most part earth-dwelling, the viper [**Echidne**], which the Greeks call *echidnein* [adder or viper, eds.], climbs under rocks during the winter. It is approximately one cubit long (17.4 inches) and is covered with dark spots on a red background. It first produces its eggs inside itself, then unlike other living animals, it does not bear one offspring at a time, as Nicander and Pliny write, but in one day it bears 20 offspring. Nor do the rest of the offspring, intolerant of the slowness of the birth, break through the sides of the parent, but as spies of serpents tell us, on one single day it generally bears 11 offspring, sometimes more, and it lives curving over them as protection. And in fact, when vipers mingle their bodies together, wound about one another, the female does not bite off the head of the male from the sweetness of pleasure, when it is pushed into her mouth, as Pliny writes. Moreover, not only does the male, but also the female have a tail that is naturally short and seems broken, not long like the rest of the snakes. But they differ from one another in that the females have a broad head, and the males a narrow one. When the male bites and spits out venom, the marks of two sharp teeth appear: when the female bites there are more marks. The viper does not consume milk, in the manner of other snakes, but wine, for which reason Galenus writes that it creeps into a flask filled with wine, and that wine in which a viper has died, is drunk as a remedy for one sick with elephantiasis. People do many things against the bite of a viper, but in particular, Suetonius left behind a writing that warned Caesar Claudius, with an edict having been decreed to the Romans to make a drink from the yew-tree.

Moreover, the dipsas snake [**Dipsas**] is very similar to a smaller viper, and since it is white, two black lines mark its tail. It kills victims by inflicting them with an insatiable thirst, from which

it derives its name. In fact, the snake itself is very thirsty and for this reason the belly of the burdened snake is broken open by excessive drinking, and it pours out its heavy burden: some call this a firestorm, and others a waterspout, but the waterspout differs in effect, although the shape of the spout does not differ very much from the snake. For the snake delivers a blow that renders its victim immobile and witless with paralysis: soon with the victim's weapons floating away, they are consumed with itching and weakening of the stomach.

And the blind snake [**Typhlinos, Typhlops**] buries itself in the earth like nearly all the rest of the snakes, or in cracks of rocks: in fact it is called this [caecula, i.e., the blind snake] among the Germans because of its blindness: for this very reason Nicander calls it *tuphlopa* [or *typhlopa*: blind-eyed] and others call it *tuphlinon* [or *typhlinon*: blind], for indeed it lacks eyes. Its color is green on a yellow background, and it is very resplendent. It is never longer than a foot and never thicker than an inch, just like the viper, as Columella left in writing, and often, when an unwary cow is lying down on top of a pasture, with the heavy creature having been assaulted, the snake presses a bite into it.

In fact, the languid Libyan serpent has eyes: and indeed it is small and slow, but two-headed. Therefore it is able to go forward and backward with either head, whenever it pleases. For this reason its name was given to it *amphisbaena* [**Amphisbaena**]: the colored part of its thick skin rests on the ground, marked with varied spots. The shape of this creature is not unlike that of a cylindrical snake, but it is thicker. It is as thick as the handle of a hoe, and as long as [497] an earthworm. When this creature has shed its skin in the spring time, it does not feed on hay, like the other snakes: it gets its name from a walking stick (*baculum*).

The water snake, so called because it swims, enters crevices in the earth or rocky places during the winter months. For this reason, it is called *hudros* [or *hydros*: of the water] by the Greeks because of its watery home, and *chersudros* [or *chersydros*: of the water and land] because it dwells on land and in the water. And I do not agree with Lucanus, who separates the water serpent from the water snake. Moreover, it is hostile and unfriendly to frogs: its form is no different from the asp, but it differs in its color, which is generally white mixed with an ashy-color. The Calabrian snake appears to be from the class of water snakes, although it is spotted. Virgil describes it in the following verses:

That evil thing indeed lives in the narrow passages at Calabria,
The scaly back entwined with the raised chest,
And the long belly spotted with large marks,
Which, until any rivers are broken by fountains and until
the earth grows wet with the spring dew and with the southern rains
dwells in pools, and living in river banks this evil creature fills
its foul belly with fish, and with loquacious frogs.
After the marsh is dried up and the earth cracks open from the heat,
It leaps up onto dry land and hurling balls of fire
It savages the fields, since it is violent from thirst and agitated by the heat.

Boas [**Boa**], moreover, are from the class of water snakes, which, on Pliny's authority, grow to such a great size that, during the rule of the divine Claudius, one was killed in the Vatican a whole child was observed in its belly. They are nourished, first of all, on the milky juice of cows, from which they derive their name [cow in Latin is *bos*]: and indeed, there are no kinds of water snakes other than those which are native and indigenous.

The asp [**Aspis**] on the other hand is four feet in length and the width of a lance. It is not one single color: for some are dirt-colored, some are various shades of green, some gray, and some fiery red, especially the kind from Ethiopia. Its dull eyes are situated on its temples, between the eye-

brows, in the likeness of two calloused fleshy growths. For this reason it does not cease from blinking, even when it is asleep, but it is easily awoken by the noise of animals. Egypt produces this creature, and Ethiopia, and other regions of Africa. Their consorts, I use Pliny's words, hardly ever wander, unless they are accompanied by their mate, and in this way, when one of them is killed, the other has extraordinary desire for revenge: it pursues the killer, and attacks that one as much as it pleases in an open stream with a conscious understanding. It breaks through all difficulties, it goes to great lengths, and it is not warded off by rivers or swift flight. The ichneumon [mongoose], which is similar to the weasel, is especially hostile to this snake, and in this way, not only does it destroy the snake's eggs, but it even kills the snake itself. Indeed, it often buries itself in mud, and dries out in the sun. Soon, when in this way it covers itself with many coats of mud, it approaches to fight. Raising its tail against the snake, it wards off the ineffective blows of its enemy, until it observes that the snake has its head turned and it attacks the throat. Moreover, Galenus classified asps in three categories: the red asp [*chelidonias*], the asp that resembles the land tortoise [*cherseas*, common European viper, eds.], and the asp that ejects poison at its enemies [*ptyadas*], which is named for its spitting. This is also the kind that Cleopatra used to kill herself. In fact, the asp, since it is intolerant of cold, hides during the winter, closed up and hidden in sand, just as a hamadryad hides in hollow beech or oak trees. For this reason, the asp takes its name. Some call it, as Nicander writes, a *hydron* and others a *chelydron*. For it is similar to a water snake, as far as the head is concerned, but it has a grey back and it is the same width and length as the common eel, and it smells bad. It pursues the young of frogs because they are conspicuous with their tails, and it is an enemy to the great gadfly.

But the horned snake [**Cerastes**] derives its name from its horns, which are doubled in the same manner as those of a snail, and in this way it bears a twin pair of horns on its head: and indeed they are fleshy, [498] and as Pliny writes, with the rest of its body hidden, the snake draws birds to itself with the motion of these horns. Otherwise, it is formed in the same shape as a viper. It is the color of dirt, yet in cold regions it is found to be similar in shape and color to the water snake, although it is accustomed to be found rarely in these places. It lives in sand and ruts in Africa: elsewhere it generally lives in cracks of rocks, in which it hides during the winter season. Aristotle passed down [related] that even the Theban snakes are horned.

And the haemorrhoid [**Haemorrhous**] (a snake whose bite was said to cause bleeding from all over the body) goes into cracks in rocks, and it gets its name from flowing blood: for when it bites someone, on the first night blood bursts out of their ears, their nostrils, from their mouth along with spittle, from their bladder along with urine, and from their wounds along with pus. Moreover the gums and the flesh under the fingernails ooze blood, if the female haemorrhoid bites a person. Moreover, it is a foot long, and not very thick, for it gradually comes to an end at its thin tail. Some are gray in color, others a shiny white. Two small horns come from its forehead, likewise fleshy. It crawls more obliquely and slowly and in the same way it makes a noise as if it were crawling over reeds. Its body is similar to a sepedon, but it lacks little horns and it crawls in a different way. Its color is red and it is named for the putrefaction which quickly follows its bite.

In fact, the Porphyry, as Aelianus passed down, is a palm [hand width, approx. 10 cm] in size, the head is extremely bright white, the rest is a dark red, and it is harmless in its bite, since it lacks teeth. It is found in shallow places in India: when captured, it is hung by its tail, while it is alive they collect the liquid that flows from its mouth in bronze vessels. Next, in the same way, they take the black fluid from a dead one of this species similarly in a different vessel and this substance, given in food or drink with sesame seed gradually kills over the space of one or even two years, and it immediately begins wasting a person away in the manner of hemlock.

The quick-darting snake [**Acontias**], which the Latin speakers call a dart, on the other hand,

from cracks in trees projects itself like a spear at an animal that passes by. For this reason, it gets its name. Not only does it hurl itself at an animal from above, but positioned on the ground, if it is provoked, hurling its body like a missile from far off it seeks its enemy.

The cenchris snake, which Nicander calls *cenchrinen*, in fact gets its name for the reason that it is spotted with constant speckles similar in color to millet seed, for which reason Lucanus writes:

How the cenchris always slithers in a straight path
and its variegated stomach is colored with many marks,
How the Theban spotted marble snake is dyed with small spots
and its color is indistinguishable from dry sand.

The basilisk [**Basiliscus**], on the contrary, is named for the reason that it excels the other snakes in its venom, just as a purple-clad king prevails in royal honors over those whom he is master of. Its head is pointed and its color is golden. The province of Cyrenaica, according to Pliny, produces this creature, which is no greater than the size of twelve inches, and has a white spot on its head as if it were wearing a crown. Its hiss puts all snakes to flight. And it does not spring into action with a twisted coil, as the rest of the serpents do, but advancing tall and straight up in the middle, it destroys shrubs: not only those it comes in contact with, but also those it breathes upon: it burns up plants, and it breaks rocks: so great is the violent strength of this evil creature. It is believed that when a horse is killed by a spear, this creature traveling through the spear by its own strength not only consumes the rider but also the horse. Indeed, often kings wish to see this creature when it is dead, since the poisonous secretion of a weasel is the downfall of such a great monster: thus far it has been pleasing for it to have no equal in nature. They throw weasels into caverns which are easily recognized by their putrefaction alone: the weasels kill with their odor, and they
499 die and their natures create a fight. [499] The theologian Cassianus confirms that the basilisk is born from the eggs of birds which the Egyptians call the ibis: he asserts that the monster is born from an egg which the common rooster bears. The basilisk is regarded to be the animal that killed several men in Zuicca with its venom, and for this reason the master of the storeroom in which the creature was, closed the doors and enclosed them with a dirt wall.

The dragon [**Draco**] follows, named for seeing, because it perceives more acutely than other snakes, for which reason the ancients placed it as a guardian of treasure chambers. And they placed it as a guardian in sacred temples, inner sanctums and oracle sites. Moreover, it is beautiful to look upon, for it is entirely black, except for the stomach which is greenish and it seems to have flesh hanging under its long chin, bringing the appearance of a beard because of it, and this flesh is moist with venom. The flesh of each eyebrow is thick. Moreover, it is adorned on both sides of the jaw with a triple row of teeth: yet it does not bite very much. It fights in some regions with eagles, and in Africa and India with elephants. For these animals are each 20 cubits in length. The class of this creature is divided in two: one earthly type, which I have just described, the other winged, which have membranous wings like bats. Cicero left the writing that this is carried into Egypt from the devastation in Libya by the African wind. I had one which was a foot and a half long, which I gave to Ambrosius Fibianus. It was nearly the color of a crocodile and Lucanus writes the following about it:

You who also crawl, a power harmless to all lands,
dragons shining with gilded flame,
blazing Africa creates pestilential dragons,
You reach the lofty ether with your wings, and chasing the whole herd
you destroy it by encircling the mighty bulls with your whip-like tail.
And the elephant is safe in no place, you give all to death,
And there is no need for you to provide a harmful fate with your venom.

Besides, like some of the serpents described, they do not have to hide at any time of the year in the hottest regions, but they are certainly accustomed to sleep in sand and cracks of rocks.

In contrast, the wood worm [**Teredo**] crawls, for it lacks not only wings but also feet. But it is a copper color and it is born and hides under rotten wood, and it is generally found near centipedes. It is the width of the smallest goose-feather, which we use when we write. It is the length of a centipede, but it is smooth.

Up to this point, I have described animals which hide in the earth during some season of the year: now I will talk about animals that are really and truly called subterranean, that is, about those animals which are born in the earth and almost always live underground, as if hidden. Moreover, these animals lead their lives partially on dry land, partially in the water or they live in subterranean streams. Of the first class are the mole, the mouse, the poisonous frog, the mussel, the pinworm, the earthworm, and cave-dwelling snails: of the second are subterranean fish. These are the animals I will pursue and I will begin with the mole [**Talpa**]. This quadruped is not much different from a mouse, except it is blind, although it has the likeness of eyes, as Pliny writes, if anyone should remove the membrane stretched over them. It is not covered with hair. It can even hear when it is submerged in water, but when removed from the earth, which it inhabits here and there in fields and even more often in meadows and gardens, it can't live for very long. It has short legs, because of which it walks slowly. There are five toes on each of its front feet, four on the back feet, all are armed with sharp claws, with which it digs in the earth. Moreover, it has hair marked with glittering black patches which are white on the young of this species. It eats frogs, even the poisonous ones, earth worms, and the roots [500] of crops and grasses. The pelts of these animals become felt 500 caps and bed-covers.

The subterranean mouse [**Mus subterraneus**] follows, which some call the wild mouse. Servius thinks that it was called a dormouse by Cicero. Virgil writes the following about this mouse:

Often a small mouse
Builds dwellings under the earth and makes storehouses,
Or moles, captured because of their eyes, dig dens,
And a toad, found in caves, and many monsters which
The earth produces.

There are two types of this mouse, the smaller and the larger, and the former is not much larger than the smaller domestic mouse. The latter is not much smaller than the larger domestic mouse. In fact, it has a long, thick tail like the smaller domestic mouse. It chews, or more correctly it eats, and sometimes completely consumes the roots of the hops plant, parsnips, turnips and the rest of the legumes. It ravages crops: not only does this pestilential creature always hide in the earth, but it comes out rarely, if ever.

On the other hand, the poisonous frog, which our miners call by their own word *puriphrunos* (fire toad), because of the color of fire which is on it, hides continuously among rocks as if buried and interred. It is born deep inside the earth, and is only found in fissures, small cracks and gaps of rocks, since they hollow these out for themselves. In this way they appear in solid rocks, although there are no holes to be seen, since the rocks are broken open by wedges. Truly in this way the fire toad was discovered at Sneeberg and Mansfield. When this creature is brought out of its subterranean hollows into the light it first swells and begins to puff up, and soon it leaves life. This kind of frog is very often found in Toulouse in Gaul [France], in a sandy red rock marked with white spots from which millstones come. For this reason, this species breaks through all rocks before they can make millstones from them, and if frogs are inactive when they live in millstones, they grow hot, are accustomed to puff up, and when the millstone has broken open they infect the grain with their poison.

The mussel-worm [**Spondylis**], on the other hand, is accustomed to be found inside the earth, wrapped around plants' roots like a spindle whorl, for which reason the Greeks call it *spondulos*, since it bears that appearance. It is the length and width of a small finger: it has a red head, and the rest of the body is white, except the upper part is somewhat black. Whenever it consumes food it swells up. This creature is a pestilence for gardens, since it is not lacking feet, for it has six, and it does not crawl, yet Pliny writes that this species of creeping animal consumes the whole root of plants, the rind of fruits, and wherever the roots of these are covered, it gnaws away that much. In fact, it even eats the roots of the wild cucumber, the black pine-thistle, the centaury, the sulfur-wort, the birthwort, and the woodland grape vine, since no other animal would touch these. But the four-footed worm, which is born in May and runs in fields, is likewise as thick and long as the smallest finger, and like the earthly aphid (or other plant-eating pest), born in legumes, it lives above the earth. Its body is smooth, glittering black, thin and straight. The latter part of the body is attached to the chest. When it is held in the hands, it infects them with a greasy liquid, it pushes out urine as well as blood.

And indeed the roundworms [**Ascarides**], which are small worms, are not of one uniform color, for some are white, some yellow, and some black. Most often they are stirred up by the plow. Moreover, many are found gathered in one certain place. They lay waste to plants: indeed they kill strong crops from underneath by cutting their roots.

But earthworms [**Lumbricus**], which are likewise born inside the earth, and lack eyes are pulled out by the rain. Therefore Plautus's Euclio, when asked about a church filled with gold, says to Strophylus:

Outdoors, outdoors, O earthworm, you who crawl in this way out of the earth,
You who are visible nowhere in this way, now when you are visible, you die.

501 [01{501} typographical error in folio pagination]

In fact, snails on the Balearic islands, as Pliny writes, called cave-dwelling, do not crawl forth from their caves in the earth, and they do not live in the grass, but they cling together in groups like grapes.

Now I will continue on to the second class of subterranean animals, which live in wet places of the earth. For earthworms and other certain animals of this class are born as much in water as on land. Moreover, fossilized fish are found in two classes inside the earth, and they are tapered to a certain extent like eels and they lack a thick skin and scales like the gudgeon. And they have hard and not very pleasant tasting flesh. The larger ones are around two inches thick, the smaller ones around an inch. The former are approximately 16 inches long, the latter about 12. They emit a high-pitched noise. Drug sellers hang them enclosed in glass from a ceiling beam, so that they might present a spectacle for customers. For a long time they feed on bread and other things.

Those animals, however, which rush from rivers into marshy places, leaving through cracks in the river banks penetrate deeper into the earth, and sometimes as far as the closest town in the subterranean cellars, in which wine and beer are accustomed to be stored. And yet Theophrastus writes that they are found near rivers and in watery places. For when water floods the earth, they leave the river beds and go onto land, and when the flood abates, they are left on the dry land. And in this way, following the water they go onto land, then when the water is dried up into vapor they are left behind. They do not live any differently than fish among the rest of those which are salted. Moreover, they perceive nothing when they are in their hiding places because of a numbness of their senses, but when they are dug out they move. And Theophrastus says that they descend into the Black Sea no differently than those fish which ice encircles. For they do not feel or move themselves before they are cooked, having been tossed into a dish.

In fact, we see no fish that are accustomed to live continuously in rivers come up to the earth, left behind after floods in dry areas: they all die. And in this way, since fossilized fish are accustomed to be found in places which the water does not flood, it is certain that they entered that place through cracks and small fissures in the earth. Concerning this matter further, I have diligently turned to the Elbe River of Ortrand, the town which is near the Pulsnitz River. Not only are fossilized fish accustomed to be found in Germany, but even behind the Pyrenees Mountains, as Polybius says in the 34th book of his histories, and on the plain all the way up to the Narbonne River. The Illiberis and Roschinus rivers were carried through this plain, flowing near cities of the same names, which were inhabited by Celts. Therefore, there were said to be fossilized fish on this plain. For the ground on this plain is thin, and a lot of grass grows there, and the spread out stream of a river flows under this through the sand at a depth of two or three cubits. And if ever the plain is flooded with water, the fish go under the earth for the sake of nourishment, for miraculously they grasp the roots of the grass, and they cause the plain to be full of underground fish, which the inhabitants dig up. Fossilized fish are even found near Herculaneum and in many areas of the Black Sea, as Theophrastus published for posterity, and in Paphlagonia, as Eudoxus published. In fact, if we are to believe Seneca, there are pools full of shadows and large spaces under the earth. And animals are born in these, but they are limping and deformed, since they are made in dark air, and derived from fat in the lethargy-causing waters. And as he also writes, that in Caria, around the city of Idimum, when the water bursts forth, whichever ones have perished, those fish consumed, and the new river reveals them to a place that was unknown before that day.

Finally, perhaps because it is pleasing to theologians, demons [**Daemon subterraneus trunculatus**] are able to be considered in the number of natural subterranean animals, that live in certain mines. Moreover, the class of these creatures is divided in two. For there are those which are aggressive and terrifying to look upon, [538{502}] which are generally hostile and unfriendly to miners. Such was the one at the Annaberger mine, which killed more than twelve laborers with its breath, which is called a rose-halo. In fact, it emits its fiery breath from its open mouth. And it is said to have been seen in the image of a horse possessing a tall head and neck and savage eyes. And the one at Sneeberg was of this sort: covered with a black hood, it picked up a certain laborer from the ground into the highest part of the large cavernous space, which was rich in silver, and placed his mutilated body in the Georgian mine. In fact, Psellus, when he classified the number of demons into six types, says that this kind is worse than the others, because the material of its skin is thicker. Certain philosophers call these and similar demons, which are harmful and wicked by nature, stupid and lacking reason. 502

Then there are weak demons, which some of the Germans, as also the Greeks, call hobgoblins, because they are imitators of humans. For they passionately ridicule joy: and they seem to do many things, but they do nothing completely. Some call them mountain devils, since they are commonly noticeable in height, since they are certainly $\frac{3}{4}$ as tall as a dwarf. Moreover, they appear as old men clothed in the manner of miners, that is, clothed with a shirt, and dressed with a piece of cloth hanging from their loins. These are not accustomed to do damage to miners, but they wander in wells and mines and although they do nothing, they seem to train themselves in every habit of laborers, now they dig cavities, now they pour what is dug out into vessels, and now they maneuver the hauling machine. Although in fact the dirt sometimes irritates the workers, nevertheless it rarely harms them. The hobgoblin never harms them unless it is first provoked by loud laughter or insults. And in this way they are not very different from demons, but they appear to humans much more rarely than those, since everyday they complete part of their work at home and they attend to their beasts of burden. Because they act kindly toward these for our sake and they are in the ancestry of humans, at any rate since they seem to be friends, the Germans placed a name on them, so

they call them Gutelos: and you call them Trullis. Nevertheless these had a false sex of male or female and were in slavery among the other nations, especially among the Swedes. But mountain devils work chiefly in caves from which metals are already being dug out or there is the hope that they can be dug out. For this reason miners are not frightened by their labors, but they are more eager, recognizing an omen from them and they work more vigorously.

**Animantium nomina Latina Graecaque Germanice reddita,
quorum author in lib De Subterraneis animantibus meminit**

**Latin and Greek Names of Animals translated into German,
which the author calls to mind in the book on Subterranean
Animals**

NB: Latin [or Greek {italics}] and German name
(from Agricola, left column) followed by translation (right column)

Of those that walk (Gradientium)

Alce, elch/elend	moose or elk
Aper, wildschwein	wild boar
Araneus niger, schwarze feldspinne	black [field] spider
Asellus, schefflein: in fenestris uersatur	donkey, lives in windows (?)
<i>Batrachides</i> , kaulkröten	little frogs [tadpoles][kröten toads, eds.]
Blattae, wibel/bzotworme/springtwibel	cock roach or book worm
<i>Brexas</i> , laubfrosch	tree frog
Bufo, kröte	toad
<i>Kalamite</i> , item laubfrosch	tree frog
<i>Kampsiouros</i> , eichorn	dormouse
Caprea, reh	roe deer
Castor, piber	beaver
Cervus, hirs	stag/deer
Chamaeleon, Germanis est ignotus	chameleon, unknown to the Germans
Crocodilus, crocodil	crocodile
Cuniculus, cunlein	rabbit
Dama, ein gemp des horner vor sich gebogen sein	gazelle/antelope
<i>Eleios</i> , Italice gyro	dormouse, gyro in Italy
Erinaceus, igel/eius duo genera, huntsigel und sewigel	hedgehog
Fiber, piber	beaver
Formica, eims	ant
<i>Gale</i> , wisel	stoat/weasel
Glis, grossehaselmaus	dormouse
<i>Gurinoi</i> , Kaulkroten	polywog/tadpole
Hystrix, stachel schwein/ dornschwein/porcopick	porcupine
Ibex, steinpock	ibex
<i>Iktis</i> , iltes & aliae sylvestres mustelae	weasel (and other woodland weasels)
Lacerta, grunadex	lizard
Lacerta Chalcidica, kupferadex	Chalcidican lizard
Lacerta aquitilis, wasseradex	water lizard
Lupus, wolff	wolf
Lupus ceruarius, luxs	lynx/wolverine

Lutra, otter	otter
Martes, steinmarter/und paummarter	marten
Meles, daxs	badger
Melium, ein halsband dar under daxs gefuttert/so man den hunden anlegt	badger fur collar
<i>Molourides</i> , kaulkroten	tadpole/pollywog
Mus alpinus, murmelthier	Alpine mouse
Mus araneus, spitzmaus	shrew mouse
Mus agrestis, schormaus	country mouse
Mus lassicius, lassitz	
Mus Noricus, pilche/bilche/zisel/ bilch maus/ziselmaus	gopher
Mus domesticus maior, ratte	rat
Mus Pannonicus	Pannonican mouse
Mus Ponticus, hermlin	Black Sea mouse
Mus aquaticus, wasserm Maus	water mouse
Mus subterraneus, klein schörmauss	subterranean mouse
Mus sylvestris, haselmaus oder nösmaus	woodland mouse
Mustela domestica, wisel	domestic [=common] weasel
Mustela sylvestris, iltes	woodland weasel
<i>Mugale</i> , spitzmaus	rat
<i>Mus skiouros</i> , eichorn	dormouse
Noerza, noerz	mink
Platyceros, damhirs	wide-horned stag
Pulices terreni, erdfloh	ground fleas
<i>Puriphrunos</i> , feürkrote	fire toad
Rana rubeta, krote	toad
Rana temporaria, reinfroschlein	pure frog
Rana venenata fossilis, feürkrote	fire toad
Rana viridis parva, laubfrosch	small green frog, foliage [tree] frog
Ranae virides, sublividae, subcinereae frosche	green, slate, or gray frogs
Rupicapra, ein gempes des horner hinder sich gebogen sein	mountain goat
Salamandra, molch	salamander
Scarabeus, de quo hic loquimur, sewkefer	beetle [scarab] (about which we are speaking here)
<i>Skiouros</i> , eichorn	dormouse
Sorex, mitle haselmaus	shrew-mouse
Stellio, Tarantula [<i>sic</i> : ? in error] [Tarantula	gecko tarantula]
Talpa, molwurff	mole
Tarandrus, reen	reindeer
Testudo, schiltkrote	tortoise
Tragelaphus, brandhirse	wild goat or antelope
Vermis in Maio natus, meiworm	May worm

Viverra, furette und frette	ferret
Vormela, wormlein	lemming; marbled polecat
Ursus, beer	bear
Vulpes, fuchs	fox
Zobela, zobel	sable

Of those that fly (Volantium)

Alauda, lerch	crested lark
Anas immansueta, wilde ente	wild duck
Anser immansueta, wilde gans	wild goose
Apis, pien	bee
<i>Apodes</i> , spirschwalben	bank swallow
Aquila, adler	eagle
Ardeola, reiher	heron
Attagen, haselhun	hazel-hen
Bubo, groshuhu	horned owl
Ciconia, storch	stork
Cornix, Krahe [Krähe]	crow
Corvus aquaticus, wasserrabe	cormorant, water raven
Corvus, cuius caput rubra macula est insigne, holkrahe [-krähe]	crow (whose head is marked with a red spot)
Corvus nocturnus, nachtrabe	night crow [raven]
Crabro, horlitz	hornet
Cuculus, kuckück	cuckoo
<i>Kupselos</i> , spirschwalben	bank swallow
Fulica, wasserhun	coot
Galgulus, hemmerling	yellow bird (perhaps the golden oriole)
Gryllus domesticus, hausheim	domestic cricket
Gryllus agrestis, feldheim	wild cricket
Halcyon fluviatilis, eisvogel	river kingfisher
Hirundines domesticae, hausschwalben	domestic [=house] swallows
Hirundines agrestes, maurschwalben	wild swallows
Hirundines ripariae, spirschwalben	bank-dwelling swallows
Ibis auis Aegyptiaca Germanis ignota	Egyptian ibis bird (unknown to the Germans)
<i>Ikteros</i> , hemmerling	golden oriole
Lagopus, schnevogel	ptarmigan
Locusta, heuschrecke	locust
Mergus, teucher	gull
Merula, amssel und schamssel	black-bird
Milvus, weih oder hunerahr	kite
Noctua, ranzeule/schlaerule/ stockeule/steineule	little owl
<i>Nuktikorax</i> , nachtrabe	night raven
Olor, schwan	swan
Onocrotalus, schnegans	pelican
Palumbes, holztaube und ringeltaube	wood-pigeon

Perdix, räphun	partridge
Pica, agelester	magpie
Picus, specht	woodpecker
<i>Purrokorax</i> , holkrabe	fire raven
Querquedula, krichentlein	teal
Sturnus, stār	starling
Tetraones, pirckhuner und auerhän	wood grouse
Turdus, krametvogel/zimer/ wein drusschel/zipdrusschel	thrush
Vespa, wespe	wasp
Vespertilio, fledermaus	bat
Ulula, huhu	screech [tawny] owl
Upupa, widerhapfe	hoopoe
Vultur, hasengir	vulture

Of those that swim (Natantium)

Alburnus, weisfisch	white fish
Asellus, in Italia Asino	hake (Asino in Italy)
Aurata, Venetiis Auraia	gilthead (Auraia in Venice)
Barbus, parme	river barbel
Buccinum, in Liguria corneto	kind of shellfish (corneto in Liguria)
Cancer fluviatilis, krebs	river crab
Conger, in Italia congro	conger eel (congro in Italy)
Coracinus, Neapoli coracino	Egyptian bolti (coracino in Naples)
Delphinus, mehrrschwein/dar von kompt salspeck	dolphin
Glaucus	unknown fish
Gobio fluviatilis, schmerle	gudgeon or loach
Hippurus	goldfish
Lucius, hecht	pike, pike
Merula, Massiliae roquando	wrasse (roquando in Marseille)
Murena, in Italia murena	moray eel (murena in Italy)
Orphus, in Sicilia cernha	sea perch (cernha in Sicily)
Pisces fossiles, peifter und merputten/ qui sunt crassiores	fish fossils
Pecten, Venetiis cappe	scallop (cappe in Venice)
Perca, berse	perch
Primadia	
Purpura, in Graecia porphyro	purple murex (porphyro in Greece)
Raia, roch	skate or ray
Salar, fhure	an unidentified sea fish perhaps a trout
Salmo, salm/laxs	salmon
Sturio, stöz	sturgeon
Thynnus thunno	tunny fish
Turdus, Massiliae roquando	green wrasse (roquando in Marseille)

Of those that crawl (Serpentium)

Acontias, ignotus Germanis	dart snake, unknown to the Germans
Amphisbaena, ignota	Amphisbaena, unknown
Aspis, ignota	asp, unknown
Boa, unke	boa
Basiliscus, ignota	basilisk, unknown
Caecula, blindschliche	blindworm/slowworm
Calabricus serpens, , ignota	Calabricus snake, unknown
<i>Xersudros</i> , natter	water snake
Cenchris, ignota	Cenchris snake, unknown
Cerastes, hornichte schlange	horned snake
Dipsas, ignota	dipsa snake, unknown
Draco, drach	dragon
Dryinos, eichschlange	Dryinos
Haemorrhous, ignota	haemorrhoids, unknown
Natrix, natter	water snake
Porphyrus, ignota	Porphyros, unknown
Scytale, ignota	cylindrical snake, unknown
Sepedon, ignota	snake
<i>Tuphlinos</i> , blindschleiche	[<i>Typhlinos</i>], blind snake
<i>Tuphlops</i> , blindschleiche	[<i>Typhlops</i>], blind snake
Vipera, Italis marasso	viper, marasso in Italy
<i>Hudros</i> , natter	[<i>Hydros</i>], water snake [adder or viper]

Of worms (Vermium)

Ascarides, erdworme	earthworm/pinworm/roundworm
Lumbricus, reinworm	earthworm/pure worm
Scolopendra, nassel	venomous centipede/nereid worm
Spondylis, engerle	mussel [worm]
Teredo, kupferworm	wood worm

Of demons/supernatural beings (Daemonum)

Daemon subterraneus truculentus	mountain devil/mitis
bergteufel mitis bergmenlein/ kogel/guttel	

Index in Librum De subterraneis animantibus secundus

Second Index in the book about Subterranean Animals

NB: Words in *italics* are transliterated from the Greek. Pagination shown for the original text and may be found in the translation by reference to the boldfaced numbers in brackets [XXX] that delimit the beginning and end of each of the original folio pages.

A

Acontias (quick-darting snake)	498 mid.
Aelianus	478 mid., 498 mid.
Aenariae coloni terrae motu & calidarum aquarum effusionibus sedibus exacti (Aenarian inhabitants, driven out by the motion of the earth and the outpouring of hot water from their homes)	480 top
<i>Akanthochoiros</i> , qui & histrix (porcupine [<i>akanthochoiros</i> as well as <i>hystrix</i>])	491 mid.
Alaudae (Crested larks)	482 bot.
hyeme latent in caver nis montium (hide in the winter in caves of mountains)	494 mid.
Albertus Magnus (Albert the Great)	480 mid.
Alce (elk)	485 top
Ambrosius Fibianus	499 mid.
Amphisbaena	496 bot.
Anates immansuetae (wild ducks)	481 top
Animal incognitu repertum in Norico (unknown animal found in Noricum [former Roman Province now including most of Austria south of the Danube, and excluding Tirol])	480 mid.
Animantes subterraneae quae proprie & sint & dicantur (Subterranean animals, esp. what they are and what they are said to be)	479 bot., 499 mid.
those which live on dry land	499 bot.
those which live in the water	500 bot.
Animantium subterraneorum tria genera (the three classes of subterranean animals)	482 top
Animantes omnes natura mutationem sentire (that all animals by nature perceive the change [of the season])	479 bot.
Animantes quae in regionem e qua egressae sunt non reuertuntur (animals which do not return to the region from which they left)	479, 480 top
reuertuntur (which return)	480 bot., 481 top.
Animantes frigoris aut caloris uitam di causa locum mutantes (animals that change location to avoid hot or cold)	481 top
Animantes quae noctua uel interdiu in cauernis terrae delitescunt (animals that hide at night or during the day in caves in the earth)	482 top and following
Animantes quae in terra latet aliquo anni tempore (animals which hide in the earth during a certain season)	486 bot. and following up to p. 500
Anseres immansueti (wild geese)	481 top
Aper (wild boar)	485 top
Apes (bee)	481 bot.
<i>Apodes</i> , as well as <i>kupseloi</i> (bank swallows)	494 top
Aquatilia quae aliqua anni parte se in coeno uel arena condunt (aquatic animals which bury themselves at a certain time of the year in mud or sand)	494 mid.

Aquila Northusae mortua (the eagle killed in Northusa)	480 mid.
Aquila a lanio Dincelspyhelensi occisa (the eagle killed by the butcher of Dincelspyhelensus).	480 mid.
Aranei nigri (black spiders)	493 bot.
Aratus	495 bot.
Ardeola (heron)	481 top
Aristotle.	478 mid., 479 mid., 485 mid., 487 bot., 492 mid., 493 top, 498 top
Aristophanes	486 top
Arces subterraneae (subterranean citadels).	482 mid., bot.
Ascalabus, <i>askalabotes</i> , and stellio (gecko)	493 mid.
Ascarides (earthworm/pinworm/roundworm).	499 bot., 500 bot.
Aselli rimis parietum occultantur (donkeys [Aselli] are hidden in cracks of walls).	481 bot.
Asellus (the hake fish hides itself during the summer months)	474 mid.
Asio noctuae species (the appearance of the little horned owl)	486 top
Aspis, & eius genera (Aspis and the classes of this [asp, and its relatives {kinds}])	497 mid., bot.
Attagenes (hazel-hen)	481 mid.
Aves hyeme in cavis arboribus latet (birds which hide in hollow trees during the winter)	481 bot.
Aves luteae (yellow birds).	479 mid.
Aves quaedam cur uerno tempore conspiciantur implumes (certain birds are seen without feathers during the spring)	482 top
Aves nocturniae (nocturnal birds).	485 bot.
Aurata aestiuis mensibus se condit (the gilthead [Aurata] hides itself during the summer months).	494 mid.

B

Basiliscus (basilisk)	498 bot.
Batrachides (tadpoles)	495 bot.
Blattae parietum rimis occultantur (cockroaches [Blattae] are hidden in cracks of walls).	481 bot.
Boae ex natricum genere (boas of the class of water snakes)	497 mid.
Brexas (tree frog [see definition in <i>Animantivm nomina</i>]) (<i>brexas</i> , rana)	495 mid.
Bubo (horned owl)	485 bot., 494 mid.
Buccina (shellfish).	494 mid.
Bufo (toad)	495 bot.

C

Cancer fluviatilis (river crab)	496 top
Calabricus serpens (Calabrian snake)	497 top
Caprea (deer [roe deer or wild she-goat]).	485 top
Cassianus theologus (the theologian Cassianus).	499 top
Castor (Beaver (<i>kastor</i>)).	484 bot.
Castorea.	same
Caucasus mons (Caucasus mountain).	482 mid.
Causon quae & dipsas (Causon and dipsas snakes).	496 bot.
Caecula hyeme se condit in terra (blind snake buries [hides] itself in the earth) during the winter)	496 bot.

Cellae subterraneae (underground chambers [burrows])	482 mid.
Cenchris serpens (Cenchris snake)	498 mid.
Centipeda quae & scolopendra (centipede and nereid worm)	494 top
Cephi Aethiopici (Ethiopian goblet)	480 mid.
Cerastes (horned snake)	497 bot.
Cervus (stag)	485 top
Ciconiae (storks)	481 mid.
Chameleon	492 mid.
aura alitur (is nourished by the wind)	493 top
<i>Chamaitupeia</i> (brothels)	483 top
Chelydros (venomous water snake)	497 bot.
Chersydros (water snake)	497 top
Cicero	499 mid., 500 top
Circe	482 mid.
Cleopatra aspidas ptyadas sibi admouit (applied the venomous asp to herself)	497 bot.
Columella (small pillar)	496 bot.
Coenobium subterraneum in Sedonis (underground monastery in Seduna)	482 mid.
Corpus subterraneum (subterranean bodies and the classes of them)	479 top
Corvus aquaticus (cormorant)	481 top
Corvus and <i>purrokorax</i> (raven and fire raven)	481 bot.
Corvus piscis hybernus mensibus secundit (fish hides itself during the winter months)	494 mid.
Conger	same
Cochleae (snails)	same
Cochleae cavaticae (cave-dwelling snails)	499 bot., 501 top
Colubri Thebani cornuti (Theban horned serpent)	498 top
Crabrones sylvestres (woodland hornets)	481 bot.
Crocodylus (crocodile)	494 mid.
insulam Ten tyritarum non adnatat (does not swim to the island of Tentyros)	495 top
Cuculus (cuckoo)	481 bot.
Cuniculus (rabbit)	483 mid.
Cymbri (tribe: see also under K[appa]).	480 top

D

Dama (antelope)	485 top
Dantisci bona pars vulgi sub terra habitat (The great part of the Dantiscan people lives under the earth)	483 top
Daemones subterranei, & eorum du plex genus (subterranean demons and the two classes of them)	501 bot., 502 top
Delphinus (dolphin)	494 mid.
Delphinus hostis crocodili (dolphin hostile to crocodiles)	495 top
Dioscorides	478 top
Dipsas (dipsas snake)	496 mid.
Domus in Armenia maiori quales (the types of large homes in Armenia)	482 mid.
Draco (dragon)	499 top
cum aquila & elephante pugnat (fights with the eagle and the elephant)	499 top
Dryinos	497 bot.

E

<i>Eleios</i> Aristoteli glis dictus ([<i>eleios</i>] called dormouse by Aristotle)	487 bot.
<i>Erinaceus hyeme in cavis arboribus se condit</i> (Hedgehog buries [hides] itself in hollow trees in the winter)	481 mid., 484 bot.
<i>Echidne</i> (serpent or viper)	496 top

F

<i>Liber</i> [<i>sic</i>] = Fibe, & eius descriptio (beaver and its description)	484 top
<i>Fibri pelles & testes</i> (hides and testicles of a beaver)	484 bot.
<i>Formicae</i> (ants)	481 bot.
<i>Fossae Prenestine</i> (Prenestine canals)	483 top
<i>Fulica</i> (Coot)	481 top
<i>Fulvius Hirpinus uiuaria gliribus in stituit</i> (set up an enclosure for dormice)	488 mid.

G

<i>Galgulus</i> (golden oriole)	481 top
<i>Geleotes</i> , qui & stellio (gecko/lizard (<i>geleotes</i> and gecko)	493 mid.
<i>Galenus</i>	497 bot.
<i>Gale</i> , quae uisela (<i>gale</i> or weasel)	489 mid.
<i>Ganeum</i> (common eating house)	483 top
<i>Glaucus piscis hybernis mensibus se condit</i> (fish hides itself during the winter months) .	494 mid.
<i>Glis</i> (dormouse)	481 mid., 488 top
<i>Gliraria</i> (dormouse)	488 top
<i>Gothi ex Scandia in Sarmatiam & Daciam</i> (Goths from Scandia moving to Sarmatia and Dacia)	480 top
<i>Grues ab ultimis quasi terris in untimas discedunt</i> (Cranes leave from the ends of the earth to the other side)	481 mid.
<i>Grylli domestici agrestes</i> (savage native crickets)	493 bot.
<i>Turinoi</i>	495 bot.

H

<i>Halcyones marinae, fluuiatiles</i> (marine kingfishers and river-dwelling)	485 mid.
<i>Hamester qui à quibusdam cricetus</i> (hamster, which is called cricetus by some)	490 mid.
<i>Hamestri appellatio in hominem uo racem apud Germanos</i> (the name of hamster applied to a greedy man among the Germans)	491 top
<i>Haemorrhoids</i>	498 top
<i>Hippurus piscis</i> (goldfish)	494 mid.
<i>Hirundines hyeme in loca tepidiora secedunt</i> (swallows leave warm places during the winter)	494 mid.
<i>Hirundines ripariae, quae & apodes and kupseloi</i> (bank-dwelling swallows, as well as <i>apodes</i> and <i>kupseloi</i>)	494 top
<i>Hystrix hybernis mensibus, ut Plinius scribit, in specus secedit: aestiuus: ut Albertus</i> (The porcupine [<i>hystrix</i>], according to Pliny goes into caves during the winter months: according to Albertus during the summer)	491 top
<i>Hystricis descriptio</i> (Description of the porcupine)	same

Hoensteinum (Hoenstein)	483 top
Homerus (Homer)	482 top
Homines cauernas succedentes, qui ex eo Troglodytae (Humans go below into caves, which are from Troglodytus)	492 mid.
Homines sylvestres Scricfinniae (Woodland people from Scricfinnia)	482, 486 mid.
Hydros (water snake).	497 top

I, J

Iaculus serpens (Spear snake)	498 mid.
Ibex	485 top
Ibis Aegyptia (Egyptian ibis).	499 top
in Alpibus visa (seen in the Alps)	480 mid.
Ichneumon [mongoose] crocodilo inimicus (hostile to crocodiles). . 495 [act., 494-5] bot., 496 top (especially hostile to) aspidi (to asps [viper]).	497 bot.
Iktoros (weasel)	481 top
Iktis, mustelae genus (the class of weasel)	489 mid.
Iktoros pellis, proverbium apud Germanos in vilissimum & maxime foetidum scortum (The pelt of the weasel, said among the Germans to be worthless and especially foul-smelling)	the same, bottom

K

<i>Kalamite</i> rana (frog)	495 mid.
<i>Kampsiousuros</i> , Latinis sciurus (squirrel, [in] Latin <i>sciurus</i>)	487 bot.
<i>Kikkaban</i> , sonus quem ululae edunt (shriek owl, which they call ululae)	486 top
<i>Kobaloi</i> , daemones hominum imitatores (demons that are imitators of humans)	502 top
<i>Kupseloi</i> , quae & <i>apodes</i> (bank swallows [in Greek] <i>Kupseloi</i> , as well as <i>apodes</i>)	494 top

L

Lacerta Chalcidica quae & seps (the Chalcidican lizard as well as snake)	492
Lacerta hybernis mensibus in terra latet (the lizard hides in the earth during the winter months.	same
Lacerta a stellione quomodo differat (the lizard differs in what way from the gecko) . . .	493 mid.
Lacerta aquatilis (water lizard)	492 mid.
Lacerta viridis (green lizard).	same
Lagopus (ptarmigan)	485 mid.
Lepus (hare)	same, top
Locustae in Pannonias, Daciã & Lygíos proximis annis involarunt (Locusts flew into Pannonia, Dacia and Lygia last year).	480 mid.
Lubeci bona pars vulgi sub terra habitat (good part of the Lubecian people lives under the earth)	483 top
Lucanus	498 mid., 499 mid.
reprehensus (criticized)	497 top
Lumbrici (earthworms)	499 bot., 500 bot.
Lupus (Wolf)	485 top
Lupus ceruarius (lynx/wolverine)	483 mid.
Lutra, & eius descriptio (otter and its description)	483 mid., 484 top, mid.

M

Martialis (Martial)	488 top, 490 bot.
Meles (badger)	483 mid, bot., 485 top
caninus suillus (resembling a young pig)	485 top
Melia (badger skin collars)	same, mid.
Mergus (gull).	481 mid.
Merulae (black-birds)	same, bot., 494 mid.
Merula piscis (wrasse fish)	494 mid.
<i>Molge</i> Graeco nomine Germanis, quae salamandra (salamander, by the Greek name from the Germans)	493 mid.
<i>Molourides</i> ranae (tadpole/pollywog)	495 bot.
Multipeda & millipeda, quae & scolopendra (multipede and millipede, as well as centipede	494 top
Murena hybernus mensibus se condit (moray eel hides itself during winter months). . .	same, mid.
Mus Alpinus (alpine mouse).	486 bot., 487 top
Mus aquitilis (water mouse)	496 top
Mus araneus, qui & <i>mugale</i> (shrew mouse as well as <i>mugale</i>).	489 top
Mus lassicius (Lassician mouse).	488 mid.
Mus Noricus, qui citellus (gopher)	488 mid.
Mus Pannonicus (Pannonian mouse)	same
Mus Ponticus (Black Sea mouse).	481 bot.
<i>Mus skiouros</i> (dormouse).	487 bot.
Mus sylvestris (wood mouse).	488 bot.
Mus subterraneus, qui & agrestis (subterranean mouse, that and country mouse)	500 top
Mustela quae proprie <i>gale</i> (weasel which is especially known as <i>gale</i>)	489 mid.
<i>iktis</i> ibid (as above)	same, mid.
quae martes ibidem (which is known as marten).	same, bottom
quae Germanis zobela (which is zobela in German)	490 top
Mustelarum virus basilisco exitio (venom of weasels as the destruction of basilisks). . . .	498 bot.

N

Natrix hyeme in cava terrae ingreditur (water snake) goes into hollows in the earth during the winter	497 top
eius genera ibid. (classes of this animal).	same
Nicander	493 mid., 495 bot., 496 bot., 497 bot., 498 mid.
reprehensus (criticized)	496 mid.
Nitedula (dormouse)	500 top
Noerza (mink)	490 mid.
Noctua (little owl).	485 bot., 486 top, 494 mid.
Noctuarum genera (kinds of nocturnal animals).	486 top
Nycticorax (night raven).	485 bot., 486 top

O

Olores (swans).	481 top
Onocrotalus (pelican).	same, mid.
Opianus (opium)	478 mid.

- Orphus piscis hybernis mensibus se condit (sea perch hides itself during winter months) 478 mid.
 Ovidius (Ovid) same
 Ova serpentium in ignem coniecta flammam restinguere (eggs of snakes thrown
 into fire to extinguish the flame 495 bot.

P

- Palumbes (wood pigeons) 481 bot., 494 mid.
 Pecten (scallop) 494 mid.
 Perca (perch) same
 Perdix (partridge) 481 mid.
 Perfaru régés hyberno tempore Babylone, verno Susis, aestivo in Ecbatanis degebant
 (Kings of Persia spending the winter in Babylon, the spring in Sufi, and the
 summer in Ekbatana). 480 bot.
Puriphrunos (fire toad) 500 top
Phrunos, rana rubeta (toad) 495 bot.
 Picus (woodpecker) 481 bot.
 Pisces vitandi caloris & frigoris gratia mutant locum (Fish change location to avoid
 cold or heat) same, mid., bot.
 Pisces fossiles (fossilized fish) 501 mid., bot.
 Platyceros (wide-horned stag) 485 top
 Plinius (Pliny) 478 mid., 480 mid., 485 top, 488 mid., 494 mid., 497 mid., bot.,
 498 top, bot., 499 bot., 500 bot., 501 top
 reprehensus (criticized) 495 mid., bot., 496 mid.
 Polybius 501 mid.
 Porphyrius 478 mid.
 Porphyrus serpens (Porphyrus snake) 498 mid.
 Prester à dipsade differt (A waterspout differs from a snake) 496 bot.
 Prenestinae fossae (Praenestine ditches [trenches; mines]) 483 top
 Primadiae 494 mid.
 Psellus 502 top
 Psyllorum olfactu serpentes fugantur (snakes are put to flight by the scent of
 the Psylli tribe) 495 mid.
 Pufhardum (Pufhard in Thuringia) [now Buchfart] 482 bot.
 Purpua (purple murex: purple snail) 494 mid.
Purigonoi, bestiolae (Fire-born insects) 499 mid.

Q

- Querquedula (teal) 481 mid.

R

- Raia (skate or ray) 494 mid.
 Ranarum diversa genera (different kinds of frogs) 495 mid., bot.
 Rana rubeta (toad) same, bot.
 Rana quae *kalamite* (frog [Latin] as well as frog [Greek]) same, mid.
 Ranae temporariae (pure frog) same
 Rana venenata (poison frog) 499 bot., 500 top, mid.

Renum doloris medicamētũ (a cure for kidney disease)	485 mid.
Reinesteinum (pure stone)	482 mid.
Rupicapra (mountain goat)	485 top

S

Sal inimicus lacertae aquatili (salt hostile to water lizards)	492 mid.
Salamandra, quae Germanis Graeco nomine <i>molge</i> (Salamander, which is named <i>molge</i> in Greek by the Germans)	493 mid., bot.
Salmo (salmon)	481 mid.
Scandia	480 top, 482 mid.
Scarabei rutili (red scarab [beetle])	493 bot.
Scolopendra (centipede)	same
Scricfiniae sylvestres homines (Woodland men of Scricfinnia)	482 mid.
Scytale (cylinder snake)	496 bot.
<i>Skiouros</i> (dormouse)	487 bot.
Seneca	501 bot.
Sepedon (snake)	498 mid.
Seps seu lacerta Chalcidica (Seps, or Chalcidican lizard)	492 top
Serpentes hyeme latentes (snakes hiding during the winter)	496 top, mid.
Serpens Calabricus (Calabrian snake)	497 top
Servius	500 top
Sorex (shrew-mouse)	488 mid.
Spondylis vermis (Mussel worm)	499 bot., 500 mid.
Stellio (gecko)	493 mid.
Sturio (sturgeon)	481 mid.
Sturni (starling)	481 bot., 494 mid.
Subterraneum corpus, & eius divisio (Underground bodies and their classification)	479 top
Sibyllae Cumeae antrum (The cave of the Cumaean Sibyl)	482 mid.

T

Talpa (mole)	499 bot.
Tarandrus (reindeer)	485 top
Tenedi insulae piscatores rupiũ specubus pro domibus utũtur ([the way in which] fish on the island of Tenedos use holes in rocks for homes)	482 mid.
Tenyritae	495 top
Teredo (wood worm)	499 mid.
Terrarium quasdam oras onera, quibus premuntur in alias saepe deponere (Burdens which press certain countries of the earth are often lifted onto others)	480 top., mid.
Tetraones (wood grouse)	481 mid.
Teutones (Teutoni tribe)	480 top
Thebani colubri (Theban serpents)	498 top
Theophrastus	478 top, 501 top, bot.
reprehensus de piscibus subterraneis (criticized concerning subterranean fish)	501 top
Testudo terrestris (Land tortoise)	493 bot.
Thynnus (tunny fish)	481 mid., 486 mid.
Tragelaphus (wild goat or antelope)	485 top

Troglodytae.	482 mid., 486 mid.
Trochilos crocodilo dentes & fauces repurgat (The Egyptian plover [trochilos] cleans the teeth and throat of a crocodile)	494 bot.
Trulli daemones (Trullan demons)	502 bot.
Turdi (thrushes)	481 bot., 494 mid.
Turdus piscis (green wrasse)	494 mid.
Turtures hyeme in cavernis montium latent (Turtle-doves hide in caves of mountains in the winter)	481 bot., 494 mid.
<i>Tuphlinos, tuphlinops</i> (blind snake)	496 bot.

V

Varro.	485 mid., 486 top, 488 top
Vermis quadrupes in Maio natus (The four-legged worm born in May)	494 bot.
Vespertilio (bat)	485 bot., 486 top, mid., 494 mid.
Vespae (wasps)	481 bot.
Vipera quae <i>echidne</i> (viper also called <i>echidne</i>)	496 top, mid.
Virgilius (Virgil)	497 top, 500 top
Visela quae <i>gale</i> (weasel also called <i>gale</i>)	489 mid.
Viverra (ferret)	490 mid.
Vlula [Ulula] (Screech [or tawny] owl)	485 bot., 486 top, 494, mid.
Volucres quae hyeme se condunt in terra (birds that hide themselves in the earth during the winter [in hollows of trees])	494 mid.
Vormela (lemming; Marbled polecat)	491 top
Vpupae [Upupae] (hoopoes)	481 bot., 494 mid.
Vrsus [Ursus] (bear)	491 mid., bot.
Vulpes (fox)	483 top, mid., bot.
Vultur (vulture)	481 top

X

Xenophon	482 mid.
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Z

Zobela mustelae species (The sable species of weasel)	490 top, mid.
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The end of the index on subterranean animals.

Facsimilae reprint

Georgius Agricola's 1556 edition of *De Animantibus Subterraneis* as it appeared as Libri XII in *De Re Metallica*.

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**The authors
26 November 2008**

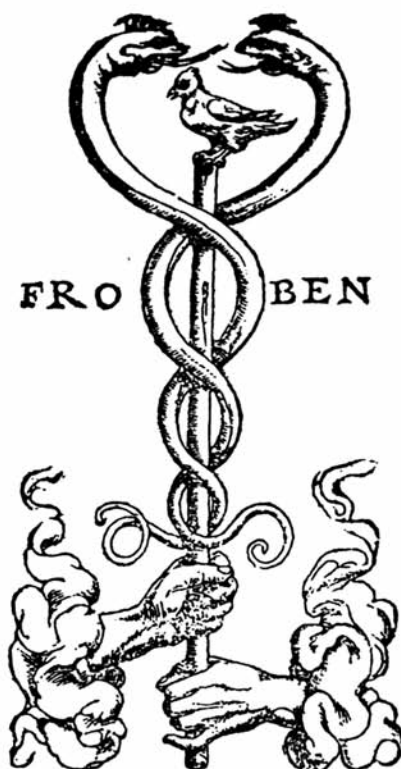
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GEORGII AGRICOLAE DE RE METALLICA LIBRI XII ▷ QVI▷

bus Officia, Instrumenta, Machinae, ac omnia denique ad Metallificam spectantia, non modo luculentissime describuntur, sed & per effigies, suis locis insertas, adiunctis Latinis, Germanicisque appellationibus ita ob oculos ponuntur, ut clarius tradi non possint.

E I V S D E M

DE ANIMANTIBUS SVBTERRANEIS Liber, ab Autore recognitus; cum Indicibus diuersis, quicquid in opere tractatum est, pulchre demonstrantibus.



BASILEAE M▷ D▷ LVI▷

Cum Priuilegio Imperatoris in annos v.
& Galliarum Regis ad Sexennium.

LIBER DVODECIMVS.

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SCRIPTORVM, QVORVM INVEN-
tis author in sequenti De animantibus subterraneis libro usus,
& ad hanc experientiam excitatus est,
CATALOGVS.

Ælianus	Lucanus
Albertus	
Alexander Aphro-	Martialis
dienfis	
Ammonius	Nicander
Aratus	
Aristoteles	
Aristophanes	Oppianus
Athenæus	Ouidius
Cassianus Theologus	
Charisius	Plautus
Cicero	Plinius
Columella	Pfellus
Corn. Tacitus	
	Seneca
Dioscorides	Seruius
	Strabo
Galenus	
	Theophrastus
Homerus	Varro
Horatius	Virgilius
Iornandes	Xenophon

GEORGIVS

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GEORGIVS AGRICOLA GEOR=

gio Fabricio S. P. D.

Vanquam duos libros de stirpibus scripsit Aristoteles, tamen
 ijs Theophrastum discipulum non deterruit, quo minus suam
 de ijsdem stirpibus sententiam multis libris explicaret. Nec ipse
 Theophrastus tanta scientia, tantaq; copia studium Dioscori-
 dis ardoremq; restinxit: sed etiam is posteritati seruiens quarun-
 dam arborum ac herbarū figuras & uires, longo atq; multo usu perceptas,
 literis memoriæq; mandauit. Male enim se habuissent studia, si ætate inferi-
 oribus ad ea quæ à maioribus erant inuenta, nihil addere licuisset: certe si
 Græci hanc legem iniquam quondam accepissent, nulla ars, nulla scientia,
 nulla disciplina potuisset perfici. Quapropter etsi Aristoteles libros com-
 plures edidit, in quibus animantium naturas, partes, ortus, ratione & uia est
 persecutus: tamen philosophiæ deditos auocare nec uoluit, nec debuit, à stu-
 dio tum perquirendi posterisq; prodendi naturas earum animantiū, de qui-
 bus parum aut nihil scripsit: tum tractandi locos, quos in ijs libris non satis
 expressit. Itaq; etiā apud Græcos Oppianus scripsit de piscibus, de animan-
 tium natura Porphyrius & Ælianus: apud Latinos item de piscibus Ouidi-
 us, de omnibus ferè animantibus Plinius. Quos scriptores ego secutus cum
 res subterraneas, quæ anima carent, exposuissem pluribus libris, ut rationē
 institutam, quoad fieri posset, absoluere, animantes etiam descripsi subter-
 raneas: nec eas modo quæ perpetuo ferè uersantur in terra, sed eas q; quæ
 certis anni temporibus in eadem solent latere. Quo sanè modo & bestiarū
 quarundam formas Aristoteli & alijs uel incognitas, uel parum expressas,
 & illius locum de animantibus, quæ hybernis se condunt mensibus, uolui
 latius explicare. Hunc librum si probauero tibi, qui Latinis & Græcis li-
 teris in primis eruditus, animantium naturas scrutaris, & iam multarum co-
 gnitionem cepisti, eum facilius, ut spero, cæteris qui item rerum occultarum
 studio delectantur, probabo. Vale Kempnicj, III Idus Aug. Anno
 M. D. XLVIII.

GEORGII

GEORGII AGRICOLAE DE ANIMANTIBVS

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subterraneis Liber, ab autore recognitus.



CORPVS subterraneum, ut res ipsa demonstrat, in animatum distribuitur, & inanimatū: quod autem animi expers est, rursus diuiditur in id, quod sua sponte erumpit ex terra, & in id, quod ex eadem effoditur. De altero inanimi genere dixi in quatuor libris De natura eorum quæ effluunt ex terra inscriptis, de altero in decem De natura fossiliū: nūc de subterraneis animantibus dicā. Cū uero genus animantiū omne constet ex quatuor elementis, & corpus humidū ac siccū, id est aqua & terra, ad accipiendū apta sint, necesse est ea ipsa duo elementa animantium materiā esse. Ex quo rursus illud quoddam naturæ necessitate consequitur, ut omne animal & in aqua uel terra gignatur, & in eis cōmoretur atq; uita fruatur. Nam bestię uolucres, & si passim per aerem uolitant, tamen in terra, uel in stirpibus ex ea natis, uel in ædificijs super ipsam collocatis, construunt nidos, & eis aut terra aut aqua cibos suppeditat. Vt enim uerum sit quod perhibent, aues raras illas, & non adeo magnas, quarum pennas longas, & colore luteo dilutiore splendentes, rex Turcarum in superiore parte coronæ, multis gemmis preciosis ornata gestat, in aere perpetuum uitæ cursum tenere, foeminam ouis quæ parit, super dorsum maris sinuatum, locatis uentre item sinuato incubare, & pullos excludere, neutram uiuam unquam pedibus breuissimis, & in pluma reconditis terram attingere, tamē solo aere nec ali uidentur posse, nec augescere, sed his quibus uescuntur. Ac uero etiā bestiolæ, quæ *τρυφονοι*, propterea quod in terreno isti igni gignuntur, à Græcis nominantur, terra & aqua non carēt: gignuntur aut, ut Aristoteles scribit, in his Cypri fornacibus, in quibus lapis ærarius multos dies crematur: atq; magnis muscis paulo maiores sunt & subalata. In igni ambulant & saluant, sed emoriuntur quā primum ab eo dimotæ fuerint. Animantium aut partim, tametsi latere soleant, nō subeunt terræ rimas, nec foramina, nec speluncas: quæ in subterranearum numero non sunt: partim noctu, aut interdū subterraneas succedunt cauernas, partim certo anni tempore: quarū utræque eo ipso diei uel anni tempore subterraneæ sunt, atq; dici possunt: partim ferè perpetuo occulte in terra latent: quæ subterraneæ & semper sunt, & proprie dicuntur. Vt autem res expressior & illustrior fiat, paulo altius ordiar. Quoniam animantes omnes natura mutatioes temporum sentiunt, pleræq; frigoris aut caloris uitandi causa, uel regionem, locumue mutant: uel ingrediuntur in domicilia, aut arbores exesas & excauatas: uel subeunt terram. Earum aut quæ regionem mutant, aliæ semel egressæ nunquam reuertuntur, aliæ reuertuntur: nunquam redire solent rationis participes, hoc est homines. Etenim hi non modo frigoris aut caloris uitandi

uitandī causa alibi sedem collocant, uerum etiam ex regionibus macris & nihil ferentibus migrant in opimas & fertiles: uel cū tanta multitudo fuerit orta, quantam non satis cōmode alit regio, partim aliō ad habitandum cūt. Quo sanē modo alia ora parsq; terrarū onus, quo premitur, in alia sæpe deponit: quibus de causis Scandia, peninsularum omnium maxima, olim magnam Gothorum copiam unā cum coniugibus & liberis effudit in Sarmatiam & Daciam. Cymbros uerō et Teutones, ex ultimis Galliæ Belgicæ oris, in quas ē Germania cōmigrarunt, maris inundationes exegerunt. Et eadē ac terræ motus atq; eruptiones igniū & aquarum calidarum effusiones ex Ænaria colonos, quos Hiero tyrannus Syracusanus eō miserat. Atq; his ferē de causis gentes aut uictæ ab his quæ migrarunt, expelluntur & eiciuntur ex proprijs sedibus ac possessionibus, uicissimq; etiam ipsæ in alienas irruunt & eas occupant: aut subactæ & bello domitæ uictricibus seruiūt: aut tam uictæ quā uictrices cōmuni conditione libertatis eandem regionem obtinent. Simili modo animantes rationis expertes, maxime uolucres, ex regionibus in quibus & natæ sūt & uiuere consueuerunt, nunquam rediūræ in exteras se conferūt: etsi rariū. Quo pacto ab hinc annos sex, locustæ, diræ herbarum, leguminū, segetum, stirpium, quas uastant, pestes, gregatim inuolarunt in Pannonias, in Daciam, in ueterem regionem Marcomannorum, Lygiorumq;: ut quondam etiam sæpe ex Africa in alias Europæ oras. Quin ut interdum unicus homo in longinquas regiones abit, nec redit unquam, ita unum solū animal: quo modo annos abhinc propē uiginti in Norico captum est animal canis uillis uestitum: cuius, ut cephi Æthiopici, prioribus pedibus similitudo erat cum humanis manibus: posterioribus cum humanis pedibus. Et Alberti cognomento Magni temporibus in Slauorū syluis cōprehensæ sunt animantes duæ, mas & fœmina, quarum pedes priores item erant similes manib. humanis: posteriores pedibus humanis: eas uerō ipse putauit esse in simiarū genere. Ac ibi Ægyptiā in Alpibus à Marco Egnatio Caluino præfecto uisam Plin. memoriæ prodidit. Aquilā q; Northusæ in Toringia, quū ibi consenuisset, mortuam scimus. Hoc etiā anno, qui est octauus & uicesimus imperij Caroli quinti, Ianus quidam Dyncepspyhelenis aquilam profligatam occidit, & quasi donum senatui attulit: quæ aquila in eum in equo sedentem, pridie Epiphaniæ prope Rotelin opidum impetu tam uiolento inuolauit, ut non procul abesset à periculo uitæ. Eodem modo uerisimile est aliquos etiam pisces, cū semel reliquerunt mare, in fluuios, qui per longinquas regiones fluunt, ingredi, & nunquā in idem redire. Hactenus de generibus animantium dixi, quæ in regionem ē qua egressæ sunt, non reuertuntur: nunc dicam de his quæ reuerti solent: quæ & eadē sunt, & eadem ferē de causā, caloris scilicet uel frigoris uitandī, à regione, cuius incolæ sunt, semigrant: & quidē æstate in locis frigidis, hyeme in tepidis morantur. Etenim homines qui ualitudini dant operam, ut tueri se possint à calore, in æstiuis sunt: ut à frigore, in hybernis: qui mos in primis fuit Romanis. Atq; etiam reges et domini multarum gentium æstate in alias terras abeunt, in alias hyeme: nam reges Persarum olim hyberno tempore Babylone degebant, uerno Susis, æstiuo in Ecbaranis. Eodem modo bestię

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bestiæ uolucres & aquatiles solū mutant & secedunt: quarū aliæ in his ipsis regionibus & locis, in quibus æuum agere consueuerunt, refrigerationem in æstate, in hyeme teporem solent persequi: aliæ in longinquis & ultimis. Ac ferè uolant, natant, eunt ad habitandum in locis, in quibus aer ita sit temperatus, ut cibos ferat uel suggerat: quorum nascendi facultatem eis adimit terra, quando frigore obrigit, uel calore exaruit: aqua eos non suppeditat, quando cōglaciavit. Aues enim quædam æstiuo tempore in syluis, hyemali ad horrea & tecta plerumq; cōmorantur: ut pica, cornix, lurida, quam ἰκταροπ Græci, Latini uocant galgulum: quædam cum æstate æuum agant in syluis, hyeme demigrant in finitimos locos apricos, montium recessus secutæ: sicuti uultures, milui, sturni, turdi, merulæ, palumbes, upupæ. Aquatiles etiam uolucres temporibus hybernis se conferunt ad lacus & fluuios, in austri partibus sitos, qui frigore non congelant: aut ad aliquam fluminum partem, cui aqua non congelat: ut ardeolæ, mergi, corui aquatici, onocrotali, fulicæ, anates immanfuetæ, querquedulæ: quædā ab ultimis quasi terris discedūt in ultimas: ueluti grues. Etenim, quod Aristoteles tradit, ex Scythiæ campis proficiscuntur ad paludes Ægypto superiores, unde Nilus profluit. Abeunt etiam longius olores, ciconiæ, immanfueti ansæres. Paucae uerò aues hyeme in syluis manent, ut tetraones, artagenes: minus multæ in agris, quarum in numero sunt perdices. Item piscium aliq, ut uitare possint solis calores, æstate de litore abeunt in altum: & contrā, ut confectari queant teporem, consequenti tempore ex alto, in quo se merferant, emergunt, ac in litore uersantur: ueluti delphini: aliq ex mari ingrediūtur in mare, ut thynni hyberno tempore ex Ponto in magnum mare: & contrā uerno ex magno mari in Pontum. Alij eodem tempore in fluuios, ut salmones, thyñi, sturiones.

Atq; hæ animantes subterraneæ dici non possunt: ut nec ullæ aliæ quæ terræ cauernas non succedunt: etiam si frigoris uitadi causa hybernis mensibus, caloris æstiuis occultentur & lateant, quales sunt in hominum genere qui multū frigidas aut calidas regiones habitant: nam qui illas hyberno tempore, qui has æstiuo in domibus latent, in quadrupedū genere erinacei: hyeme enim se condunt in cauas arbores, in quas autumnus poma cōportarunt. Similiter glires & mures Pontici, ac serpentes quidā se condunt in cauas arbores: sed hi ipsi maxima ex parte, ut postea dicā, saxorū cauernas succedūt. Quædā etiā blattæ & asellæ rimis parietū & domorum latebris occultantur. Formicæ quoq; condūtur in acruis, in quibus cōgerendis uere & æstate multum operæ & laboris consumpserūt. Apes item domesticæ hyeme ingrediuntur in alueos, syluestres aut in caua arborum, aut in terræ cauernas, aut in parietinas: crabrones quoq; syluestres in cauernas, & quosdam quasi nidulos arborū: uespæ in earūdē domorum uel nidulos, quos æstate cōstruxerunt. Similiter hyeme latent in cauis arboribus nō paucae uolucres, ut cuculus, picus, coruus, cuius caput rubra macula insigne, qui propterea πυρροκόραξ à Græcis nominatur, upupæ quædam. At hirundines tam domesticæ quā agrestes in loca uicina quæ sunt tepidiora secedūt: quæ si defuerint eis, se in angustis montiū locis condūt, in quibus aliquando etiā sturni, palumbes, turtures, merulæ, turdi, alaudæ, upupæ latere cōsueuerunt. Siue autē in

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arboribus, siue in montibus latuerint, ea de causa uerno tempore deplumes solent cōspici. Satis multa, et fortassis plura quā instituta ratio postulabat, dixi de his animantibus quæ calor frigiditatis uitandi causa non subeunt terræ neque rimas neque foramina, neque spelūcas. Quanquam quæ dicta sunt, ita apte natura cum his quæ sequuntur cohærent, ut distracta uix possint satis cōmode explicari. Igitur animantiū, quarū gratia potissimum hunc scribendi laborem suscepi, tria sunt genera. Quædam enim uel noctu uel interdum subeunt terræ cauernas, atque in eis delitescunt, dormiuntque: sed pleræque omnes etiam hyeme egrediuntur ad pastum capescendum: quædā certo anni tempore subterraneas succedunt cauernas, & in eis graui somno pressæ aliquot menses cōsumunt: quædam ferè perpetuo occulte in terra latent. Primi generis non solum terrenæ sunt, sed etiam uolucres: uerū terrenas primò persequar. Earum autem in numero habentur homines cauernas succedentes, qui ex eo nominantur Troglydytæ: quorum alij eas cauernas subeunt caloris uitandi causa, ut qui in Africa habitant ad mare rubrum, & Syrticæ gentes: alij frigoris, ut qui in Asia post Caucasum montem incolunt planiciem septentriones uersus sitam, & Scythicæ gētes, & syluestres homines, qui in Scandiae regione Scricfinnia noctu nautis infesti sunt: quos nō rogis ardentibus abigunt. In Armenia etiam maiore, ut Xenophon optimus author scribit, sunt domus subterraneæ, quarum ostium putei instar angustū est, inferior pars lata, aditus iumentis sunt fossiles, homines descendunt gradibus. Quin in Tenedo insula pilcatores hodie rupiū speluncis pro domibus utuntur: ut quondam Cacus latro spelunca inter Auentinū montē & salinas ^{Facies quā} dira tegebat Solis inaccessam radijs: ut Sybilla Cumæa antro illo ad Auernum lacum tam musuo opere insigni quā uaticinationibus nobili. Et Circe, mulier cantionibus clara, habitauit, ^{ἐν πύλαις λαφυροῖσι}, ut Homerus canit. In Sedunis etiā in tractu Sittenli ad Bremisam pagum ex rupe excisa sine ullis tignis & trabibus ligneis formatum est integrum cœnobium, hoc est, templum, cubicula, conclaue, culina, cella uinaria. Similiter in altis montibus conspiciuntur arces subterraneæ: ut quæ in Alpibus Couolum nominatur, in quam nec equites nec pedites possunt ascēdere, sed cum homines, tum omnia ad uiuendum necessaria ad ipsam attrahuntur: quæ in præcipiti Siciliæ rupe, non longe ab Eryce monte existit, cum Drepano promontorio coniuncta ponticulo, quo solo adiri potest: quæ in Saxonia inter Blancheburgum & Halberstadum est: quæ in Toringia inter Vimariam & Blanchenhainam prope Mellingum pagum: illius nomen est Reinesteinum uetus, huius Pufhardum, atque ea distat à Vimaria quatuor milib. passuum: utraque ab habitatoribus nunc deserta est & uacua: utraque habet in saxo incisa hypocausta, conclauias, scamna, stabula, præsepia, ianuas, fenestras: Saxonica uerò etiam templum, supra quod incolæ extruxerunt speculam, quæ sola subiecta fuit sub aspectum. Hoc templum testudinis figura, & pila media rotunda insigne est: cætera omnia sunt quadrata. Ipse mons Saxonicus præceps est ex omni parte, præter eam qua ascenditur: in cuius planicie excelsus collis clementer affurgit, qui qua parte planiciem spectat, fossa satis alta & lata circumdatur: ex huius collis saxo arenaceo, non nihil rubro, exciso formata est

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ra est arx illa, cui multæ & magnæ fenestræ, quin in pede ipsius mōtis cellæ sunt subterraneæ cum equorum item stabulis. Vtræq; arx hoc ænigma perperit usitatum Saxonibus & Toringis,

Dic quibus in terris arx alto condita monte,
Mille ubi per tectum possunt errare bidentes.

Hoensteini etiam, quæ arx est Misenæ trans Albim, equorum stabula in saxo incisa sunt. Et Prænestinæ fossæ subterraneæ literis celebrantur, in quarum una Caius Marius obfessus, extinctusq; occidit. Græcas quoq; mulieres, quæ meretricium quæstum faciebant publice, in cellulis subterraneis habitasse ex comicorum scriptis apparet: à quibus χαματυπεια nominantur. Et ganeum ἀπὸ γῆς, quod esset in terra, dictum putat Terentij interpretes. Tales etiam cellæ Romæ fuerunt, & frequentiores quidem sub circo maximo, qua pertinet ad naumachiā, & in uico Suburano, & Summæniano atq; Thulco: quin Romæ subterraneæ Ditis aræ fuerunt, & subterraneum Consi templum: ac antiquos dijs inferis effodisse scrobes subterraneas, nymphis antra legimus. In maritimis quoq; Germaniæ quibusdam urbibus, sicut in Prussis Dantisci, & in Saxonibus Lubeci, bona uulgi pars sub terra habitat in testudinibus, super quas exstructæ sunt magnificæ domus, quæ à dominis incoluntur. Eodem modo cuniculus, uulpes, fiber, lutra, meles, & forassis aliæ quædam bestię subeunt cauernas, sed egrediuntur ad pastum capescendum etiam hyberno tempore. Ac cuniculus quidē multos fodit specus, & in colles terrenos agit cuniculos: ex qua re nomen inuenit. Mane & uesperī egreditur, reliquo tempore ferē latet. Aliquos autē specus operit puluere, ne deprehendantur. Sed cum uiuerra atq; parui quidam canes, quibus est ad inuestigandū sagacitas narium, in specus & cuniculos immissi, aut liquor feruens in eisdē infusus, fugatum & exturbatum pellunt in retia, quibus capitur. Cuniculis autē nō unus est color: uel enim in cinereo fuscus, uel lepori nonnihil similis, uel maculosus: quomodo candidi nigris uel rutilis maculis stellantur. Vulpes uerō in primis ad fraudē callida, non tam ipsa fodit specus, quā ab alijs animantibus, effossos occupat. Et melem à specu prærepto, quia eius os stercoreib. inquinat, fetore abigit. Venatur lepores, cuniculos, mures, gallinas, aues, pisciculos. Dolose autē agit omnia. Est enim sæpe lepores & cuniculos, dum simulat se cum eis colludere uelle, capit incautos, muribus, ut feles, insidiari solet: gallinas noctu, clam ingressa in casas, prehendit & asportat: aues, dum insidiosē se fingit mortuam, ad ipsam aduolantes, captas necat & deuorat: aquilæ impetū supina iacens in terra pedibus arcet donec cōprehensam laniet. Cauda, quam huic animali magnā & uillis densam natura donauit, à ripis in flumen demissa, pisciculos in eam innatantes capit: & cum paululū de ripa se subduxerit, illam conquassans pisciculos captos excutit in terram ac deuorat. Retrorsum etiam gradiēdo ad nidulum uespas accedit, quod sibi ab earum aculeis metuat: ac cauda in nidulum immissa, uespas excipit: mox his ipsis refertam extrahēs proximo lapidi, uel arbori, uel parieti, uel maceriæ illidit: omnibusq; uespis isto modo oppressis & interfectis nidulū uastat atq; exinanit. Eadē cauda canē, cū eam infectatur, hac & illac per ipsius rictū ducta, eludit. At crinaceum, quod ob

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metū se in globū concludat, ut se spinis undiq; possit defendere, periningit, eoq; modo suffocat. Etenim propter urinam in ipsius os influentem spiritus ducendi nullam habet potestatem. Ea uerò uulpis, quæ canis mediocris magnitudo est. Color autē sæpe rutilus, priore tamen parte canescens: raro candidus, rarius niger. Fiber etiam & lutra egrediuntur ex riparum cauernis, in quibus latent, & se in fluminibus mergunt, ac pisces capiunt quibus uescuntur: sed fructus quoq; & cortices arborū comedunt. Lutra autem à lutando appellatur. Frequenter enim se lauat cum capiendi piscis causa se in aquas, imò sæpe in earum profundum, penitus immergit: quanq; Varro hoc uocabulum à Græcis fluxisse, & lytram iccirco nominatam putat, quod succidere dicatur radices arborum in ripa, atq; eas dissoluere: ad tantum autem fere spaciū sub aquis natat & currit anteaq; rursus emergens aerem spiritu ducit, ad quantum arcus intentus sagittam potest emittere: quem aerem si ducere nequit, ut cæteræ animantes gradientes, suffocatur. Corpus ei latius & longius fele, pedes breues, dentes acuti: à fibro cauda, posteriorib. pedibus, pilis differt. Nam lutra caudam habet longam & reliquarum quadrupedū similem: fiber piscis: squamis tamen non obductam, admodum pinguem, latam ferè palmum, longam dodrantem. Is si iacet in gradibus, caudam & posteriores pedes demittit in flumen cum frigoribus non congelat: si natat, cauda mota quasi remigare solet. Lutræ autem pedes omnes caninis sunt similes: fibri priores caninis, posteriores anserinis. Etenim membranæ quædam digitis sunt interiectæ: itaq; hi ad natandum, illi ad eundem magis nati aptiq;: nam in aqua & in terra uiuit. Fibri uerò pilus est in cinereo cæcidus & inæqualis: ubiq; enim à breuibus duplo longiores existunt: sed lutræ fuscus nonnihil ad castaneæ colorem deflectit, & breuis ac æqualis est. utriq; uerò nitidus, & mollis, quare utriusq; pellibus concisis fimbrias uestium ex pellibus nobilibus confectarum, solent exornare: quanquā lutræ pelles longè præstant fibri pellibus: attamen fibrorū quoq; pelles inter se multum differunt colore: nam aliæ magis aliæ, minus ad nigrum accedunt, quædam ad rufum: nigriores quidem longe cæteris præstant, minus nigri medium locū tenent, subrubi sunt deterrimi. Fiber autem in primis prouidus est & solers: etenim fruticibus & arbusculis dente, tanquam ferro, resectis ante riparum cauernas construit paruas quasdam casas, & in ijs duos tresue gradus, quasi quasdam cameras: ut cum aqua fluminis crescens inundauerit ripas, possit ascendere cum decrescens resederit, descendere. Atq; etiam cum arborem iam ferè secuit, quoties ictū facit, totiens suspiciens considerat num sit casura. Timet enim ne, si eo ictu cōcidat, ab ea, priusquā recedere de loco possit, incautus opprimatur. Nec uerò minus est cōstans in proposito quàm solers: nam quam arborem ad ripas primo elegit secandam, eam non mutat, etiam si longo temporis spacio dissecare nō possit. Hoc animal uocem infantis instar mittit: ipsum aut uenamur nō modo propter caudā qua uescimur, & pellem qua uestimur, sed etiā propter testes, quibus ut medicamentis, utimur: præsertim Ponticis: maximā enim uim habent: Eos testes, castorea medici nominant. Fibrū enim Græci uocant *κασοπα*. Sed fiber autore Varrone dictus ab extrema ora fluminis dextra & sinistra, qua maxime solet uideri:

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nam antiqui fíbrum dicebant extremū. At meles exit è cauernis, & uagatur in syluis non aliter atq; lupus, lupus ceruarius, lepus, aper, ceruus, trage-laphus, tarandus, alce, platyceros, caprea, ibex, rupicapra, dama, & aliæ plures. Verum hæ animantes in syluis cubant: posteriores tamen in altissimis montium faxis & rupibus. Meles aut auide appetit mel, ex quo nomen hoc duxit. Magnitudine est uulpis aut canis mediocris, cuius quodāmodo speciem præ se fert, maximè canina. Nam eius duo sunt genera. Vnum canis inftar digitatum, quod caninum uocant: alterum ungulas, ut fues, habet bisulcas, quod idcirco suillū appellant. Omnibus aut melibus crura sunt breuia, dorsum latum, cutis spissa, cuius in metu sufflata distētu, utor Pliniij uerbis, ictus hominum, & morsus canum arcent: quanquam, si quando cum iisdem pugnant, ualde mordent. Duris uestiuntur uillis, qui sunt uel albi uel nigri, & dorsum quidem abundat nigris, reliquum corpus albis, excepto capite, quod alternis quibusdam quasi lineis nigris & candidis à suprema capitis parte ad rictum ductis decoratur. Crassæ autem meles non sunt, pingues tamen: quæ earum pinguitudo inuncta, uel cum alijs infusa, renum dolores sedat. Ex huius animalis pelle collaria fiunt, quæ ex comelia à Varrone nominantur. In ripis etiam fluminum & lacuum nidos fingunt halcyones: nec Aristotelem latuit eas in fluuios ascendere, sed hyeme non occultantur. Auis est non multo maior passere. Cum autem marinæ halcyonis corpus totum coloribus cæruleo, uiridi, subpurpureo, sed mistis insigne sit, adeo ut neq; collum, nec alæ aliquo ex eis careant, & rostrum habeat subuiride, longum, tenue, fluuiatilis seu ripariæ pectus purpureum est, collum & dorsum in uiridi cæruleum, alæ fuscæ, rostrum, ut etiam pedes, cinereum. Vescitur pisciculis & uermibus. Lagopus quoq; in altissimarum Alpium specubus iuxta glaciem, quæ tota nunquam æstate solis calore liquefacta, uel alijs etiam anni temporibus imbre dilapsa diffunditur, nidos cōstruit & cubat. Ex pedibus, quos habet leporis instar uillis & quidem candidis, non plumis, uestitos, nomen traxit. Ei magnitudo columbæ. Color hyeme candidus, æstate in candido cinereus. Longe non uolat, sed Alpibus se tenet. Capta nō uiuit, nedum mansuescit. Caro huius auis sano palato est bona, ægroto salutaris. At aues, quibus oculi diurno spacio sunt hebetes, acres, acutiq; nocturno, interdiu latere, noctu ex latebris euolare, & ad pastum solent accedere, quas iccirco nocturnas appellant: quales sunt uespertilio, bubo, ulula, noctua, nycticorax. Verum hæ non solum in tenebricosis montium & rupium cauernis latent, sed etiam in cauis arboribus, in ædificijs desertis, sub tectis domorum magnificarum & templorum & turrium, quæ raro homines succedunt. Vespertilio autem uenatur culices & muscas, exedit pernas, aliasq; carnes suillas de trabibus suspensas. Cæteræ aues nocturnæ persequuntur mures, hirundines, aues, scarabeos, apes, uespas, crabrones. Sed bubo etiam capit lepusculos & cuniculos. Ea omnium nocturnarum auium maxima ex sono, imò uerò gemitu, quem edit, mihi uidetur nomen inuenisse. Caput habet magnum: corpus anseris magnitudine, breue tamen & quasi decurratum ac colore uarium: rostrum curuum, ungues aduncos, oculos grandes. Huic non multum dissimilis est ulula, sed minor: quæ item ex ululanti

S 3 uoce

uoce nomen hoc traxit. Cum his duabus cognationem habent noctuæ sed differunt uoce. Nec enim ululant, uerū edunt sonum, quem Aristophanes *κικαβαῖ* nominauit. Earum quatuor sunt genera. Vnum, cui pluma aurum modo eminet: quod maximum est, & alio uocatur. Alterū eximij candoris in gutture & uentre, alioqui candidis & luteis maculis alternis distinctum. Tertium paruū, quo, ut etiam sequenti, aucupes uenantur aues. Quartum minus illo: quod in rupibus saxisque uersatur. Hoc, sicut & proximum, cinereis & candidis maculis uariat, item alternis. Nycticorax autem, hoc est coruus nocturnus, niger est, ut alterius generis coruus, sed eo plerumque minor. At uespertilio, quæ ex uespere, quo euolat, nomen hoc duxit, muri non nihil similis est, quare scite scripsit Varro: Factus sum uespertilio, neque in muribus planè, neque in uolucris sum. Alas enim habet & uolat, quod ei non conuenit cum muribus: sed animalia parit, non oua, in qua re cum uolucrum natura non congruit, & foetus uberibus ad motos lacte nutrit, cum uolucres cibos conquirant undique, quos in os pullorum inferant. Præterea sunt ei dentes, quibus carent uolucres. Caput autem simile habet muri uel canis: aures plerumque duas, raro quatuor: dentes ferratos: corpus obscure fuluis pilis uestitum, rostrum tamen nigrum, item aures: alas duas, quæ ut draconis & piscis uolantis, non ex plumis constant, sed ex membranarum, & quidem nigris. In utraque uerò ala habet digitum, cui est unguis, caudam latam, & sicut alas, membranaceam, in qua duos pedes, quorum uterque quinos habet digitos uncis unguibus armatos, quibus in parietibus & rimis cauernarum adhærescit. Aut enim pendet, aut uolat, aut iacet. Quia uerò pedes non oriuntur ex corpore, sed ex cauda, ei esse traditur coxendix una. Vocem acutam ut mus non emittit, uerum ferè ut catellus latrat. Geminos autem, ut Plinius, uolitat amplexa infantes, secumque deportat. Cauda & alis affixa dies aliquot uiuit. Quinetiam Troglodytæ, qui in Africa habitant, interdium, maxime uerò meridie latent in suis specubus.

De primi generis animantibus, quæ noctu uel interdium in terræ cauernis delitescunt, dormiunt uel sat. Ab eo ad secundi generis animantes, quæ certo anni tempore, ut dixi, subterraneas cauernas succedunt, & in eis graui somno pressæ menses aliquot, quasi mortuæ sine cibo consumunt, ac usque ad finem eum latent, dum tempore ueris humo excitatæ reuiuiscunt, & reminscuntur cibum, quem tanto tempore oblitæ erant sumere. Tamen ex his de quibus iam dixi, aliquæ sunt etiam, ut omnis generis quædam bestię sunt, in harum numero, ut suo loco dicā. Hæ autem aut terrenæ sunt, aut uolucres, aut aquatiles, aut earum uita est in terra pariter & in humore: sed terrenas hic quoque primò persequar. Itaque multæ quadrupedes hyemis aut æstatis tempore se in specus condunt. Etenim mures Alpini autumnō subeunt cauernas, in quibus æstate cubare consueuerunt. Nam in eis ex fœno, straminibus, sarmentis exstruunt cubilia, in quibus totam hyemem usque ad uer erinaceorum instar conuoluti delitescunt & dormiunt. In una cauerna plerumque septem, aut nouem, aut undecim, aut tredecim. Mira uerò eis machinatio & solertia cum fœnum ac reliqua iam congefferunt. Vnus enim humi stratus erectis pedibus omnibus iacet in dorso, in quem, tanquā in plastrum

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strum quoddam, cæteri ea quæ congefserunt, coniiciunt, & sic onustum, cauda mordicus apprehensa, in specum trahunt, & quasi quodam modo inuehunt: ex quo euenit, ut per id temporis detricto dorso esse uideantur. Itaque posteaquam cubilia in specu strauerint, ipsum aditum atque os eius sarmentis & terra obstruunt & obturant, ut tuti à uentorum uis, ab imbribus, à frigore esse possint. Tam autem arcte & grauer dormiunt, ut effossi & extracti non excitentur antequam in sole expositi uel ad ignem locati concalescant. Hic mus cognomen ex Alpibus, in quibus nascitur, trahit: color ei est aut fuscus, aut cinereus, aut rutilus: magnitudo ferè leporis: muris species ac figura, ex qua mus dicitur. Attamen mutilas habet aures & quasi decurtatas: priores dentes longos & acutos: caudam amplius duos palmos longam, pedes breues & uillis superius referros: digitos pedum urfinis similes: ungues longos, quibus alte effodit terram: posterioribus pedibus non secus ac rursus ire solet, ac interdum ingredi bipes. Si cibus huic animanti datur, eum in priores pedes sumit, ut sciurus: ut idem sciurus & simia erectus usque eo in clunibus residet quoad ipsum comederit. Vescitur non modo fructibus, sed etiam pane, carne, piscibus, iure, pulmento: cupide uerò lacte, butyro, casco, quæ cum mādīt, oris suctu sonitum sic uti porcellus edit. Multum dormit: at cum uigilat, semper aliquid agit, stramina, scenum, linteola, ralla cubili suo importans: quibus os ita complet, ut nihil amplius capere possit: reliquum pedibus accipit & trahit. Cum irritatus exarserit iracundia, acriter mordet. Si quando inter se colludunt mures Alpini, ut catelli clamorem faciunt. Cum è cauerna montiuagi egrediuntur ad pastum, ex eis unus aliquis remanet iuxta illius aditum, quàm potest diligentissime & longissime prospiciens. Is cum uel hominem, uel armentum, uel feram uiderit, sine mora clamat: quo audito undique omnes ad cauernam concurrunt. Eorum autem uox fistulæ acutæ & lædentis aures similis est: qua & mutatione aeris significat, & sibi quid aduersi accidere. Dorsum ualde pingue habet, quum cæteræ corporis partes sint macræ: quanquam hæc uere nec pinguitudo nec caro dici potest: sed, ut mammillarum caro in bubus, inter eas est medium quiddam. Illud ipsum utile est puerperis, & his quæ ex utero laborant: quibus etiā eorum prodest pinguitudo. Vigiliis præterea tollit. Glires etiam hyeme non solum in cauis arboribus, de qua re supra dixi, sed in terræ latent specubus. Glirem autem Aristoteles *ελειόρ* nominat, cinereus, ut Albertus scribit est, excepto uentre, qui albicat. Ab eo differt bestiola paulo minor: quam alij Græci hac de causa *καμψίρορ* uocarunt, quod uertat & sursum uersus inflectat caudam: aliqui uerò *σκήρορ*, quod cauda sua uillis uestita & conferta, quasi flabello corpus soleat inuibrare: aliqui *μυῦ σκήρορ*, quod præterea similitudinē quandā gerat, speciem præ muris: sicut etiam sciurus Fennicus, qui non cauda, non figura & liniamentis totius corporis, non magnitudine, non moribus, sed solo colore differt à nostrate sciuro: nam in candido cinereus est, cum sciurus nostras sit aut rutilus, aut niger: attamen in ea Sarmatiæ parte, quam hodie Poloniam uocamus, inuenitur cui rutilus color mistus cinereo. Vtriq; autem sciuro, hoc est tam Fennico quàm nostrati, duo inferiores dentes sunt longi: uterque cum graditur, demissam caudam trahit: quum uescitur,

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cibū in priores pedes, quibus ut mures utitur pro manibus, fumit: posterioribus, et clunibus insistit: uescitur uerò faginis glandibus, castaneis, nucibus auellanis, pomis, & similib. fructibus. Hyeme uerò conis abietis, picæ, tedæ, aliarumq; arborū. Vtriq; uerno tēpore pariūt, & pullos, si quis manū in nidū immiserit, in aliū, nam faciūt plures, transferūt. Vtrorūq; carnē tenues comedunt: diuities, qđ gustatū sūpore quodā ingrato cōmoueat, raro mandūt. Vtriq; quantū in arborib. uersantur, se tamē hyeme nō condūt. At gliribus cum hyberno tempore latent, pro cibo somnus: atq; per id tēporis pinguescunt. Quare recte de glire scripsit Martialis,

Tota mihi dormitur hyems, & pinguior illo

Tempore sum, quo me nil nisi somnus alit.

Eius autem caro dulcis. Et si uerò glires uiuunt in syluis, ut non immerito de eorum penuria in Fundanio, uel De admirandis Varro his uerbis cōqueratur, Glis nullus est in sylua mea: tamen ueteres gliraria habebant. Quæ qualia debeant esse, idem Varro libro tertio De re rustica tradidit. Et hodie in quibusdam locis syluestribus incolæ fodiunt tellurē, ut in eius cauernis glires inhabitare, & quando uelint eos capere, & in cibo uti possint. Apud Romanos uerò gliribus uiuaria in dolijs Fuluius Hirpinus instituit, ut Plinius scriptum reliquit. Mus autem Ponticus, quem hodie uocant Hermelam, hyeme solū in cauis latet arboribus, ut suprā dixi. Est uerò totus niuis instar candidus, excepta cauda digitum longa: eius enim dimidia pars, & quidem inferior, nigerrima. Huic animanti magnitudo sciuri. Persequitur mures & aues quibus uescitur. Eius pelles in preciosarum numero habent: ut etiā muris quem Lassicū uocant: is in cinereo candidus est, nec duobus digitis crafior. At mus Noricus, quem Citellum appellant, in terræ cauernis habitat. Ei corpus ut mustelæ domesticæ, longum & tenue: cauda admodū breuis: color pilis, ut cuniculorum quorundam pilis, cinereus, sed obscurior. Sicut talpa caret auribus, sed non caret foraminibus, quibus sonum ut auis recipit. Dentes habet muris dentium similes. Ex huius etiam pellibus, quamquam non sunt preciosæ, uestes solent confici. Subit etiam terræ cauernas mus Pannonicus, cui color subuiridis, species mustelæ, magnitudo muris. Sorex quoq; mensibus hybernis se condit in terra, in quam cauerna ad pedum ferè trium altitudinem descendit: effossus & in sole expositus, ut cæteræ animantes, quæ totam hyemem dormiunt, sensim se mouens euigilat: ei dodrantalis longitudo: color æstate rufus, fusco mistus, autumno cinereus: aures, ut Plinius scribit, pilosæ: caudæ caulis infima parte setosus: nec enim totam habet, ut sciurus, uillis cōfertam et plenam: quinetiam auriū pili sunt perexigui: hic mus syluestris arbores, sicuti glis & mus Ponticus, & sciurus, scandit: semina pyrorum comedit, & nuces auellanas: quare apud Germanos ex corilo nomē inuenit. At alter mus syluestris sorice breuior est, etenim semipedalis: color dorso & lateribus murinus, uenter albicat: is sub fruticibus terram fodit ad duūm pedū altitudinem: inq; ultimam cauernæ, ad pedes quatuor longæ, partē cōgerit omne genus glandiū, atq; nucleos ceraforū & prunorū, aliorumq; fructuū, sed maxime nuces auellanas, & quidē optimas: unde etiam ipse ab istius generis nucibus nomen traxit: in cauerna fere

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fere media nidum pilei instar ex folijs arborū facit, ut aqua, si quando ea stil-
lauerit terra, extrinsecus defluat, ipse siccus intus in nido cubet: ad alterū etiā
am cauernæ latus habet foramen, per quod ex ea, cum auellanæ nuces efflo-
diuntur, effugere possit. Mus aut araneus ueluti reliqui mures domestici,
non latet in terra: qui ex eo, quod uenenū morsu, sicut araneus, inferat, apud
Latinos nomen duxit: apud Græcos uerò, qui *μυῖς* uocant, ex eo quod
magnitudine, ut Aetius, qui breuiter eum describit, autor est, muri sit æqua-
lis, colore mustelæ similis: hoc est in fusco subrufus, excepto uētre, qui ex ci-
nereo albicat, rostellū habet longiusculum: in utraq; maxilla dentes in bifi-
dos mucrones desinunt: quare animantes ab eo morsæ quadrifida uulnera
accipiunt: ocellos habet minutulos & nigros: caudam breuem, & in ea bre-
uissimos pilos, eius morsus in calidis regionibus plerūq; est pestifer, in frī-
gidis non est: sed ipse diuulsus, aut dissectus, & uulncri impositus proprio
ueneno medetur: hunc captum feles interimunt, ab eius ueneno abhorren-
tes non mandunt: ut nec murem maiorē: qui, tametsi etiam ipse hyeme nō la-
tet, tamen in ualle loachimica ex proximis domicilijs in cuniculos ingreditur,
& in his uersatur: alioqui hyberno etiā tempore in domibus nostris so-
let uagari: mole corporis mustelæ minimæ magnitudinem fere assequitur
& exæquat: pilis est subnigris: cauda procera, nec admodū gracili, nec prorsus
nuda pilis. At in terra latent aliquot mustelarū genera: nā plura sunt:
est em mustela domestica, quā Græci *χολύς*, Germani ex sono quē edit, ui-
selā nomināt. Ea plerūq; est in dorso & laterib. rutila, raro subfulua: in guttu-
re & uētre semper cādida: quin nōnunquā tota candida reperitur, quanquā
rarius. Corpus habet tenue, & in longius ductū: caudā breuē, primores den-
tes breues, nō sicuti mus, longos, appetēs est seui. Catulos nuper natos, quia
ab hominib. et nōnullis alijs animātib. eis periculū metuit, singulis dieb. ore
prehenso aliō trāsfert. Persequitur mures, depugnat cū serpentibus, sed ut
à ueneno tuta sit, prius edit rutā. Vbera uaccarū mordet, quæ q̄primū in tu-
more fuerint, mustelina pelle perfricata sanātur: Hæc mustela, si nostræ do-
mi uiuit, etsi habet suas cauernas, nō diu ac multū se cōdit: si ruri, hyberno tō-
pore in specub. latet. Secundū mustelarū genus Germani *iltiß* nomināt ex
Græco uocabulo *ικτίς*, quo erudita illa gens appellat syluestrem mustelā: id
uerò habitat in riparū cauernis, ubi lutræ & fibri more pisces captos come-
dit: & uersatur in syluis, ubiprehendit aues: in domibus, ubi gallinas: quare
Plinius eā esse domesticā diceret: quarū sanguinē exugit: sed ne clamare pos-
sint, earū capita primo mordicus aufert. Atq; etiā earūdē oua, quæ furari so-
let, ac multa in unū cōgerere, exorbet. Aliquāto maior est mustela domesti-
ca, breuior, sed crassior ea syluestri, quæ martes uocatur: pilos habet in æqua-
les & nō unius coloris. Etem breues subfului sunt: lōgi, nigri: qui sic ex mul-
tis corporis partibus eminēt, ut distinctæ nigris maculis esse uideātur: attā-
men circa os est candida: cū grauiter exarserit, male olet. Quocirca nostri ui-
lissimum quodq; scortum, & maxime foetidum, pellem huius ictidis solent
nominare. Tertium mustelæ genus etiam syluestre, in saxorum rimis &
cauernis cubat, quod à Martiale martes, à Germanis martarus nominatur.
Martialis uersus hic est in libro decimo Epigram. ad Maternum,

Vcnator

Venator capta marte superbus adest. Ei magnitudo felis, sed paulo longior est: crura uerò habet breuiora, itemq; breuiiores ungues. Totū eius corpus pilis in fuluo subnigris uestitur, excepto gutture, quod candidum est. Hæc mustela, similiter atq; proxima, ingreditur domos & necat gallinas, earumq; sanguinem exugit, & oua exorbet. Quartum mustelæ genus item syluestre, in arboribus uitam uiuit, quod etiam uocabulo martis appellatur. Ea mustela syluas insolenter & raro deserit: atq; in hoc differt à proxima superiore mustela: & insuper quod guttur eius lutei sit coloris, & quod reliqui corporis pilus magis sit obscure fuluus. Huius duo genera quidam esse censent: unū quod in fageis syluis uersatur: alterum quod in abiegnis, atq; id sanè est aspectu pulchrius. Quintum mustelarum genus omnium pulcherrimum & nobilissimum est, quod Germani zobelam uocant: in syluis, ut martes de qua iam dixi, degit, ea paulo minor, tota tamen obscure fulua, præter guttur, quod habet cinereum. Mustelæ horum triū generum bonitate cæteris omnib. eo magis præstāt, quo plures pili candidi cū fuluis permisti fuerint. Zobelinæ autē pelles præcī maioris sunt q̃ panni auro texti. Etenim cōperi optimas quadraginta numero, tot em̃ uno fasciculo colligari & unā uendi solēt, plus quàm milibus nummū aureorū uenisse. Omne aut mustelarum genus ira incitatum graue quiddam olet, sed maxime id qđ Germani iltis appellant: omnis præterea mustelæ stercus aliquantum redolet muscū. Noerza aut, quæ item in syluis uersatur, magnitudine est martis: pilos uerò habet æquales, & breues, atq; colore ferè similes lutræ pilis: sed noerzæ pelies longè lutræ pellibus antecellunt: atq; hæ etiam præstant si pili candidi cum reliquis fuerint misti. Reperitur hoc animal etiā in uastis & densis syluis quæ sunt inter Sueuum & Vistulam. Et si uerò mustelæ omnes nec hybernis latent mensibus, neq; subeūt terram, tamen earum formas expressi singulas, quod id, ut arbitror, rerum naturalium studiosis utile sit futurum. At uiuerra quæ cuniculos ex specubus exturbat, paulo maior est mustela domestica. Color ei plerūq; in albo buxeus. Audax hoc animal & truculentū, ac omni ferè animantiū generi infensum atq; inimicum natura sanguinē earū quas momorderit ebibit, carnē nō fermè comedit. Istius ferè ferocitatis est etiā agri uastator & Cereris hostis hamester, quē quidam Cricetū nominant: incolæ Palestinæ quondā Græce ἀγκρομύρ uocarunt: et quidē iccirco qđ generis & murini sit, & ursini, cū erectus posterioribus pedibus insistit ob uentris nigrorē esse uideatur: existit iracundus & mordax adeo ut si eū eques incaute persequatur, soleat profilire, & os equi appetere: & si prehēderit, mordicus tenere. In terræ cæuernis habitat, nō aliter atq; cuniculus, sed angustis: & idcirco pellis, qua parte utrinq; coxam tegit: à pilis est nuda. Maior paulo q̃ domestica mustela existit: pedes habet admodum breues. Pilis in dorso color est ferè leporis: in uentre niger, in lateribus rutilus. Sed utrunq; latus maculis albis, tribus numero distinguitur. Suprema capitis pars, ut etiā ceruix, eundē, quē dorsum, habet colorē, tempora rutila sunt, guttur est cādidū: caudæ, quæ ad tres digitos trāsuersos lōga est, similiter leporis color. Pili aut sic inhærent cuti, ut ex ea difficulter euelli possint. Ac cutis quidē facilius à carne auellitur, q̃ pili ex cute radicitus extrahantur.

Atq;

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Atq; ob hanc causam & uarietatē pelles eius sunt preciosæ. Multa frumētī grana in specū cōgerit, et utrinq; dentib. malas em̄ amplas habet atq; laxas, mandit. Quare nostrī hominē uoracē huius animantis nomine appellant, tanquam sciurus priorib. pedibus tū aures & os demulcet, tum cibū sumit: inq; eos erectus, posteriorib. & clunibus insistens edit. Ager Toringiæ eorum animalium plenus ob copiam & bonitatem frumētī, neq; Misenæ eorum expers est: nam in tractu Pegano & Lipsiano reperiuntur. Criceto minor est uormela, & magis uaria. Etenim præter uentrem, qui itē niger est, totum corpus albis, subluteis, rutilis, obscure fuluis maculis decoratur. Cauda etiam, quæ longa sesquipalmum, habet pilos cinereos cum candidis permixtos, sed extrema parte nigros. Hactenus dixi de murium & mustelarum ac cognatorum animalium generibus, quorum maxima pars succedit cauernas subterraneas: nunc de histrice dicam, qui item in specus secedit, sed æstiuus, ut Albertus scribit, mensibus: idq; facit contra morem cæterarum animantium. Eum Græci quidam *ἀκανθόχοιρον* uocant, quod & similitudinem gerat speciemq; porci bimestris, & spinis erinacei instar hirsutus sit: attamē caput habet leporino similis: aures humanis, pedes ursinis. Iuba ei est superiore parte erecta & priore cana, tubercula cutis, quæ ex utraq; oris parte sunt, setas longas & nigras continent ex eis natas: quin reliquæ etiam setæ sunt nigrae. Primæ spinæ à medio oriuntur dorso & à lateribus, sed longissimæ à lateribus, sed longissimæ à superiore eorum parte. Quæ singulæ partim nigrae, partim candidæ sunt: longæ duos, uel tres, uel quatuor palmos, quas, si quando libitum fuerit, ut pavo caudam erigit, ingressurus in cauam demittit: irritatus iracundia cum cutem intendit, missiles in ora urgentium canum infigit, aut tãto impetu iaculatur ut in ligno figat. Dentes, ut lepus, quatuor habet longos, duos superiore parte, & duos inferiore. Noctu uigilat, interdiu dormit. Vescitur pane cōminuto, pomis, pyris, rapis, pastinacis, bibit aquā, sed cupide uinum dilutum. Hoc animal gignit India & Africa, unde ad nos nuper allatum est. Ursi præterea se hyemis tempore in specuū latebras, quas locus ipsis suppeditat, coniiciunt: quod si nullas suppeditet, eas prioribus pedibus pro manibus usi, faciunt ex ramis & fruticibus congestis & ita constructis ut non recipiant imbres, in quæ latibula supini irrepunt. Timēt enim de suis uestigijs, quod in solo impressa eos uenatoribus prodant. Mares autem quadraginta dies, foeminæ quatuor menses se occultant latebris: quo tempore candidam informemq; carnem & pariunt, & lambentes sensim in propriam formant figuram: quod non ignorauit Ouidius qui canit:

Nec catulus partu, quem reddidit ursæ recentī,

Sed male uiua caro est: lambendo mater in artus

Fingit, & in formam, quantam capit, ipsa reducit.

Abditi primū iacent & arctius dormiunt ad dies quatuordecim, multūq; tam graui somno fiunt pingues: deinde resident, & priores pedes fugentes uitam ducunt. Ex latibulis uerò rursus prodeunt uere: mares ualde pingues, foeminæ non item, quod pepererint eo tempore, aluum astrictam soluiunt aro herba deuorata. Et si uerò ursi sunt auidissimi cædis, tamen ursæ in homines si prostraucrunt se, & os ad terram uerterint, ac acriem spiritu non duxerint,

duxerint, nullam adhibent fauittiam: sed eos tantūmodo odorantes, tanquā mortuos, quos odiffe existimantur, relinquunt: urfi autem hominibus nostris noti sunt: multos enim regiones frigidæ gignunt, & quidem fuscis aut nigris: quorū duo sunt genera, magni & parui: hi facilius arbores scandūt, & in tantam magnitudinem, in quantam illi, nunquam crescunt. Vtrique comedunt carnes, mel, fructus arborū, herbas. Mysia uerò albos urfos gignit, qui pisces, ut lutra & fiber, capiunt. Latet etiā in terra hybernis mensibus lacerta: quanquam fuerunt qui negarent eam semestrem uitam excedere: reliquis aut anni temporibus, plerumque in rubetis & spinetis solet uersari: ei quæ drupedi lingua bifida & pilosa: pedes humiles: uerno tēpore uiridis color: æstiuo non nihil pallidus. Latet lacerta Chalcidica, ex ærei coloris lineis, quibus tergum eius distinguitur, nominata. Eadem seps uocatur, quod uulnus, si quem momorderit, putrescat, & sanie male olente soleat manare: à lacerta uiridi nō corporis figura differt, sed colore tantum. Latet lacerta aquatilis, cuius uita est in aqua & in terra, sed crebrius in aqua. Gignitur in lacunis opacis, quæ in pingui solo sunt, & in quibusdā mœniū fossis. Parua est, & hanc præterea habet ab alijs lacertis in colore dissimilitudinē, quod ipsa uel cinerea sit, uel in cinereo fusca. Testudinis aut salamandræ instar tardius ingreditur. Irritata si exarserit, elata, et quodā modo inflata, rectis pedibus insistit, & terribilis oris hiatu acriter oculis intuetur eū à quo fuerit lacescita: manatque sensim lacteo & uiroso sudore usque dum tota fiat candida. Imposita salicæ caudā mouet ac effugere conatur: nam cum quia ualde mordet, nō potest ferre, statimque moritur: cum alioqui uerberata diu uiuat. Latet chamæleon, in India & Africa natus: cuius, ut Aristoteles scribit, corpus in lacertæ figurā est formatū. Eius uerò, ut pisciū, & latera deorsum ducta & directa cum uentre iunguntur, & spina lateribus imminet. Facies simillima simiæ, quā Cebū uocant. Cauda prælonga, quæ in tenue desinit, & lori modo permultis implicatur orbibus. Quum steterit, altius quàm lacerta abscedit à terra. Cruera non aliter ac lacerta inflectit: singuli eius pedes diuisi sunt in binas partes: quæ talem inter se habent situm, qualem pollex ad reliquam manus partem ei oppositam. Quin etiam hæ ipsæ partes singulæ paululū in digitos quosdam diuisæ sunt: priorum quidem pedū interiores tripartito, exteriores bipartito: posteriorum uerò interiores bipartito, exteriores tripartito. Dignit præterea unguiculos habent similes unguibus animantium, quibus sunt adunci. Totum corpus crocodili instar asperum. Oculi in recessu cauo positi prægrandes, rotundi, obducti cute simili reliqui corporis cuti: in quorū medio exigua relicta est regio, qua uidet: eam nunquam cute operit. Oculum uersat in orbem, & aspectum quoquo uersus refert, atque ita quod uult, cernit. Mutat colorem inflatus: cum aliàs niger à crocodili colore non multum differat: & ut lacerta, pallidus sit, nigris tamen, ut pardus, maculis est uariis. Fit autem mutatio coloris totius corporis. Nam & oculorum & caudæ color non aliter ac reliqui corporis mutatur: motus eius, ut testudinis, admodum tardus est. Palescit cum moritur, & uita defuncto idem color infidet. Gulam & asperam arteriam eodem situ continet quo lacerta. Carnem nusquam habet nisi in capite & maxillis, cætera membra carent ea. Exiguæ uerò

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uerò carūculæ sunt maxillis & caudæ, qua parte corpori est agnata. Sanguinem tantūmodo habet in cordē, in oculis, in loco cordis superiore, & in uenis hinc ductis; atq; in his quidem perpaucum. Cerebrum paululum supra oculos positum, & cum eis continens est. Cute autem oculorum exteriore detracta cōplectitur quiddam quod uelut annulus æneus tenuis pellucet. Membranæ multæ ac robustæ & quæ multo præstāt his quæ cæteris sunt, distribuuntur in totū eius corpus. Totus dissectus diu spirat, quod exiguus admodū motus adhuc in ipsius insit corde. Cum omnes corporis partes cōtrahit, tū uel maxime costas. Lienē qui cōspici possit, nusquā continet. Aura uerò perhibetur ali: unde Ouidius non modo dulcis, sed etiā doctus poeta:

Id quoq; quod uentis animal nutritur & aura,

Protinus assimilat, tetigit quoscunq; colores.

Stellio etiam latet, figura similis est lacertæ, natura chamæleonti: nam rore tantū uiuit, & præterea araneis & melle. Eum Nicander ἀσκαλάβου, Aristoteles ἀσκαλάβω τῶν nominat. Etenim illius tergū guttis stellarū instar lucen-
tibus pictū: ex qua re etiam apud Latinos nomē inuenit: atq; hoc differt à la-
certa. Idem γαλεώτης à Græcis uocatur. Vt anguis exiit uere membranā hy-
bernā tanquam senectutem: eamq; nisi præripiatur, deuorat. Quem mo-
morderit stellio, stupor opprimit. In Græciā est uenenatus & pestifer, in Si-
cilia innocens. Aduersatur scorpionibus: uitam agit in sepulchris, in came-
ris, in locis ostiorum & fenestrarum: inclusus in uitro uitam sine ullo cibo su-
pra semestrem spacium ducere potest: eius oculi tantūmodo intumescunt, ma-
li præterea nihil tum patitur.

Latet præterea hybernis mensibus salamandra. Etenim hoc anno in Fe-
bruario Snebergi maxima uis salamandarū ex uicinis locis collecta, ag-
glomeratq; in ultimā cuniculi cuiusdam, quondam in Molebergum montem
acti, tunc uerò instaurati, parte fuit reperta. Et proximo anno in Nouembri
salamandra uiua ex fonte finitimæ syluæ per fistulas in hoc oppidū influxit.
Pluuiæ aut & subsequens serenitas salamandas excitant ex uenis, uenulis,
cōmissurisq; saxorū: hanc quadrupedem, cui item lacertæ figura, Germani,
quia propter crura breuiā tarde graditur, Græco nomine μόλυμψ appellant.
Caput ei magnum, uenter lutei coloris, ut etiā ima caudæ pars: reliquū cor-
pus totum alternis maculis nigris & luteis quasi stellatum distinguitur. Pro-
pter frigus ignem, non aliter ac glacies, extinguit: quo modo etiā oua serpen-
tium in ignē camini coniecta, flāmam solēt extinguere: attamē tam ipsa oua
quā salamandra cōburuntur. Salamandra aut irritata saniē euomit lacteā:
huic animali nec masculinum nec fœmininū genus falso putant esse. Testu-
do etiā terrestris totā hyemem in terra latet, atq; graui somno pressa tem-
pus sine ullo cibo traducit. Scarabei deniq; rutili, & grylli, qui potissimū
noctu strident, aridam fodiūt terram, ut in eius cauernis cubent æstate: gryl-
li domestici etiam hyeme. Nam scarabei ante autumnū, imò prius intereunt
quā tota æstas effluerit: grylli agrestes ante hyemem, ut etiam aranei nigri,
qui similiter habitant in terræ rimis. At scolopendra in truncis arborum,
aut in lignis supra terram locatis, aut in palis terræ infixis, unde nomen inue-
nit, cum putrescunt, & gignitur & uiuit: quibus amotis aut cōmotis egredi-

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tur: aliàs plerunq̃ solet latere. Pennis caret, sed plurimos habet pedes: quos circa eam ex Latinis aliq̃ multipedā, aliq̃ centipedam, aliq̃ millipedā uocant: si quando repit, partem corporis mediā tanquam arcum intendit: si bacillo aliāue re tangitur, se contrahit. Color ei æneus, corpus tenue, nec ualde latū, longū uerò tres digitos, aut summū quatuor. Iam in uolucrib. quæ se condunt, hirundines ripariæ sunt. Etem̃ plures numero inter se nexæ hybernīs mensibus latēt in ripis fluminū, lacuū, paludum, & in litoribus ac scopulis maris: unde accidit, ut piscatores interdū ita inter se iunctas ex aquis extrahant. Dictæ autem sunt ripariæ, quòd soleant ripas excuare, & in eis nidos cōstruere ac latere: has Græci & ῥιπάρια uocant, nō q̃d sine pedibus sint, sed eorū careant usu: & κνίλας, quòd oua pariāt et excubent in cistellis longis, ex luto fictis: quibus aditus sit angustus, ut omni anni tempore belluas & homines uitare, hyeme à frigoribus tutæ esse possint. Hoc differūt ab hirundinib. tam agrestibus q̃ domesticis, quòd tibias habeāt hirsutas. Har, inquit Plinius, sunt quæ toto mari cernūtur, nec unquā tam longo naues, tamq̃ cōtinuo cursu recedūt à terra, ut non circumuolitent eas apodes. Cætera genera residunt & insistant, his quies, nisi in nido nulla: aut pendent, aut iacent.

Hyeme etiā in cauernīs montium, etsi non in his solis, latent uespertilioes, bubones, ululæ, noctuæ, hirundines, sturni, palumbes, turtures, merulæ, turdi, alaudæ, upupæ: de qua re suprā dixi.

Iam ex aquatiliū quæ latent genere, quædam hyeme, quædam æstate cōdunt se, uel in cœno, uel in arena: & ita quidē se in ijs condūt, ut reliquū corpus totū tegatur, os sit liberū. Hybernīs mensibus hi pisces condunt se, primariæ, hippurus, coracinus, murena, orphus, conger, turdus, merula, perca, thynnus, raia, & omne genus cartilagineū, cochleæ. Æstiuis uerò mensibus condit se glaucus, asellus, aurata. Tricenīs diebus circa canis ortū purpura, buccinū, pectē, delphinus. Iam in numero animantiū, quarū uita est in terra pariter & in humore latet hyeme lacerta aquatilis, de qua suprā dixi. Crocodilus q̃q̃ specū eiusdē hyemis uitandæ causā succedit, & in eo quatuor latet menses. Frigus adeò moleste patitur, ut etiam, cum nō soleat latere, interdū in terra uersetur, in aqua noctu. Viuis in Europam raro nunc affertur: sed mortuum sæpe pharmacopolæ in officinis suis de trabe suspendunt. Plinius eius figuram & naturā diligenter est persecutus: quadrupes malū, inquit, & terra pariter ac flumine infestum. Vnū hoc animal terrestre linguæ usu caret: unum superiore mobili maxilla imprimit morsum, aliàs terribile peccinatim stipante se dentiū serie. Magnitudine excedit plerunq̃ duodeuiginti cubita. Parit oua quanta anseres, eaq̃ extra eum locū semper incubat prædiuinatione quadā, ad quem summo auctu eo anno egressurus est Nilus. Nec aliud animal ex minori origine in maiorē crescit magnitudinem. Et unguibus hic armatus est, & contra omnes ictus cute inuicta. Hūc satutum cibo piscium & semper esculento ore in litore somno datū, parua auis, quæ trochilos ibi uocatur, rex auium in Italia, inuitat ad hiandum pabuli sui gratia, os primo eius ad sultim repurgans, mox dentes, & intus fauces quoq̃, ad hanc scabendi dulcedinem quā maxime hiantes: in qua uoluptate somno pressum conspiciat ichneumon, per easdem fauces, ut telū aliquod, immisus erodit

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sus erodit aluū. In eo maior erat pestis, quàm ut uno esset eius hoste natura cōtenta. Itaq; & delphini immeantes Nilo, quorum dorso, tanquā ad hunc usum, cultellata inest pinna, abigentes eos praeda, ac uelut in suo tantum amne regnantes, alioquin impares uiribus ipsi, astu interimunt: in uentre molis est, tenuisq; cutis crocodilo, ideo se ut territi immergunt delphini, subeuntesq; aluum illa secant spina. Quin & gens hominum est huic belluæ aduersa in ipso Nilo, Tentyritæ ab insula in qua habitat appellata. Mēsurā eorum parua, sed præsentiā animi in hoc tantū usu mira. Terribilis hæc contra fugaces bellua est, fugax contra insequentes: sed aduersum ire soli hi audēt; quinetiā flumini innatant, dorsoq; equitantiū modo impositi, hiantibus resupino capite ad morsum, addita in os claua, dextra ac læua tenentes extrema eius utrinq;, ut frenis in terrā agunt captiuos. Ac uoce etiā sola territos cogunt euomere recentia corpora ad sepulturam: itaq; ei unī insulæ crocodili non adnātant, olfactuq; eius generis hominum, ut Pyllosorū serpētes, fugantur: hebetes oculos hoc animal dicitur habere in aqua, extra acerrimi uisus. Quidā hoc unū quādiu uiuat, crescere arbitrātur: uiuit autē lōgo tēpore.

Latent etiā hybernīs mēsis in terra ranæ omnes, exceptis temporarijs istis minimis, quæ pallent in cæsis, & reptant in uis & litoribus. Hæ enim, quia non ex semine, quod effundunt mas & foemina, cum complexu uenereo iunguntur, sed ex puluere æstiuīs imbris madefacto oriri uidentur, diu in uita esse non possunt. Itaq; conditur uiridis illa parua, quā Græci & καλαμίτλω uocant, quod in arundinetis agere consueuerit: quanquā etiā arbores scandit, atq; in herbis uiuit: & βρεῖαντα, quod sono sui generis pluuias futuras prænunciet. Nec enim, ut Plinius à nobis dissentiat, est muta & sine uoce. Verno tempore sæpenumero uidetur ex terra eminere media, media adhuc in ea latere. Conduntur uirides ranæ, quæ uersantur in fluuijs atq; piscinis, & hæ quidem uocales & edules sunt. Conduntur subliuidæ & sub cineræ, quæ item in fluuijs, lacubus, paludibus, lacunis uiuunt: hæ partim uocales & edules sunt, partim mutæ & non eduntur: quas hybernīs mēsis in terra latere argumento est, quod uerno tempore non tantum earū fœtus conspiciantur in lacunis, sed ipsæ ueteres etiam ranæ. Quare uerum non est quod scribit Plinius: mirumq; semestri uita resoluuntur in limum nullo cernente, & rursus uernis aquis renascuntur, quæ fuere natæ: perinde occulta ratione, cum omnibus annis id eueniat: fœtus autē earum sunt primo carnes paruæ, rotundæ, nigræ, dein oculis tantum & cauda insignes: quas Nicander, quia caudam mouent, *μολοειδᾶς*, Aratus quia rotundæ, *γυεῖνς*, alij Græci *βατταχιδᾶς*, quasi dicas, ranunculos, nominant: quorum postea figurantur pedes, priores ex pectore, in posteriores finditur cauda. Conduntur præterea ranæ pallidæ in hortis agentes, quæ nō comeduntur, & mutæ sunt. Cōditur deniq; rana rubeta, quæ ex rubis, sub uepribus enim uersari solet, nomen inuenit: eam Poeta bufonem, Græci *φρύνον* uocāt. Duo eius genera, altera terrena, quæ in domibus & uepribus agit: altera palustris, quæ sui generis uocem edit. Vtraq; uenenata est, utraq;, si bacillo sæpius uerberetur, inflato corpore uirus primò è clunibus exprimit longius, deinde sudat: cuius sudoris lactei guttæ admodum grauis & putidi sunt odoris: ac cum occi-

T 2 dicitur

ditur ferè opij: occiditur autem difficulter. Rana rubeta mulieres ueneficæ quondā ad ueneficia sunt usæ. Mus quoq; aquatilis hyeme latet in ripis fluminū & riuorum quos incolit. Ei magnitudo ferè muris syluestris: mordet sæpe manus piscatorū, cū ex foraminib; riparū, canculos fluuiatiles extrahunt. Vorat pisciculos paruos, quales sunt gobiones fluuiatiles, & alburni: uorat fœtus lucij, salaris, barbi, aliorumq;: quocirca ubi magna uis id genus muriū nascitur, riuus uastitatem solet inferre. Cancer etiā fluuiatilis succedit ripas, & in eis hyeme latet, æstate plerūq; uersatur. At scorpius, quem Germania tantūmodo importatū nouit, in terra non latet: quanq; in parietibus, & sub lapidibus. Iam deniq; in serpentium genere, qui maxima ex parte terreni sunt, uipera, quam Græci *χιδνυλ* uocant, hyeme subit saxa. Ea longa est circiter cubitum, & maculis in cinereo fuscis plena. Primò intra se oua parit: dein his exclusis uiuas animantes: nec tamen ipsa catulos singulos, ut Nicander & Plinius scribunt, diebus singulis parit uiginti numero: nec cæteræ tarditatis impatientes perrūpunt latera occisa parente: sed ut nobis serpentū speculatores affirmant, uno eodemq; die catulos plerūq; undecim, plures interdū parit: & quidem eis superstes uiuit. Nec uerò etiā cum uiperæ cōmiscant corpora sibi circūuolutæ fœmina maris caput insertū in os, ut idem Plinius scribit, abrodit uoluptatis dulcedine: non aut mas modo, uerum etiam fœmina natura breuē & quasi mutilam habet caudam, nō ut pleræq; aliæ serpentes longam: sed differūt inter se: etenim fœminæ caput est latum, maris acutū. Cū hic mordet ac uirus euomit, apparēt uestigia duorum dentium acutorum: cum illa, plurium: uipera non lac modo sicuti serpentes cæteri, appetit, sed etiam uinū: unde eam Galenus in lagenam uino refertam irrepisse scribit, & uinū, in quo demortua fuit, potum elephantia se laboranti remedium fuisse: contra ad uiperæ morsum multa faciunt, sed maxime taxi arboris succum facere Claudium Cæsarem edicto proposito Romanos admonuisse Suetonius scriptum reliquit. Minori aut uiperæ diplosa est assimilis: quæ cū alba sit, eius caudam duæ nigræ distinguunt lineæ: à se ictum inexplabili siti enecat, ex quo nomen hoc duxit: quin ipsa multum sitit: quocirca immoderato potu onustæ umbilicus rumpitur, et grauius onus effundit: hanc alij caufonem, alij presterem uocant: sed prester, ut corporis forma non multum à diplosa differat, effectū differt: nam ictū extemplo sideratione quadam reddit immobilem ac mente alienum: mox pilis defluentibus cum pruritu ac uentris solutione absumit. Condit etiam se in terra, sicuti cæteræ serpentes ferè omnes, uel in saxorum rimis cæcula: ex cæcitate apud Germanos quoq; nominata: quā eadē de causā Nicander *τυφλῶς* *πᾶ*, alij *τυφλινον* nominant: etem caret oculis. Color ei in luteo uiridis, & ualde splendens: nunq; pede est longior, nunquam digito crassior, ea sicut & uipera, ut Coiumella scriptum reliquit, sæpe cū in pascua bos improuide supercubuit, laceffita onere morsum imprimit. Quin amphibæna hebetes habet oculos: item parua est & tarda, sed biceps: quare alterutro capite, cum ei libitum fuerit, progredi uel regredi potest: unde ei nomen impositū: densæ cuti color insidet terræ, uarijs notis distinctæ. Huic non dissimilis est figura scytale, sed pinguior: ei crassitudo quæ manubrio ligonis, longitudo quæ

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do quæ lumbrico: hæc cum uerno tempore exuuias posuerit, fœniculo, ut cæteræ serpentes non uescitur: ex baculo nomen inuenit. Tum hybernis mensibus in caua terræ uel loca saxosa ingreditur natrix à natando appellata: qua de causâ à Græcis ex aqua *ὄφελος* nominatur: & *χέρονος*, quod & in terra & in aqua uersetur. Nec assentior Lucano qui chersydrum à natrice distinguit. Est aut infesta & inimica ranis: forma nō differt ab aspide, sed colore, qui ei plerumq; in cinereo candidus. Ex natricū genere uidetur esse Calabricus serpens, etiam si maculosus sit. Eum his uersibus describit Virgili:

Est etiam ille malus Calabris in saltibus anguis,
Squammea conuoluens sublato pectore terga,
Atq; notis longam maculosus grandibus aluum,
Qui dum amnes ulli rumpuntur fontibus, & dum
Vere madent udo terræ, ac pluuiialibus austris
Stagna colit, ripisq; habitans hic piscibus atram
Improbis ingluuiem, ranisq; loquacibus explet.
Postquam exhausta palus, terræq; ardore dehiscunt,
Exilit in siccum, & flammantia lumina torquens
Sæuit agris, asperq; siti atq; exterritus æstu.

Ex natricum præterea genere sunt boæ, in tantam, Plinio autore, amplitudinem exeuntes, ut, diuo Claudio principe, occisæ in Vaticano solidus in aluo spectatus sit infans. Aluntur primo bubuli lactis succo, unde nomen traxerunt: sunt enim nihil aliud quàm domesticæ atq; uernaculæ natrices. Aspis autem est longitudine IIII. pedū, crassitudine hastæ. Color eis nō unus: nam alijs squallidus, alijs uiridis & uariis, alijs cinereus, alijs igneus: maxime Æthiopici. Oculi hebetes in temporibus, & iuxta supercilia carunculæ instar calli eminent: quocirca quasi somniculosa nictare non cessat, sed animantium strepitu facile excitatur. Gignit eā Ægyptus, Æthiopia, & cæteræ regiones Africae. Coniugæ, uxor Plinij uerbis, feruē uagantur, nec nisi cum compare uita est: itaq; alterutra interempta, incredibilis alteri ultionis cura: persequitur interfectorem, unumq; eum in quantolibet populi agmine noticia quadam infestat: perrumpit omnes difficultates, permeat spacia, nec nisi amnis ardetur, aut præceleri fuga. Huic ichneumon, qui similis est mustelæ, maxime inimicus est: itaq; non tantum eius oua perdit, sed ipsum etiam interficit: etenim mergit se limo sæpius, siccaturq; sole: mox ubi pluribus eodem modo se corijs loricauit, in dimicationē pergit: in ea caudā attollens ictus irritos auersus excipit, donec obliquo capite speculatus inuadat in fauces: aspides autē Galenus in tria distribuit genera, in chelidonias, chersæas, ptyadas, à sputo cognominatas: quas Cleopatra sibi admouit. Aspis uerò frigoris impatiens hyeme inclusus atq; abditus latet in arenis: ut in cauis fagis aut quercubus dryinos: ex qua re nomen inuenit: eam alij, ut Nicander scribit, hydron, alij chelydron nominant: est enim natrici, quod ad caput attinet, similis, sed tergū habet cinerei coloris, crassitudo & longitudo ei est mediocris anguillæ, grauius olet: ranarum foetus, cauda insignes persequitur: & eam contra musca magna. At cerasæ ex cornibus nomen traxit, quæ modo cochleæ instar gemina, modo quadrigemina gestat in capite: & quidem corporea:

T 3 quorum

quorū motu, scribit Plinius, reliquo corpore occultato sollicitat ad se aues: alioqui in uiperæ figuram est formatus. Color ei squalidus: in frigidis tamē regionibus reperitur natrici similis figura & colore: quanquam raro in his reperiri soleat. In Africa in arenis & orbitis uersatur: alibi plerunq; in saxorum rimis, in quibus latet hyberno tempore. Aristoteles colubros etiā Thebanos tradit esse cornutos. Hæmorrhoids quoq; in saxorum rimis agit: ea ex profluente sanguine nomen inuenit: nam cū aliquem momorderit, prima nocte sanguis erumpit ex auribus, ex naribus, ex ore unā cum sputo, ex uesica cū lotio, ex uulneribus cum sanie: gingiuæ præterea & caro quæ est sub unguibus, stillant sanguine, si quem hæmorrhoids fœmina momorderit: est autem longa pedem, non multum crassa: etenim paulatim in tenuem caudam definit: colore aliàs cinereo, aliàs candente. Ex fronte eminent duo cornicula, item corporea; oblique ac tardius serpit, & perinde strepit ac si arundines transeat. Huic figura similis est sepedon, sed corniculis caret, & cōtrarie serpit: color ei ruber: à putredine, quæ mox sequitur eius morsum, nominatur. Porphyrus uerò, ut Ælianus tradit, palmi est magnitudine, capite candidissimo, reliqua purpureus, morsu innocuus, quippe qui dentibus careat. Inuenitur in Indiæ locis uadosis: captam cauda suspendunt, uiuentisq; ex ore defluentem liquorem legunt in uasculis æreis: alterum item ex iam defuncto liquorem nigrum similiter in altero uase excipiunt: & hic quidem in esculentis seu poculentis, cum grano sesami datus tabe lenta uiuus, uel etiam duorum annorum spacio paulatim enecat: ille more cicutæ statim absumit. Acontias autem, quem Latini iaculum appellant, ex arborum ramis se iaculi instar uibrat in animal quod præterierit: ex qua re nomē reperit: nec uerò solum desuper se uibrat in animal, sed humi positus, si fuerit laceffit, iaculi modo corpus intorquens eminus petit aduersarium.

Cenchris uerò, quam Nicander cenchrinen uocat, ex eo quòd crebris maculis milij semini colore similibus, sit interstincta, nomē inuenit, de qua Lucanus:

Quam semper recto lapsurus limite cenchris
Pluribus ille notis uariatam tingitur aluum,
Quam paruis tinctus maculis Thebanus ophites
Concolor exustis atq; indiscretus arenis.

At basiliscus ex eo nominatur, quòd ita ueneno cæteris serpētibus præstet, ut rex purpura & insignibus regijs ijs, in quos dominatur, antecellit. Caput ei acutum, & color flauus. Cyrenaica, inquit Plinius, hūc generat prouincia, duodecim non amplius digitorum magnitudine, candida in capite macula, ut quodam diademate insignem: sibilo omnes fugat serpētes: nec flexu multiplici, ut reliquæ, corpus impellit, sed celsus & erectus in medio incedens, necat frutices: non contactos modo, uerum & afflato: exurit herbas: rumpit saxa: talis uis malo est. Creditum quondam ex equo occiso hasta, & per eam subeunte ui, non equitem modo, sed equum quoq; absumptum. Huic tali monstro, sæpe etenim enectum concupiuerunt reges uidere, mustelarū uirus exitio est: adeo naturæ nihil placuit esse sine pari. Inijciunt eas cauernis facile cognitæ sola tabe: necant illæ suo odore, moriunturq; & naturæ pugnam

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gnam conficiunt. Basiliscum ex uolucrum, quas Ægyptij uocant ibes, ouis gigni theologus Cassianus affirmat: uulcus ex ouo, qd gallus peperit, monstrose asserit nasci: qualis fuisse perhibetur is qui Zuicæ aliquot homines necauit suo ueneno, qua de causa dominus cellæ, in qua erat, fores clausit, muroq; sepelit. Sequitur draco à uidendo appellatus, qd acrius cernat quã cæteræ serpentes, quocirca ueteres eum thesauris custodiendis præfecerunt: atq; in ipsius custodia ædes sacras, adyta, oracula posuerunt. Est autē ad aspectum pulcher: etenim totus niger, præter uentrem, qui subuiridis, & carnem sub mento, barbæ speciem præ se ferentem, quæ felle tincta uidetur esse. Pellis utriusq; supercilij pinguis. Ipse præterea utrinque triplici dentium ordine decorus: nec tamen multum mordens. Pugnat in alijs regionibus cū aquila, in Africa & India cum elephante. Nam in his sunt uicenum cubitorum. Duplex eius genus: unum terrenum, quod iam descripsi: alterum uolucrum, cui ut uespertilionis mēbraneæ sunt alæ. Id ex uastitate Libyæ uēto Africo inuehi in Ægyptum Cicero scriptum reliquit. Vnum habui longum sesquipedem, quo Ambrosium Fibianum donauit: cui ferè color crocodilli fuit: de hoc scribit Lucanus:

Vos quoq; qui cunctis innoxia numina terris
 Serpitis aurato nitidi fulgore dracones
 Pestiferos ardens facit Africa, ducitis altum
 Acra cum pennis, armenta q; tota sequuti
 Rumpitis ingentes amplexi uerbere tauros,
 Nec tutus spacio est elephas, datis omnia letho,
 Nec uobis opus est ad noxia fata ueneno.

Vt autem ex dictis serpētibus aliquæ in calidissimis regionibus nullo anni tempore necesse habent latere, certe in arenis & rimis saxorum solent cubare. Serpit etiam teredo, caret enim non modo pennis, uerum etiam pedibus: sed ea cui color æneus sub lignis putridis & nascitur & latet, ac plerunq; iuxta scolopendram inuenitur. Crassitudo ipsi est minimæ pennæ anserinæ, qua utimur, cū scribimus: longitudo scolopendræ, sed teres est.

Hactenus de animantibus, quæ in terra latent, aliquo anni tempore: nūc dicam de subterraneis proprie uerè sic dictis, hoc est de his quæ intra terrā gignūtur, & semper ferè sub terra, quasi defossæ uiuunt. Hæ aut ipsæ partim in terra sicca, partim in humida, uel in aquis subterraneis uitā agūt. Primi generis sunt talpa, mus, rana uenenata, spondylis, ascarides, lumbrici, cochleæ cauaticæ: alterius, pisces subterranei: quas animantes singulas persequar: & primò quidē talpā. Ea quadrupes est nō multū dissimilis muri, cæca tñ: quanquā oculorū effigies, scribit Plinius, inest, si quis prætentā detrahat membranā, quæ nō est pilis uestita: liquido audit etiam obruta, extracta ex terra, quam in aruis, magis uerò in pratis & hortis, passim egerit, diu non potest uiuere: crura habet breuiā, quare tarde graditur: digitī, qui in prioribus pedib. sunt quini, in posterioribus quaterni, oēs acutis unguiculis, quibus terram fodit, armantur: pilos autē habet nigrore splendido insignes: quibus catulis earum sunt albi. Vescitur ranis, etiam uenenatis, lumbricis, radicibus

T 4 frugum

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frugum & herbarum: ex earum pellibus pileoli & cubicularia fiunt stragula. Sequitur mus subterraneus, quem alij agrestem uocant. Seruius à Cicerone nitedulam putat nominari. De hoc Vergilius:

sæpe exiguus mus
Sub terris posuitq; domos, atq; horrea fecit,
Aut oculis capti fodere cubilia talpæ,
Inuentusq; cauis bufo, & quæ plurima terræ
Monstra ferunt.

Duplex autem est, minor scilicet & maior, ille non multo maior existit domestico mure minore: hic non multo minor domestico mure maiore: quin caudam ut ille longam habet ac crassam. Corrodit, imo exest, planèq; interdum consumit radices lupuli, pastinacæ, rapi, & reliquorum leguminū. Vastat messes: uerū ea pestis non semper in terra latet, sed nōnunquam egreditur, etsi rarius. Contrā rana uenenata, quam metallici nostri ex ignis colore qui insidet ei, *ωνεόφωρον*, suo tamen uocabulo nomināt, in saxis perpetuo quasi condita & sepulta latet. Altius intra terrā gignitur, & reperitur modò in uenis, uenulis, saxorū cōmissuris, cū hæ excauantur: modo in saxis ita solidis, ut nulla foramina, quæ uideri possint, appareant, cū cuneis diuiduntur. Quo sanè modo & Snebergi & Mannisfeldi fuit inuenta. Ea ex subterraneis cauernis elata in lucē primò turget ac inflatur, mox de uita decedit: talis etiam rana crebrius reperitur in Gallijs Tolosæ, in saxo arenaceo rubro, candidis maculis distincto, ex quo molæ fiunt: quocirca id genus saxa omnia, priusq; molas ex eis faciant, perfringūt: q̄ ni fecerint ranæ, ubi cū molæ uersantur, concaluerint, inflari solēt, & disruptis molis frumenta ueneno inficere. Spondylis aut uermis intra terrā reperiri solet, ita circa radices cōuolutus ut uerticilli, quod Græci *ωρόνδυλον* uocāt, speciē præ se terat: unde nomē inuenit. Ei longitudo & crassitudo minimi digiti: caput rubrū, reliquū corpus albū, nisi quod superne sit aliquantū nigrum, ubi cibo, quem sumit, turget: quæ horticorū pestis, cū nec careat pedibus, nam sex habet, nec serpat, tamen Plinius scribit, genus id serpentis est radices herbarū totas cōsumit, fructū corticem, quo radices eorū obducuntur, tantum abrodit: quin etiam edit radices cucumeris asinini, chamæleontis nigri, centauri, peucedani, aristolochiæ, uitis syluestris: cū aliud animal eas nō attingat. Sed uermis quas drupes, qui in Maio natus in agris currit, item crassus & longus minimum digitum, ut pulices terreni, in leguminibus orti, supra terrā uiuit. Ei corpus molle, nigror splendidus, gracilis isthmus: posterior corporis pars pectori adhæret: cū in manus sumitur, eas pingui liquore inficit, pellit urinam, sed unā sanguinem. Ascarides etiā, qui sunt uermes parui, non unius & eiusdem coloris: nam alij candidi, alij lutei, alij nigri, sæpius aratro excitantur. Reperiuntur autem plures in unum aliquem locum congregati: hi uastant satata: etenim ualidas segetes radicibus subsecutis enecant. At lumbricos, qui item intra terram gignuntur, & oculis carent, pluuiæ elliciunt. Concinne igitur Eudio Plautinus, sollicitus de aula auro referta, inquit ad Strophylum:

Foras, foras lumbrice, qui sub terra crepisti modò,
Qui modò nusquam comparebas, nunc quom compares, peris.

Quin

S V B T E R R A N E I S .

O I

[501]

Quin cochleæ in Balearibus insulis, ut Plinius scribit, cauatice appellatæ, non prorepunt è cauis terræ, neq; herba uiuunt, sed uuæ modo inter se coherent. Accedo nunc ad alterū animantiū subterranearū genus, quod in humidis terræ locis agit: etsi lumbrici etiā & aliæ quædā id genus animantes in terra tantū gignuntur humida. Pisces aut fossiles duorū generū inueniuntur, sed intra terrā nō nihil teretes ut anguillæ, uerū pelle carent tenaci: squamis etiam, ut & gobij: duramq; nec admodum iucundam gustui habēt carnem: maiores crassi sunt ferē duos digitos: minores, digitum: illi longi circiter palmos quatuor: hi tres. Sonū edunt acutū. Eos pharmacopolæ in uistrum inclusos de trabe suspendunt, ut spectaculum hominibus præbeant: longocq; tempore alunt pane & alijs quibusdam. Ex fluminibus aut quæ currunt in locis paludinosi, egressi per riparum uenas longius penetrant in terram: & interdum in proximi oppidi cellas usq; subterrancas, in quibus uinum uel ceruisia solet condi. Attamen Theophrastus scribit eos reperiri iuxta fluuios, & in aquosis locis. Cū enim terram inundaerit aqua, ex alueis fluminum egredi in eam: cū decreuerit, relinqui in exiccata. Itaq; persequentes humorem terram subire: dein humore exiccato in halitu permanere: non aliter ac pisces inter cæteros salitos uiuunt. In latebris autem propter sensuum stuporem eos nihil sentire, sed effossos se mouere. Non dissimile ait accidere in Ponto his piscibus quos glacies complectitur. Etenim non prius sentiunt & mouentur, quā in patinam iniecti coquantur. Verū nullos pisces, qui in fluuijs uersari semper soliti fuerunt, post inundationes in locis siccis relictos subire terram uidemus, sed omnes de uita decedere. Itaq; cū fossiles pisces etiam in locis, quos non inundauit aqua, solcant inueniri, certum est illos eò per uenas & uenulas penetrare. De qua re ultra Albim Orteranti, quod oppidum est ad Polsenicū fluuium, diligenter aduertit. Nec in Germania modo fossiles pisces reperiri solent, sed etiam post Pyrenæos montes, ut Polybius in quarto & trigésimo historiarū libro tradit, usq; ad Narbonem amnem planicies est: per quam fluuij feruntur liberis, & Roschinus, fluentes propter urbes eiusdem nominis, quæ habitantur à Celtis. In hac igitur planicie sunt pisces fossiles dicti. In ea enim est terra tenuis, & multū nascitur gramen: sub quod altitudine duorum uel trium cubitorum per arenam aqua fluminum dilatata fluit. Et si quando inundaerint cum aqua, pisces terram subeuntes alimenti causa, nam mirifice appetūt graminis radices, planiciem efficiunt refertam piscibus subterraneis, quos incolæ effodiunt. Inueniuntur etiam fossiles pisces circa Heracleam, & in multis Ponti locis, ut Theophrastus memoriæ prodidit: in Paphlagonia, ut Eudoxus. Quin, si Senecæ credimus, sub terra sunt stagna obsecra tenebris & locis amplis. Animalia quoq; illis innascuntur, sed tarda & informia, ut in aere cæco, pinguiq; concepta, & in aquis torpentibus facta. Et, ut idem scribit, in Caria circa Idimum urbem, cū exilisset unda, periere quicunq; illos ederant pisces, quos ignoto ante eum diem cælo nouus amnis ostendit.

Postremò in subterranearū animantium, seu, quod placet theologis, substantiarum numero haberi possunt dæmones, qui in quibusdam uersantur fodinis. Eorum autem duplex est genus. Sunt enim truculenti & terribiles aspectu:

aspectu: qui plerumq; metallicis infestī atq; inimici sunt. Talis fuit Annebergius ille, qui operarios duodecim amplius flatu interfecit in specu, qui corona rosacea appellatur. Flatū uerò emittebat ex rictu. Equi enim sp̄cie habētis procerū collū & truces oculos dicitur uisus. Eiusmodi etiam fuit Snebergius, nigro cucullo uestitus, qui in fodina Georgiana operarium ē solo sublatū in superiore loco maximæ illius concauitatis quondā feracis argēti collocauit, non sine corporis attritu. Certe Psellus, cū sex genera dæmonum definiat numero, hoc cæteris peius esse dicit: quod ipsi amictui sit crassior materia. Quidam philosophi hos & similes dæmones, qui nocentes sunt, & natura improbi, nominant brutos, & rationis expertes.

Sunt deinde mites, quos Germanorū alij, ut etiam Græci, uocant Cobalos, quod hominum sunt imitatores. Nam quasi læticia gestientes ridēt: & multa uidentur facere, quū prorsus nihil faciant. Alij nominant uirunculos montanos, significantes staturā, qua plerumq; sunt: nempe nani tres dodrantes longi. Videntur autē esse seneciones & uestiti more metallicorū, id est, uitato indusio, & corio circū lumbos dependentes induti. Hi damnum dare non solent metallicis, sed uagantur in puteis & cuniculis: & quū nihil agāt, in omni laborum genere uidentur se exercere: quasi modo fodiant uenas, modo in uasa infundant id quod effossum est: modo uersent machinam tractoriam. Quanquam uerò interdū glareis laceſſunt operarios, rarissime tamen eos lædunt. Nec lædunt unquam, nisi prius ipsi cachinno fuerint, aut maledicto laceſſiti. Itaq; nō admodum dissimiles sunt dæmonibus, tum his qui raro hominibus apparent, quum quotidie partem laboris domi perficiant, & curent iumenta: quibus quod nostri causa benigne faciant, generiq; hominum sint, aut saltem esse uidentur amici, nomen imposuerunt Germani, Gutelos enim appellant: tum Trullis uocatis: quos sexu tam mulieris q̄ uiri ementito, cū apud alias nationes, tum maxime apud Suionas in famulatu fuisse fuerunt. Sed dæmones montani potissimum laborant in his specubus, ē quibus metalla effodiuntur iam, uel ea effodi posse spes est. Quocirca metallici non deterrent à laboribus, sed omen inde capientes alacriori animo sunt, & uehementius laborant.

ANIMANTIVM NOMI-

NA LATINA GRAECAQVE GER-

manice reddita, quorum author in lib. De Subterra

neis animantibus mēminit.

GRADIENTIVM

Alce elch/elend
 Aper wildschwein
 Araneus niger schwarze feldspinne
 Asellus schefflein: in fenestris uersatur.
 Βατραχίδες Kaulkröten
 Blattæ wibel/brotwurm/springwibel
 Βελγας laubfrosch
 Bufo Kröte
 Καλαμίνι item laubfrosch
 Καμλίξο cichorn
 Caprea reh
 Castor piber
 Ceruus hirs
 Chamæleon, Germanis est ignotus
 Crocodilus crocodil
 Cuniculus cunlein
 Dama ein gempys des hornes vor sich gebogen sein
 Ελεός Italice ghyro
 Erinaceus igel/eius duo genera, hützigel vnd sewigel
 Fiber piber
 Formica cimo
 Γαλήν wiesel
 Glis grosse haselmaus
 Γυρίβοι Kaulkröten
 Hystrix stachel schwein/dornschwein/porcupick
 Ibex steinpock
 Ιτρίς iltes & alix syluestres mustelæ
 Lacerta grunadey
 Lacerta Chalcidica Kupferadey
 Lacerta aquatilis wasseradey
 Lupus wolff
 Lupus ceruarius lups

Lutra otter
 Martes steinmarter/vnd baummarter
 Meles dachs
 Melium ein halsband dar vnder dachs gefuttert / so man den hunden anlegt
 Μολογίδες Kaulkröten
 Mus alpinus murmelthier
 Mus araneus spitzmaus
 Mus agrestis schömaus
 Mus lassicius lassig
 Mus Noricus pilche/bilche/ziesel/bilchmaus/zieselmaus
 Mus domesticus maior ratte
 Mus Pannonicus
 Mus Ponticus hermlin
 Mus aquaticus wassermaus
 Mus subterraneus Klein: schömaus
 Mus syluestris haselmaus oder nösemaus
 Mustela domestica wiesel
 Mustela syluestris iltes
 Μυσάλη spitzmaus
 Μύς ονίξο cichorn
 Noerza noerz
 Platyceros damhirs
 Pulices terreni erdsloh
 Ρανέττα feirkrote
 Rana rubeta Kröte
 Rana temporaria reinfroschlein
 Rana uenenata fossilis feirkrote
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 Rupicapra ein gempys des hornes hins der sich gebogen sein
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 est insigne holkrähe
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BASILEAE APVD HIERON
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SE MARTIO.