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- I. *Observations on Living Animals found inclosed in Stones and other solid Substances.* By F. W. A. MURHARD.
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OF living animals being found inclosed in solid masses, I have met with no mention in the works of the ancients. Martial, indeed, in one of his epigrams, speaks of insects inclosed in amber; but these animals were dead, and therefore do not belong to this subject. As far as I know, Fulgos* is the first author who makes mention of a living toad being found inclosed in a stone. He wrote about the beginning of the sixteenth century; and the circumstance took place in the village of Meudon in Italy, in the time of Pope Martin V. He was informed by a stone-cutter that there was nothing surprising in it, as such phenomena had often occurred to himself. Agricola, who lived afterwards, speaks of poisonous frogs being found in stones, but which soon died when exposed for a short while to the air. Aldrovandi† also speaks of marble in which these animals were found

* See his work *De Mirabilibus*. Mediol. 1509, fol. and Antwerp. 1565.8, in the chapter *De avibus animalibusque aliis admirandis*.

† Aldrovandi *De Testaceis*, p. 81.

alive. Ray* at first doubted the truth of these relations; but his doubts were soon removed by the undoubted testimony of eye-witnesses. Accounts of a similar kind may be found in Francisci's *Theatre of Various Curiosities*, printed at Nuremberg in 1671 †. The author there speaks of toads, crabs, serpents and shell-fish found in stones; but it is very evident that he confounds these with petrifications.

Lloyd, in the third letter at the end of his *Litbophylacii Britannici Ichnographia* ‡, says, he was informed by Dr. Richardson that he had found a living toad inclosed in a fossil rock. Dr. Bradley§ mentions a fact of the like kind, having been witness to a toad being found in the trunk of a large oak. We are told in the History of the Academy of Sciences of Paris for the year 1719, that a toad was found inclosed in an elm as thick as a man's body. As soon as the trunk was cleft the animal dropped out, and no opening could be discovered through which it had got in to the heart of the wood. A similar circumstance is mentioned in the same work for 1731, viz. of a toad being found in an oak at least eighty or a hundred years old ||.

Labat, in his Travels through Spain and Italy¶, gives a very minute description of a kind of shell-fish found in stones fished up from the sea in the territories of Civita Vecchia, and which were eaten by the inhabitants. "While walking," says he, "on the coast of Bichiere, I had the pleasure of seeing fished up several sea dates (*dattoli di mare*) which are produced and grow in certain stones of a some-

* Synops. Animal. Quadruped. p. 21.

† Der lustigen Schau-Bühne vielerhand Curiositäten 2ter Theile durch Erasmus Francisci. Nuremberg, 1671 8. p. 1109.

‡ Lond. 1698.8. p. 107.

§ A Philosophical Account of the Works of Nature. Lond. 1721. 4to. p. 9 and 120. See also Acta eruditorum. Lip. 1721. p. 370.

|| See also Acta eruditorum. Lip. Suppl. VII.

¶ Voyages en Espagne et en Italie. Amst. 1731.8. vol. iv. p. 240.

what spongy nature, found in great abundance in the Adriatic Sea, and of which there are some also in the port of Civita Vecchia. These sea dates, which are a kind of muscles, are almost round, pointed at both ends, and consist of two shells which open on one side, and are from one or two to nearly four inches in length. The shell is of the same quality as that of the common muscle, but it is a little browner and less smooth on the outside. The inside has a somewhat silvery appearance. The fish which they contain is white, delicate, fat, and of a very agreeable taste, so that it is a morsel for a cardinal (*un boccone di cardinale*). They are called dates, because the shell which contains the fish has a great resemblance to the dates of Barbary when they are ripe and dried. The stone in which they are inclosed is heavy and pretty solid, though it appears spongy. The cavity which the shell occupies in the stone, and which it exactly fills, touches it on all sides like the best fitted case. Some small ones are not half an inch in length, but others are four inches. When the fishermen had procured a sufficient number of the stones, they placed them on the edge of the quay, and broke them by means of a large hammer. In some they found nothing, but others contained two or three dates. They gave some of them to me, together with fragments of the stone which inclosed them, and on which I made the above observations."

Instances of a similar kind may be found also in various other works. Thus we are told that Charles Hall, a merchant at Eberach, saw a living toad sitting in a stone, upon its being broken. Martin Weinreich * relates a circumstance of the like kind; and John Nardius † says, that he found in a block of marble a living snake. Libavius speaks of vipers and toads found in stones, as does also Cardan. A living

* Commentar. de Monfris, cap. vii. p. 58.

† Joan. Nard. in Ann. 1. noct. gen. 4. p. 266.

toad was found in an oak by Seigne in 1731, and another in a hard stone, at Ecretteville, by Le Prince in 1756*.

A great many particulars relating to this subject have been collected by Guettard. A common toad, two of whose feet were free, and the other two sticking fast in gypsum, so that it was impossible to disengage them without tearing them to pieces, was sent to him by order of the Duke of Orleans. Count Hermann II. of Hatzfeld, told Dr. Sachsen† that he heard a living frog croak in the middle of a stone at his palace of Schellenberg, near Cologne, and that the animal hopped out on the stone bursting of itself. I shall now give a few other instances, of which Guettard makes no mention.

In the year 1733 a living toad was found by J. M. Gräberg in a solid hard block of stone, dug up from a quarry in the parish of Wamblingebo, in Gothland, and which he caused to be broken by the workmen. The colour of the animal was blackish grey, a little spotted on the back, and somewhat fainter on the belly. Its eyes were small and round, and covered by a tender skin or film, under which they seemed to sparkle a little with a colour like that of pale gold. Having touched it on the head with a stick, it contracted its eyes as if it had been asleep: as soon as the stick was removed, it gradually opened them; but moved neither its body nor feet in the least, though he touched it different times. He remarked also that the mouth had no aperture. It was covered with a yellowish skin, which he examined also with the stick, but he was not able to make it

* Instances of the like kind may be found in the following works: *Haller de corp. bum. fabr. et funct.* vol. vii. p. 157; *Avant Coureur*, 15 Sept. 1766; *Chr. Franc. Paulini in Brfone*, c. 3. sect. i. p. 33; *Christ. Fr. Garmann in Oolog. curr. diss.* ii. p. 145. § 120; *Nierenberg. Hist. Nat. lib.* vi. c. 13; *D. Baueschius de Aetite*, p. 74; *Euseb. Christ. Franks Historie der Grafschaft Munnsfeld*, Leip. 1723. vol. i. ch. 5; *Lessers Lithotheologie*, Hamburg 1751. 8. p. 101 and 112.

† *Memoires sur differens parties des Sciences et des Arts.* Paris 1783-4. vol. iv. p. 615.

open it. Having at last pressed it on the back, a little clear water issued from it behind, upon which it immediately died*. Don Antonio de Ulloa, who with Condamine, Bouguer and Godin, was employed in measuring a degree of the meridian in Peru, saw at Madrid two worms which had been found in the middle of a block of marble by the king of Spain's statuary. Miffon, in his Travels through Italy, speaks of a living crab found in a piece of marble near Tivoli. M. Peyssonnel, physician to the king of France, having employed some workmen to dig a well near his house in Guadaloupe, they found living frogs amidst the strata of the rock. His curiosity being excited by this circumstance, he descended into the well himself, bored into the rock, and brought up alive some green frogs, which had a perfect resemblance to the common ones.

In the Gentleman's Magazine for 1756 mention is made of a living toad found in a block of marble, at an old castle belonging to Lord Tankerville, twelve miles north-west from Alnwick†. T. Whiston relates, that in the year 1743 a stone-cutter named Charlton found near Wisbich, in the Isle of Ely, a living toad inclosed in a piece of marble‡. Being called to the spot, he saw the animal, and the cavity in which it was contained. The latter was somewhat larger than the toad, and had almost the same figure. The animal was of a dark yellow colour; and the solid marble, which inclosed it on all sides, was several inches thick. It seemed to be quite healthy, and by its long confinement had not become meagre. John Malpas also, in the year 1755, found a living toad inclosed in a piece of free-stone at Great Yarmouth§. The hole in which it lay was six inches distant from the corner of the stone. He took it out with a pair of

* Kongl. Swenska Vetenskaps Acaemiens handlingar for ar 1741. p. 248.

† Gentleman's Magazine, 1756, p. 74.

‡ Ibid. May 1756, p. 240.

§ See Gentleman's Magazine, loc. cit.

compaffes, but in doing fo happened to hurt it. When he placed it on the ground it however crept about, but died in the courfe of an hour. It had a yellow ftripe over the back, the colour of which became changed after it was dead. No crack or cleft could be difcovered in the ftone. The infide of the cavity was fmoother, and looked as if it had been polished.

M. Gerhard, at Padenburg, in the county of Mansfeld, faw likewife a living toad inclofed in a ftone. The cavity in which it lay feemed exactly fitted to the fize of the animal, but was exceedingly fmoother in the infide. No opening could be obferved through which it was poffible for it to have got into the ftone. After fome fearch, however, a hole was difcovered at the furface of the earth, which extended to the depth of twelve toifes; but ceafed at the diftance of thirteen inches above the cavity that contained the toad. M. Gerhard confiders it as very probable that this aperture had formerly extended to the cavity, into which the egg of a toad might have been conveyed by water; and that the opening muft afterwards have been clofed up near the cavity. The toad, however, muft have remained long in this ftate; for fuch apertures do not clofe up foon, and a long time is required for the petrification of earthy particles*.

M. le Cat †, who relates many instances of the like kind, examines the poffibility of them, and the caufes of fuch phenomena. Some philofophers have been of opinion, that the eggs of thefe animals, created by the Supreme Being at the beginning of the world, and floating about on the watery expanfe, have fince that time been inclofed in the interior parts of the rocks. But M. le Cat contradicts this opinion by remarking that the creation of an egg is not fufficient, and that it muft be hatched in order to produce a living creature. He confiders it alfo as impoffible that fuch ani-

* See Nouveaux Memoires de l'Acad. des Sciences et Belles Lettres de Pruffe pour l'année 1782. Berlin 1784, 4to. p. 13.

† In Du Lac Melanges d'Hiftoire Naturelle, vol. iv. p. 615.

mals can be of the same antiquity as the stones or substances in which they are found. The age of the oldest men, says he, never exceeded 169 years; and what is the life of an insect when compared with that of man? Even if we suppose that the moderation of these animals, and their being exposed to very little motion, had caused their growth and the periods of their life to be extended in an uncommon degree; and though their want of air, or rather their being preserved and defended from the manifold impressions of that corrupted element, had contributed a great deal to their support, the prolongation of life thence arising could not exceed so very much their natural and usual existence. M. le Cat rather thinks that a hatched egg, in all the cases mentioned, may have fallen by chance into some small cavity, where it was secured from petrification till its substance acquired sufficient strength. He here remarks that eggs, when rubbed over with varnish so as to be defended from the effects of the air, may be preserved fruitful for years; and he therefore believes, on good grounds, that an egg so secured in the centre of a rock might retain its activity for some thousands of years, and even that it would be impossible for it to be hatched till it had been exposed to a very high degree of often renewed or long continued heat. According to M. le Cat's opinion it is the egg which is of great antiquity, and not the animal. I shall here observe that nature, when allowed peace and rest, does not require so much time as is generally believed in order to produce minerals. Of the truth of this remark I am fully convinced, since I saw in the museum at Göttingen the step of a ladder found on clearing the gallery of a mine in Rammelsberg, abandoned at most about 100 years before, and which in the course of that period had been encrusted with selenite seven inches in thickness. Nay we have instances of ore having grown up in a much shorter time*.

* See *Ulloa's Nachricht von America*, vol. ii. p. 14, and *Tiebras Erfabrungen vom Innern der Gebürge*, p. 53, tab. 4, no. 4.

I must observe also, that most of the animals found in this manner were of the amphibious kind, and request the reader to reflect on the habits, nature and mode of living peculiar to that class. Caldesi relates, that tortoises can endure hunger for half a year; and numberless instances might be produced of their strong and tough nature.

I shall not enlarge farther on this subject at present, as I mean at some future period to communicate my ideas to the public in a more connected manner, and to give as complete a theory on it as possible. I flatter myself that I am the more qualified for this task, as many have written on these phenomena and formed conjectures without having ever seen one instance, while I have been an eye witness of some of the latest. In a quarry not far from Cassel, between that city and the palace of Freyenhagen, I found three toads together in a pretty large block of free-stone *. I remember, also, that, when a boy, our house at Cassel being under repair, and the old plaster pulled down, several toads were found between it and the stone wall †.

At a period like the present, when so many things are made the subject of experiment, when every one endeavours to tread in the footsteps of a Bacon and a Newton, and, instead of being contented with surveying Nature in her private recesses and carefully watching her progress, compels her as it were to labour and make known her secrets, I am much astonished that she has not been put to the proof in this respect long ago. Such experiments, without which all theory must ever remain mere hypotheses, and can never amount to demonstration, would require little or no expence. Nothing would be necessary but to make a deep hole in a stone; to inclose some animal in it, such for example as a

* See Diff. Academicor. Institut. Bonon. (interp. Beccario) op. Benedict. XIV. P. M. de Sevor. Dei beatificat. l. iv. p. 1. p. 328; and Beccarius in Commentar. Instit. Bonon. tom. ii. p. 1. p. 323.

† A full account of this circumstance, which I transmitted to M. Kaftner, may be found in the *Gattingisch. Anzeig.* for 1796.

toad, and to prevent the air from penetrating to it: or eggs only might at first be put into the stone. It would, however, be attended with most advantage if several experiments were made at the same time, in order that the state of the animals might be examined at different periods. Such experiments, and careful observation of the nature and economy of these animals, could alone lead to any certain conclusion respecting a circumstance so abstruse, which, at present, seems to surpass the powers of our comprehension.

II. *Observations on Snow and Rain; their Influence on Vegetation, and their Combination with Oxygen.* By J. H. HASSENFRATZ. From Journal de L'Ecole Polytechnique, P. IV.

ALL those who inhabit parts of the earth exposed to snow, agree in considering this meteor as one of the means employed by nature to give to plants more strength, and to make them expand with more vigour. Several even are persuaded that winters which produce no snow presage a bad harvest and a feeble state of vegetation; and they ascribe its influence to the salts which they say exist in that congealed water. Snow collected in large masses, melted and evaporated in earthen vessels, having left no residuum, has made this supposition be considered as a mere chimera; and, in consequence of reasoning carried too far, some have been induced to deny that snow has any influence at all on vegetation.

In phenomena transmitted through successive generations, we must distinguish the results of observation from the explanations some have attempted to give of them. There are phenomena, indeed, the whole of which present themselves to our senses in their full force, and which can leave no doubt in the mind of the least attentive observer; but there are others which exhibit only a few traces that cannot be dif-