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TOAD IN THE HOLE

Source material on the entombed toad phenomenon

Selected and annotated by Bob Skinner

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Selected and Annotated by Robert M. Skinner

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Robert Plot, author of "The Natural History of Staffordshire", in which the first main discussion of the phenomenon of entombed toads written in English appeared.

Introduction

For centuries, reports have occasionally been made of surprising discoveries of living animals – particularly toads and frogs – found totally enclosed within the solid substances of rocks, the trunks of trees, or deep beds of clay. How such accounts can be explained, and the truth and accuracy of the observations, has long been the subject of debate and often of great controversy. Although the so-called 'Toad-in-the-Hole' or entombed toad phenomenon [1] is one of the better documented of unexplained mysteries, and several instances have been reported in recent years, the majority of people are unaware of these reports, and no detailed study or catalogue of cases has been published for more than a century.

My curiosity and interest in the reports of entombed toads was aroused four years ago. Since then I have collected records of over 300 instances of the phenomenon from all over the world – reports that range in their quality and value as data from insubstantial and purely hearsay accounts to well-documented eye-witness observations and investigated cases. The quantity of material gathered makes it likely that any definitive study of entombed toads is several years from completion, and will inevitably be several times longer than this Occasional Paper. If and how such a study could be published is another question, but regardless of this I am determined to ensure that the data I have collected will be preserved and made accessible to future researchers in some way.

This Occasional Paper will complement any future definitive study, and by reprinting some of the classic sources and original eye-witness accounts of the phenomenon,some of the better material from the past is made readily accessible today. It is hoped that this publication will go some way to increasing awareness of this strange phenomenon and to encouraging a continued open-minded collection and assessment of data.

Bob Skinner 21-12-85

1: The terms 'Toad-in-the-Hole' and 'Entombed Toad' phenomenon used in this paper also include the cases involving frogs. There is sometimes doubt about which of the two types of amphibian was involved, and confusion can be caused by unintentional misidentification by witnesses, or inexact local names for the animals. Cases that definitely involved frogs are very much less common than those involving toads. Even less frequent are reports of other entombed animals (mainly other cold-blooded creatures such as newts, lizards, snakes and various invertebrate types), and although mention of some such cases are made in passing in the classic sources reprinted here, this paper concentrates on cases involving toads and frogs - comprising the Order 'Salientia'.

Contents

A brief overview of the literature

Bob Skinner

[For the classic sources and original eye-witness reports selected for inclusion in this paper to be fully appreciated, it is useful to be able to see them in the context of other writings on the phenomenon, and of the prevailing attitudes of the times in which they were written.

For full references to sources mentioned in this paper, the reader is referred to the Select Bibliography.]

Apart from a solitary 12th century reference to the phenomenon by William of Newburgh in the 'Historia Anglia' (c.1198), it is to the writers of the 16th century that we have to go to find the first reported instances of and discussions about entombed toads. A clear first-hand account was given by the famous French surgeon Ambroise Paré in 1575, followed by his suggestion that entombed toads were "generated by some humid substance in the stones; this humidity putrefies, and then produces such animals." The theory of 'Spontaneous Generation', which was the doctrine that certain animals could be produced from putrefying substances, was the main accepted explanation for the phenomenon of entombed animals for many years – well into the late 1600s. Another hypothesis, first proposed by William of Newburgh, was that the toads in stones were somehow the result of demonic activity, and this was again suggested by Simon Majol (1597) and Martin Delrio (1599).

In the latter half of the 17th century, several continental authors reviewed what had previously been written on the subject of entombed toads, the two passages by Christian Paullini (1685 and 1686) providing the most comprehensive survey and references to the literature up to that time. Unfortunately, little more than brief notes of the phenomenon itself are given, Paullini contenting himself with providing references to other authorities.

The extract on entombed toads by Robert Plot, taken from his 'Natural History of Staffordshire' (1686) has been selected as the first of the reprinted sources. Plot was a contemporary of Paullini's, and at the time facts were often accepted solely on the authority of the writings of other authors. Plot's account is, however, made more interesting and valuable by the several instances he himself collected in Staffordshire whilst researching for his book.

An interesting number of references to the phenomenon and reports of instances appear in the 18th century, and whole articles on entombed animals appeared in the 'Gentleman's Magazine' in 1756 and the 'Annual Register' in both 1761 and 1791. The latter article is reprinted in this collection to represent the writings of the period. Interest among scientists was aroused in France when it was announced that in September 1770 a live toad had been discovered enclosed in plaster at Le Raincy castle as a wall that had stood for 40 or 50 years was demolished. Although these circumstances did not necessitate acceptance of the idea that toads found enclosed in rocks had survived long ages of incarceration, the circumstances were analagous, and the find caused considerable interest. In February 1771, Jean Guettard presented his investigation of the case to the Academy of Sciences in Paris, and accompanied it with an extensive study of the whole phenomenon of entombed toads. Like the writers of the previous century, Guettard surveyed the work of others – but he provided full details of their data and evaluated the various theories in some detail. This memoir was the most comprehensive to date, but unfortunately it is too long to reprint in this paper.

Another academician, Louis Herissant, was intrigued by Guettard's lecture to the Academy, and made the first of several attempts to study the phenomenon by experimentation. Details of his efforts are recorded in the 'Annual Register' article of 1791, reprinted here. In 1775 another Frenchman, Pierre Grignon, announced that he planned to test the vitality of toads enclosed within hollowed stones. No record of these experiments survives, but in 1805 the Rev. William Bingley made some detailed proposals for studies of this kind, and such experiments were made in 1825 by the Reverend William Buckland, Professor of Geology at Oxford University [2]. These are of great importance and interest, and after the results

2: I am grateful to Dr Andrew Allen for the following details of William Buckland's interest in the phenomenon:

"Buckland first became interested in the subject of entombed toads when a friend [Luke Howard - RMS] suggested that the phenomenon might provide decisive evidence for or against the gradualist and several different catastrophic theories of the origins of the earth. Over a period of several years, Buckland collected data on entombed toads, canvassed the opinions of zoologists on how long toads might live imprisoned within rocks (estimates ranged from a few days to 4000 years), and planned his famous series of experiments; but by the mid 1820s he was, with some disappointment, coming round to the view that while the phenomenon of entombed toads was of great interest in its own right, it was unlikely to provide decisive evidence for his own views on the history of the Earth, or a refutation of the views of his opponents."

[Personal letter dated 25 September 1984]

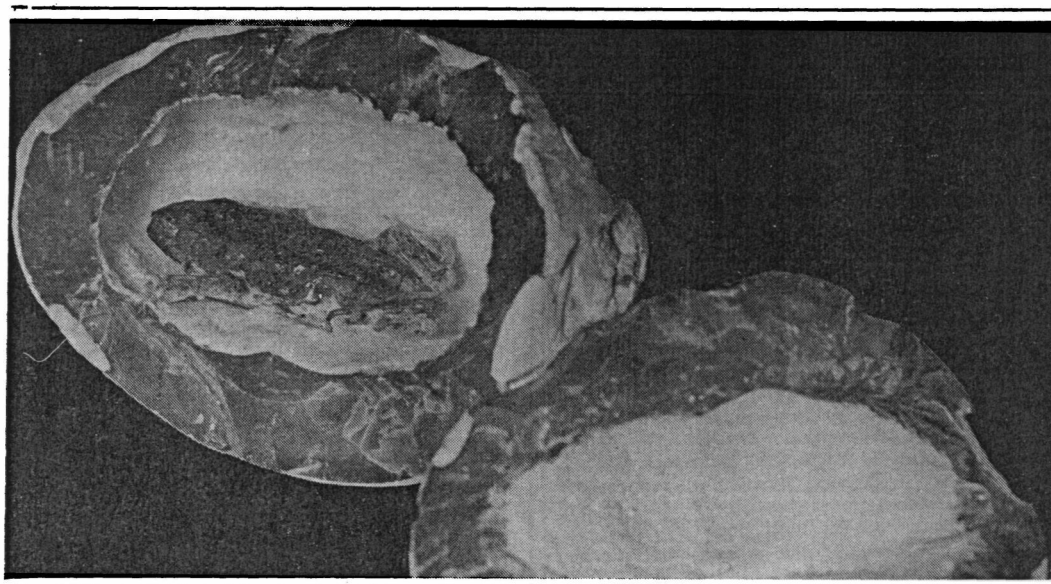
ublished in 1831 there was a noticeable change in the attitude to the phenomenon of many authors. The trials were often cited as proving once and for all that toads could not survive for long periods enclosed within rocks and trees. Buckland's account of his experiments is quoted almost in its entirity by Philip Gosse in the extract from 'The Romance of Natural History' presented here, so it is possible for the reader to decide whether or not it is fair to state that the problem of the phenomenon is so easily settled.

In 1824 the Linnean Society of Paris offered a prize to the author of the best paper examining and explaining the problem. Only two entries were received, one of which appears to have been disqualified for some reason. The remaining essay was by Jean Vallot, a physician from Dijon. His thesis was entitled 'Zooenstéréology', but it was sceptical of the reality of the phenomenon and did not deal with specified subject matter fully. The evident extent of Vallot's research and documentation, however, induced the Society to award him a consolation prize of 200 francs [3]. 'Zooenstéréology' was never published, and was so extensive a study that it would have required a book of 200–300 pages to accomodate it. The original manuscript – held in the Linnean Society's library – appears to have gone astray after the group's demise in 1826. Some details of what the thesis contained can be deduced from reports of lectures which Vallot gave and from some of his later articles on the subject. Despite the fact that Vallot attempted to completely explain away every instance of entombed toads, partly on the basis of an unlikely but ingenious theory of his own [4], his writings are a valuable source for details of other articles and memoirs on the subject.

From 1844, a number of communications on the entombed toad phenomenon were published in the 'Zoologist' magazine by the editor, Edward Newman, who wished to take an open-minded look at this and other moot points of natural history. Much of his material was quoted by Philip H. Gosse (1861), together with his own commentary and analysis. Because of the wealth of data the chapter in his book provides, it has been selected as the third of the reprinted sources. 1862 marked the start of a period of increased publicity, interest, and public awareness of the 'Toad-in-the-Hole Question', as it was sometimes called. There was also great controversy, particularly after a living frog was displayed that year at the International Exhibition in London, together with the block of coal from which it was

3: 'Memoirs de la Societe Linneenne de Paris' Vol.3 (1824) Pt.1, p.lxxiv; Vol.4 (1825) Pt.3, p.3

4: Vallot suggested that the word for toad was in certain languages also a term used by quarrymen and masons for a cavity in rock, and the term 'Living toad' was their way of describing a cavity which was lined with crystals (a geode). Vallot tried to explain all other reports as the result of poor observation of instances of toads hibernating in cavities, and not fully enclosed as was claimed by the witnesses.



The Cabinet of Curiosities in the Brighton Museum includes this mummified toad found within a hollow flint at Lewes, Sussex, about 1901. When first discovered, there appeared to be entrance to the central cavity, but later a small hole was discovered that had become filled with compacted chalk. It is not known how long the toad lived within the flint, at what stage the hole to the outside was blocked up, or when the toad died, but this exhibit illustrates how it is possible for young toads to become trapped within rock and to subsequently grow within an internal cavity.

released in March 1862 in a mine in Wales [5].

Increased publicity and debate continued for over 20 years, during which time runs of correspondence and contributions appeared in such magazines as 'The Field', 'Land & Water', Notes & Queries' and 'Hardwicke's Science Gossip'. The extent of this interest is understandable when seen in the context of the major changes that were occurring in the mid–19th century. Charles Lyell, a geologist who had studied under Buckland at Oxford, published his 'Principles of Geology' in 1830. This book marked the start of the rapid demise of older views about a world which had been created only a few thousand years before, and of catastrophism in geological thought. Such theories were rapidly replaced by newer uniformitarian thinking, which viewed the earth as many millions of years old. These changes opened the way for Charles Darwin and his theories of evolution and natural selection – ideas that he had sketched out by 1844, but which did not appear as 'Origin of Species' until 1859.

It was in this climate of change in scientific thought that the stories of living toads being found entombed within rock (which had previously been regarded more or less as curiosities) now increasingly came to be seen as anomalous, causing the scientific community to take more notice of them – if only to explain them away. Opposition to reports of the phenomenon was mounted by some scientists, who seemed determined to destroy all belief in the ability of toads to survive within rocks; but their explanations were often highly inadequate, and their attitudes biased and unscientific. The strength of feeling associated with several of these efforts indicates the extent to which toad reports were perceived as posing a threat to the new scientific beliefs. One distinguished geologist is said to have stated that "the blow of the hammer that disclosed a live frog in a block of stone without an opening would at the same time destroy not only geology, but the whole fabric of natural science." [6]

Included as the fourth extract in this collection is the sceptical article by Andrew Wilson from his essay 'Some facts and fictions of Zoology' (1879), which illustrates the kind of attitude that developed later in the 19th century and continued well into the 20th. The period is noteable for a decline in the number of Toad–in–the–Hole reports, and of public interest in the subject. The few references to entombed toads in books and magazines treated the topic very negatively, discounting reports as folklore, superstition or exaggeration.

Although the subject itself does not seem to have been mentioned in the writings of Charles Fort, the phenomenon was occasionally discussed in Fortean magazines and books from the 1950s on, and more regularly since 1970 [7,8]. Apart from this coverage there was little else, and public awareness of the phenomenon has all but died out.

Interestingly, a change in the attitude of some zoologists is detectable in recent years. In 1983 Michael Tyler – a lecturer in Zoology at the University of Adelaide – made an Australian radio broadcast on 'Frogs in Rock', and in it indicated that he had been forced to reconsider his attitude to the subject after investigating a few cases which had come to his notice. In a personal letter to me in 1985 he states that, "as a zoologist I try to keep an open mind. Many frogs in Australia are capable of aestevating in the ground for perhaps several years at a time. But I know of no process whereby this could be extended into centuries."

In his 1984 article 'Toad in the Prehistoric Rock', in 'The Countryman', Dr Andrew Allen (a visiting lecturer in animal physiology at Sussex University) concludes by writing, "Toads are cold–blooded creatures which burn energy very slowly when they are inactive or hibernating, living off thick reserves of fat just beneath the skin. Like many other cold–blooded creatures – notably spiders and snakes – they can fast for one, two, or even three years without coming to any great harm. But whether a toad could live for more than three years sealed within a block of stone, nobody knows." This more open–minded attitude was anticipated as long ago as 1959 by Dr Maurice Burton, then of the Natural History Museum, London. In one of two articles on entombed toads he wrote in that year for the 'Illustrated London News', he concluded, "It is clear...that not only do toads do peculiar things, but that the stories of toads being found in stones and rocks must be accepted. The only part of the story that must be rejected is that imprisoned toads are of great antiquity."

What these scientists seem to have done – and it is something their colleagues of the late 19th and early 20th century seemed incapable of doing – is recognise that the facts of the observations can and need to be distinguished and seperated from the interpretations and theories which have become connected with them. Just because some of the theories which have been advanced to explain the reports of entombed toads are highly improbable, or even impossible, does not mean that the observations themselves have to be rejected. Some of them are detailed and are the work of obviously intelligent witnesses. A selection of eyewitness reports of the phenomenon, originating from the 16th to the 20th centuries, and from around the world, is reprinted in a section of this paper following the classic sources.

5: Details of the find were first published by the 'Worcester Herald' (12 March 1862), and the controversy reached the correspondence columns of 'The Times' in September 1862.

6: Quoted by Ackermann (1950) p.270 [General Editor's note: See the bibliography for the full reference for this source and those cited later in the footnotes.]

7: For example Splitter (1954), Edwards (1959) and Thorn (1966).

8: Sanderson (1973), Corliss (1975, 1978, 1980, 1981), Michell & Rickard (1977, 1982), Welfare & Farley (1980), Eberhardt (1980), Smyth (1981), Calkins et al (1982).

The natural history of Staffordshire

by Robert Plot (1686) [9] pp247–51

The TOAD though living both at LAND, and in the WATER, is sometimes most wonderfully excluded from BOTH, having been frequently found close imprison'd within the middle of solid blocks of STONE, without any perceivable RIFT or CLEFT, either whereby they were first admitted, or were supplied with AIR, during their abode there; a thing so frequent in this COUNTY, that I met with instances of it in divers places: and first at HORTON, at the house of Mr. EDG, where in his barn wall, he shewed me a hollow Stone which being cloven by the MASON had a LIVE TOAD included in it; this he told me he saw himself, and that it died quickly, after it was taken forth [10].

The same happen'd again at KNYPERSLEY near by, at the Right Worshipfull Sr. JOHN BOWYERS Baronet; at INGESTRE at Mr CHETWYNDS; and as I was told by Mr LAUNDER, at the Village of BROCTON; the learned Dr PIERCE, a Physician at BATH, in a Letter to the ingenious Mr WILLIAM MUSGRAVE Secretary of the PHILOSOPHICAL SOCIETY of OXFORD, sent us lately an account also of such a TOAD found in the Center of a hard LIME–STONE, laid as a step–stone for passengers in the middle of a CARTWAY between two RILLS that ran to either side of it; where a CROAKING noise being a long time heard, and the parts near search'd and nothing found, this stone at length was resolved should be broke, where in a cavity near the middle a large TOAD was found as BIGG as a man's fist, which hop't about as briskly, as if it had been bread in a larger room; but for how long time he does not say [11]. But the TOAD that was found in the most astonishing manner, certainly that ever was heard of, was that at STATFOLD, if the tradition they have of it there be true, where as the story goes, the STEEPLE being taken down to prevent falling, the top–stone of the SPIRE or PINNACLE being taken off, was thrown down whole into the CHURCH–YARD, but breaking in the fall, there appear'd a LIVING TOAD in the Center of it, which (as most of the rest are said to doe) dyed quickly after it was exposed to the Air [12].

Nor has this sort of IMPRISONMENT of TOADS, in solid stones, been observed of late years, but in many ages backward; for GULIELMUS NEUBRIGENSIS relates [13], that a TOAD was found thus included in a stone in his time, which was near 500 years agoe; and the publisher of that EDITION of him, printed at HEIDELBERG An.1587 upon that place notes, that in the COAL–MINES near LEIGH [14], there are oftentimes found hard round smooth FLINTS with LIVING TOADS in them, without any visible cleft or passage for AIR. In the same manner JOHNSTON assures us, they are found at THOLOUSE in a reddish sort of FREESTONE; also that a STONE–CUTTER of ANTWERP met

9: Robert Plot (1640-1696), a naturalist and antiquary, was a Fellow of the Royal Society, Professor of Chemistry at Oxford, and the first Keeper of the famous Ashmolian Museum.

10: There are a number of similar records of stones that have been found to contain toads subsequently being used in buildings, with their cavities displayed, the most famous being the Chillingham, Northumberland case - see Norman (1884). The death of the entombed toad shortly after discovery is a frequent feature of reports.

11: Plot cites the Letter Book of the Philosophical Society of Oxford, March 17 and April 11 1685. The only other case I know of where there was this audible evidence of a toad within a rock before the stone was broken is the account of the case near Cologne in 1664, reproduced on page 29 of this paper

12: The Statfold tradition was probably mentioned to Plot by his friend, Francis Wolferstan, who owned the estate at Statfold. There is a small disused chapel there, but no evidence that there ever was a steeple. On finding an identical tale about a frog discovered in the top stone fallen from a steeple on Lichfield Cathedral, which is quite close to Statfold (see 'The Field' Vol.19 p.469), I began to wonder whether this is an instance of a story being transplanted from one location to another. Several details given by the correspondent to 'The Field' about the Lichfield location for the case fail to check out. It is said to be recorded in Dr Harwood's 'History of Lichfield', but I have on several occasions searched through this book without finding a reference to the story. It is also stated that the Lichfield frog, together with its stone niche, was deposited in the museum belonging to Dr Green at Lichfield. Catalogues of the items in that museum survive, but there is no record of such an exhibit.

13: William of Newburgh

14: This edition of 'Historia Anglia' gives the place name in Latin as Leodiensis, which means Liege, not Leigh. The word translated here as 'flint' is the Latin word 'silices', plural of 'silex', which means any hard stone, not just flint.

e thus inclosed in hard MARBLE; and)LA writes (as quoted by JOHNSTON) that they are sometimes found in quarries of MILL-STONE [15]. "Certum est" (says FORTUNIUS LICETUS) "inter viva faxa contineri quandoque bufones" [16]; and of later days, my Lord VERULAM pronounces it certain, that TOADS have been found in the middle of FREE-STONE [17]. And not only within STONES, but they are also sometimes met with in this COUNTY as closely included in the bodies of FIRM TREES: thus out of a great OAK that grew at LAPLEY of about 6 Tunns of timber, brought to ELMHURST, by the Right Worshipfull Sr. THEOPHILUS BIDDULPH Baronet for the new building the house, there was a great TOAD sawn forth of the middle of the tree, in a place which when growing, was 12 or 14 foot from the ground; the TREE being sound and intire in all parts quit round, saving just where the TOAD lay, it was black and corrupted, and crumbled away like SAW-DUST. Also at BENTLY there was another sawn out of a solid tree, in that part of it, that when growing, might be about a yard from the ground; the tree found underneath next the root, and in all other parts, only where the TOAD lay, there was a hollow about the bigness of the crown of ones hat, which (as those inclosed in STONE) also presently dyed, as soon as exposed to the AIR. Now how these ANIMALS should come at all to be thus included, in the middle of such INTIRE and SOLID substances? and when INCLOSED, how maintained either with BREATH or ALIMENT? and how long they may be presumed, to have continued there? seem QUESTIONS indeed worthy the consideration of the most profound PHILOSOPHER; whome I may honestly provoke to give a better, I shall here offer the READER some account of my OWNE, which though a slender one enough, yet may serve his turne, till he can get a better, and in some measure to evince the probability of the thing.

To come then close to the business, upon presumption that the MATTER of FACT is indisputable; 'tis easy to apprehend how TOADS creep into the clefts and hollows of ROCKS and TREES (which they always doe in AUGUST, when they are in a declining condition) to preserve themselves i'th WINTER: where during their rest of about eight months, they grow somewhat bigger, and the clefts or holes of the ROCKS or TREES, as much less; so that at the return of the YEAR (like the FOX in the FABLE) they cannot get out, where they came in, and so are forced to remain where they are, in that solitary condition, as long as they live; the clefts and holes of the ROCKS and TREES in the meantime growing quite up, and inclosing them in an INTIRE and SOLID case. And thus I suppose these ANIMALS may come to be inclosed in the ROCKS and TREES, upon or near the surface of the earth. But how that the TOAD in the tree at LAPLEY, should come to be thus imprisoned 12 or 14 foot high? is a difficulty yet harder, and that requires yet nicer consideration.

For the SOLUTION whereof, we must either suppose that the TOAD was produced in a HOLE at that height when the TREE was YOUNG, of an agreeable DUST, brought thither by the WIND and a sort of RAIN as well disposed for the same purpose; like the WORMS and MAGGOTS bred of DUST, and the RAINS that accompany TORNADO BLASTS, and fall in the MAGGOTI SAVANNA in JAMAICA, by equivocal generation, as was shewn in Chap.1 SS.48-9 of this BOOK: or else according to the opinion of CARDAN, generated by the seed of a TOAD blown from the top of some Mountain; or drawn up by the SUN into the CLOUDS, and so discharged thence in a shower, and lodg'd in the BOLE of this TREE whilst young: whence fearing to leap in the SUMMER, and creeping down low in the DUST, usually lodg'd in the BOLES of all TREES, in the WINTER, and there keeping its station for a long Season; the wood of the TREE in a little time might thus grow over it, so that the TREE being trimm'd up, and a taller body being given it, the TOAD at length thus appear'd to be inclosed in the BODY of the TREE at that height [18].

Nor is it at all improbable that the Spawne of TOADES, or indeed the TOADES themselves, should be thus drawn up by the SUNS heat, since we see what vast quantities of water it supports in those wonderfull EXHALATIONS they call SPOUTS at Sea, in which there are such mighty weights of water, that they overwhelme the best SHIPPS, if any thing near them, and disturb the whole SEA for a good distance, with the violence of their fall: in these SPOUTS together with the water, the FISH many times in the SEA thereabout are also lifted up, which sometimes being carried by the WINDS over LAND before their fall, has often occasion'd the wonderfull raining of FISH, as did WHITINGS, at STANSTED in the Parish of WROTHAM in the COUNTY of KENT Anno. 1666; and HERRINGS in the South of SCOTLAND, Anno.1684 as his Most Sacred MAJESTY King JAMES the SECOND most Judiciously determined the PROBLEM there [19]. Now most certainly the force that could elevate

15: Plot cites Johnston (1656) Bk.4, Ch.1 Section 2. Johnston's sources are as follows: for the Toulouse toad, which was found in the millstone quarries mentioned later, Agricola (1546); for the Antwerp case, Aldrovandus (1606).

16: The translation is, "Living toads have been found enclosed in rocks". Plot cites Fortunius Licetus, 'Lithosphere' Ch.54.

17: Lord Verulam was Francis Bacon, who made this comment in passing in his 'Sylva Sylvarum' (1627) Cent. 6 Sect. 570. Freestone is a mason's term for "any easily-wrought building stone that does not have the tendency to split into layers."

18: Plot was obviously not aware that toads can climb, and have sometimes been observed climbing the trunks of trees at night in search of insects. There are also a number of observations concerning toads found in birds' nests at some distance from the ground.

19: Plot cites the Letter Book of the Philosophical Society of Oxford, 27 March 1685, and Dr Abercromby's 'Discourse of Wit', Sect.5

y very well be allowed to attract the SPAWNE of TOADS, or large TOADS themselves, which being carried by the WIND (that bloweth where it listeth) to any place whatever, may also be let fall as well in any the like indeterminat place, and so possibly upon the BOLE of a TREE as well as anywhere else [20].

Thus having shewn the most probable means whereby these ANIMALS are thus inclosed in SOLID STONES and TREES, both near the surface of the EARTH, and at some height above it; it remains that I proceed to the second DIFFICULTY; how, when thus imprisoned in so narrow a CELL, they are supplied with the necessities of AIR and AILMENT. To which I answer, that these ANIMALS require very little of either, to support them: not of AIR, as it is plain from their long continuance under water without it, nor of other SUSTENANCE from ones living in a Glass above a Month without any at all, it being the property of ANIMALS that have but a weak heat included in cold viscous juices, and doe not perspire, to retain the SPIRITS of LIFE a long time without any foraigne maintenance; for where the HEAT is too weak to master the TOUGH JUICES, there can be no rarefaction or seperations of parts, and consequently no transpiration or consumption. Thus the TORTOIS, PORCUPINE [21] and some sorts of BIRDS live at least half a year without MEAT; and thus (as DE LAET will have it) live a sort of SOLENES (which the VENETIANS call CAPE LONGE, and the ENGLISH PIROT) all their time, they being a kind of SHELL-FISH deep bedded in a SOLID ROCK, in which there are no clefts, holes, or moisture to be found, but what in the FISH it self; nor can they have any NOURISHMENT conveyed to them, except the DEWS of HEAVEN, which as DE LAET thinks, the ROCKS imbibe, and transmit to the FISH [22].

Which if all they have, and that sufficient to support them, our TOADS included in STONES and TREES, may pretend to the fame, and perhaps somewhat more: for I doe not conceive them wholy deprived (tho' so close prisoners) either of AIR or ALIMENT: for the CAVITIES they are lodg'd are generally somewhat bigger than THEMSELVES, and they have the SALTS of the STONES, and JUICES of the TREES, to suck and lick, which together with the translocation of such FINE DEWS, may very well support an animal on so slender a dyet; that no way spends itself in PERSPIRATION; and is absolutely shut up from all other EXPENCE of its JUICES or SPIRITS, in SWIMMING, TRAVELLING, GENERATION, or otherwise. And by the same means no question lived the two ANIMALS somewhat like EVETS or NEWTS, but as big as RATTS, being a span long, of a very yellow colour, whereof we had an account from the same Dr PIERCE of Bath above mention'd, which were found embracing one another head to head, and belly to belly, in the hollow of a SOLID FREE-STONE, somewhat bigger than THEMSELVES, dugg up 2 foot and 1/2 or 3 foot underground, which being enlarged crawled about, and were kept alive some time [23]. But of these no more, because I am unwilling to prevent the ingenious Mr BEAUMONT, now most laudably designing the NATURAL HISTORY OF SOMERSETSHIRE, wherein I heartily wish him all imaginable encouragement.

Also by this means these ANIMALS seem not only to be precluded from all INJURIES they might otherwise receive from foraigne ENEMIES, and from the CHANGES of the SEASONS of the YEAR, they remaining always as it were in an equal state, without any CHANGE either of AIR or DYET, things no doubt on't that conduce not a little, to the PROLONGATION of LIFE; but to what period of time, in ANIMALS thus imprison'd, and secluded from OBSERVATION, is not easy to conceive, much less to determine; though I believe one may venture in general to pronounce it a pretty LONG one: for upon such a supposition that the TOAD in the tree at LAPLEY was dropt on the BOLE of it when young, or otherwise generated in some HOLE or CLEFT it might then have; it must necessarily have continued there a long time, the TREE when felled carrying a full yard square where the TOAD lay, which it could not arrive to, in a few years. And if the story of the TOAD in the TOP STONE of the STEEPLE at STATFOLD, may be allowed to be true, we must then perhaps afford them some HUNDREDS of YEARS, to have continued in this STATE (the STEEPLE being grown so old, that they took it down to prevent falling) which too in all probability would have been prolong'd to a much greater PERIOD, had it never been found and exposed to the AIR.

(General Editor's note: The above text has been faithfully transcribed from the original, with capitals substituted for the author's italics. Any peculiarities or impossibilities of grammar are from the 1686 version.)

20: There are several authentic records of showers of toads. See the 'Monthly Weather Review' (Vol.45, May 1917, pp.217-24) and Calkins et al (1982) pp.187, 189, 192, 194 for a few examples.

21: Plot cites the 'Journal de Scavans' (24 July 1681)

22: Plot cites Joh. De Laet, 'De Gemmis et Lapidibius' (1647) Bk.2, Ch.7

23: Plot cites the Letter Book of the Philosophical Society of Oxford for 17 March and 11 April 1685.

Instances of living animals found included in solid bodies

from the ANNUAL REGISTER 1791 [24]

The more a fact is singular, and varies from the ordinary laws of nature, the more it merits the attention of the philosopher and amateur. When once sufficiently confirmed, however contrary it may be to prevailing opinion, it is entitled to a place in the rank of knowledge. The most obstinate scepticism cannot destroy its certainty, and can only afford a proof of the presumption and pride which lead us to deny whatever we are incompetent to explain. The following phenomena are of this kind. They are such as have occurred to us in the course of our reading; and we have collected them from the hope that some one, whose studies may have been directed to such objects, will enlarge the list. The more they are multiplied, the greater light will probably be thrown upon them; and it will perhaps one day be a matter of surprise that we have been so long ignorant of their cause [25].

In 1683, Mr Blondel reported to the Academy that at Toulon, oysters, good to eat, were frequently found enclosed in pieces of stone.

In 1685, M. de Cassini mentions a similar fact, from the testimony of M. Durasse, ambassador at the Court of Constantinople, who assured him, that stones were frequently found there, in which were enclosed little animals called 'dactyles'[26].

The following instances are no less curious, and are more recent.

Some workmen in a quarry at Boursire, in Gotha, having detached a large piece of stone from the mass, found, on breaking it, a live toad. They were desirous of seperating the part that bore the shape of the animal, but it crumbled into sand. The toad was of a dark grey, its back a little speckled. The colour of its belly was brighter. Its eyes, small and circular, emitted fire from beneath a tender membrane which covered them. They were of the colour of pale gold. When touched on the head with a stick, it closed its eyes, as if asleep, and gradually opened them again when the stick was taken away. It was incapable of any other motion.– The aperture of the mouth was closed by means of a yellowish membrane. Upon pressing it on the back, it discharged some clear water and died. Under the membrane which covered the mouth were found, both in the upper and lower jaw, two sharp teeth, which were stained with a little blood. How long it had been inclosed in this stone, is a question which cannot be solved [27].

Mr le Prince, a celebrated sculptor, asserts in like manner, that he saw in 1756, in the house of M. de la Riviere, at Ecretteville, a living toad in the center of a hard stone, with which it was, as it were, incrusted [28]; and the facts of this kind are less rare than is imagined.

In 1764, some workmen in a quarry in Lorrain informed Mr Grignon that they had found a toad in a mass of stone some forty–five feet below the surface of the earth. This celebrated naturalist went immediately to the spot, but could not perceive, as he assures us in his 'Treatise on the fabrication of iron', any vestige of the prison of this animal. A small cavity was visible in the stone, but it bore no impression of the body of the toad. The toad that was, shewn him was of a middling–size, of a grey colour, and seemed to be in its natural state. The workmen informed Mr Grignon that this was the sixth that had been found in these mines within the space of thirty years. Mr Grignon considered the circumstance as worthy of a more particular attention, and he promised therefore a reward to any person who should find him another instance of a toad so inclosed in a stone that it

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24: This article appears to be a translation of a part of Delafond (1781) which was published in an extended English translation in 1803. Several versions of this article exist in different periodicals from the 1790s and early 1800s.

25: I think that this opening paragraph is a very good statement of how anomalies should be viewed, and it aptly describes the attitude that should be taken by Fortean researchers.

26: The earlier 'Annual Register' article (1761) cites Gassendi, Majol and Aldrovani for this information.

27: This account of the Burgsvic case needs to be compared with the very full original statement by I.M. Graeburg, on which it is supposedly based. (See the eye witness reports, p. 29 .) In translation here several details have become garbled, and thus errors about the case have been perpetuated by others using this translation. For example, Graeburg particularly states in his account that the small 'teeth' were NOT sharp, and that whatever they were (toads do not have teeth) they were not attached to the jaw, but to the skin of the toad's lips.

28: The first reference to this case that I have traced in in the 'Gentleman's Magazine' (1756), p.279, which reports the views of M. Le Cat of Rouen. I have yet to trace a copy of Le Cat's original memoir, which was published in 1755 or 1756.

means of getting out [29].

... 1770 a toad was brought to him inclosed in two hollow shells of stone, in which it was said to have been found; but on examining it nicely, Mr Grignon perceived that the cavity bore the impression of a shell-fish, and of consequence he concluded it to be apochryphal. In 1771, however, another instance occurred, and was the subject of a curious memoir read by M. Guettard to the Royal Academy of Sciences at Paris [30]. It was thus related by that famous naturalist.

In pulling down a wall which was known to have existed upwards of a hundred years, a toad was found, without the smallest aperture discoverable by which it could have entered. Upon inspecting the animal, it was apparent that it had been dead but a very little time; and in this state it was presented to the Academy, which induced M. Guettard to make repeated inquiries into this subject, the particulars of which will be read with pleasure in the excellent memoir we have just cited.

These phenomena remind us of others of a similar nature, and equally certain. In the trunk of an elm, about the size of a man's body, three or four feet above the root, and precisely in the center, was found, in 1719, a live toad, of a moderate size, thin, and which occupied but a very small space. As soon as the wood was cut, it came out, and skipped away very alertly. No tree could be more sound. No place could be discovered through which it was possible for the animal to have penetrated; which led the recorder of the fact to suppose, that the spawn, from which it originated, must by some unaccountable accident, have been in the tree from the very first moment of its vegetation. The toad had lived in the tree without air, and what is still more surprising, had subsisted on the substance of the wood, and had grown in proportion as the tree had grown. This fact was attested by Mr Herbert, ancient professor of philosophy at Caen [31].

In 1731, Mr Seigne wrote to the Academy of Sciences at Paris, an account of a phenomenon exactly similar to the preceding one, except that the tree was larger, and was an oak instead of an elm, which makes the instance more surprising. From the size of the oak, Mr Seigne judged that the toad must have existed in it, without air or any external nourishment, for the space of 80 or 100 years [32].

We shall cite a third instance, related in a letter of the 5th of February 1780, written in the neighbourhood of St Mexent, of which the following is a copy:

"A few days ago I ordered an oak tree of a tolerable size to be cut down, and converted into a beam that was wanted for a building which I was then constructing. Having seperated the head from the trunk, three men were employed in squaring it to the proper size. About four inches were to be cut away on each side. I was present during the transaction. Conceive what was my astonishment, when I saw them throw aside their tools, start back from the tree, and fix their eyes on the same point with a kind of amazement and terror! I instantly approached, and looked at the part of the tree which had fixed their attention. My surprise equalled theirs on seeing a toad, about the size of a large pullet's egg, incrusted in a manner in the tree, at the distance of four inches from the diameter, and fifteen from the root. It was cut and mangled by the axe, but it still moved. I drew it with difficulty from its abode, or rather prison, which it filled so completely, that it seemed to have been compressed. I placed it on the grass: it appeared old, thin, languishing, decrepid. We afterwards examined the tree with the nicest care, to discoer how it had glided in, but the tree was perfectly whole and sound." [33]

These facts, but particularly the memoir of M. Guettard, induced M. Herissan to make experiments calculated to ascertain their certainty.

February 21, 1771, he inclosed three live toads in so many cases of plaster, and shut them up in a deal box, which he also covered with thick plaster. On the 8th of April 1772 [34], having taken away the plaster, he opened the box, and found the cases whole, and two of the toads alive. The one that had died was larger than the others, and had been more compressed in its case. A careful examination of this experiment convinced those who had witnessed it, that the animals were so inclosed that they could have no possible communication with the external air, and that they must have existed during this lapse of time without the smallest nourishment.

The Academy prevailed on M. Herissan to repeat the experiment. He inclosed again the two surviving toads, and placed the box in the hands of the secretary, that the society might open it when they should think proper. But this cebrated naturalist was too strongly interested in the subject to be satisfied with a single experiment: he made

29: This is not the only instance of rewards being offered, as will be seen. Such incentives are open to the criticism that they encourage the unscrupulous and greedy to produce fraudulent examples of the phenomenon. It is well-documented that faked examples of toads within coal were made in Yorkshire in the mid-19th century.

30: Guettard's memoir was not published until 1783, when it appeared in a volume of his collected writings.

31: The original source of this report is the 'Histoire de l'Academe, Royale des Sciences' (1719) p.39

32: Original source is H.A.R.S. (1731) p.21

33: A copy of this letter appears in 'L'Espirit des Journaux' (May 1780)p.311, which cites 'Journal General de France' and 'Journal Encyclopedique'. It also appears in Guettard (1783) p.684.

34: I have corrected the date - the 'Annual Register' prints 1774 in error. The earliest record of these experiments appears in 'L'Espirit des Journaux' (January 1775) p.363-5, which cites 'La Nature Considereé sous ses Differences Aspects'. According to Herissant's obituary in the 'Histoire de la Academie Royale des Sciences de Paris' (1773) Vol.1 p.231-2, Herissant passed on a memoir of his experiments and researches to Guettard, with a view to having it edited and presented to the Academy. This does not appear to have occurred, and William Edwards, another French experimenter on toads, states the the full details of the experiments went completely unrecorded. ('Memoire sur l'asphyxie, considereé dans les Batraciens' in 'Annal de Chimie' Vol.5 (1817) p.369)

12/LIVING ANIMALS FOUND

the two following:

1. He placed, 15 April in the same year, two live toads in a basin of plaster, which he covered with a glass case, that he might observe them frequently. On the ninth of the following month, he presented this apparatus to the Academy. One of the toads was still living; the other had died the preceding night [35].

2. The same day, 15 April, he inclosed another toad in a glass bottle, which he buried in sand, that it might have communication with the external air. This animal, which he presented to the Academy at the same time, was perfectly well, and even croaked whenever the bottle was shook in which he was confined. It is to be lamented that the death of M. Herissan put a stop to these experiments.

We beg to observe upon this subject, that the power which these animals appear to possess of supporting abstinence for so long a time, may result from a very slow digestion, and perhaps from the singular nourishment which they derive from themselves. M. Grignon indeed observes, that this animal sheds its skin several times in the course of a year, and that it always swallowed it.

He has known, he says, a large toad shed its skin six times in one winter. In short, those which, from the facts which we have related, may be supposed to have existed for many centuries without nourishment, have been in a total inaction, in a suspension of life, in a temperature that has admitted of no dissolution; so that it was not necessary to repair any loss, the humidity of the surrounding matter preserving that of the animal, who wanted only the component parts not to be dried up to preserve it from destruction.

But toads are not the only animals which have the privilege of living for a considerable period without nourishment and communication with the external air. The instances of the oysters and dactyles mentioned in the beginning of this article may be advanced in proof of it. But there are other examples.

Two living worms were found in Spain, in the middle of a block of marble, which a sculptor was carving into a lion of the natural colour for the royal family. These worms occupied two small cavities, to which there was no inlet that could possibly admit the air. They subsisted probably on the substance of the marble, as they were of the same colour. This fact is verified by Captain Ulloa, a famous Spaniard, who accompanied the French Academicians in their voyage to Peru to ascertain the figure of the earth. He asserts that he saw these two worms [36].

A beetle, of the species called capricorn, was found in a piece of wood in the hold of a ship at Plymouth [37]. The wood had no external mark of any aperture.

We read in the 'Affiches de Province', 17 June 1772, that an adder was found alive in the center of a block of marble thirty feet in diameter. It was folded nine times round in a spiral line: it was incapable of supporting the air, and died a few minutes after. Upon examining the stone, not the smallest trace was to be found by which it could have glided in, or received air [38].

Misson, in his travels through Italy, mentions a crawfish that was found alive in the middle of a marble in the environs of Tivoli [39].

M. Peyssonel, king's physician at Guadaloupe, having ordered a pit to be dug in the back part of his house, live frogs were found by the workmen in the beds of petrifaction. M. Peyssonel, suspecting some deceit, descended into the pit, dug the bed of rock and petrifactions, and drew out himself green frogs, which were alive, and perfectly similar to what we see every day [40].

35: It appears that in translation a whole section has been omitted here. I append it from 'L'Espirit des Journaux' (1775):

"On that same 15th April he had also enclosed two living toads in a receptacle of plaster covered by a glass funnel. These animals had a layer of fine sand under them, and once a week they received three drops of water on their backs through the narrow end of the funnel, which was then immediately stopped again with putty. These animals, shown to the Academy on the 9th of May following, were in excellent health, although they had not had any food."

36: First reference available in the 'Gentleman's Magazine' (1756), which cites Le Cat.

37: The earliest reference available, 'L'Espirit des Journaux' (Jan 1775) gives this as Portsmouth, not Plymouth.

38: The case occurred in 1762 - 'L'Espirit des Journaux' (1775). It has been stated by some authors that such reports are really the exaggerated accounts of discoveries of fossil Ammonites.

39: Francois Misson's 'A New Voyage to Italy' (1695, English translation 1714) Vol.2 p.66

40: 'Gentleman's Magazine' (1756), citing Le Cat.

Quarrymen discovering a toad. Increased mechanisation of the previously manual work undertaken by miners and quarrymen has meant that the very people who in the past made the majority of discoveries – by virtue of their work with rock and coal 'in situ' – have on the whole been taken away from that environment. This, together with an increase in the use of alternative fuel sources and building materials, could partly account for the fall in 'toad in the hole' reports since 1900. The timber industry has also become largely mechanised, which may explain why cases of toads found in wood have also declined in the 20th century.

Illustration "Toad in the hole," from P.H. Gosse, 'The Romance of Natural History' (1861).

The Self-Immured

by Philip H. Gosse [41]

from 'The Romance of Natural History', Second series (1861)

Turning from reputed beings of which the very existence is the subject of doubt, let us consider one or two well-known and homely creatures, about which a certain degree of romantic interest hovers, because conditions of life are attributed to them by popular faith, which the general verdict of science denies.

One of the most remarkable examples of this category of 'dubitanda', is the oft-repeated case of Toads and similar animals found inclosed within the solid wood of living trees, or even within blocks of stone, with no discernable communication with the external air, or at least no appearance no aperture by which they could have entered their prison, yet, in every instance, alive. That insuperable difficulties stand a priori in the way of our believing in such conditions, no one familiar with animal physiology can deny; for, as Mr Bell observes, to believe that a Toad inclosed within a mass of clay, or other similar substance, shall exist wholly without air or food, for hundreds of years, and at length be liberated alive and capable of crawling, on the breaking up of the matrix, - now become a solid rock, - is certainly a demand upon our credulity which few will be able to answer. [42]

Yet, after all, it is a question that must not be decided a priori: it must rest upon evidence. It may be that here, too, fact is stranger than fiction; and we must not shut our eyes and ears to concurrent credible testimony, if it happens to bear witness to facts which we cannot account for. Truth will certainly be upon us, even though, ostrich-like, we thrust our head into a bush, and maintain that we cannot see it.

The learned historian of British Reptiles speaks with his characteristic candour upon this point. He admits that the many concurrent assertions of credible persons, who declare themselves to have been witnesses of the emancipation of imprisoned Toads, forbid us hastily to refuse our assent, or at least to deny the possibility of such a circumstance; while he demands better and more cautious evidence to authorise our implicit faith in these asserted facts.

Philip Henry Gosse, the Victorian naturalist, whose discussion of entombed animals appeared in the Second Series of his "Romance of Natural History" (1861).

The ordinary mode of accounting for the phenomena, supposing them to be narrated in good faith, is that the animal "fell into the hollow where the men were at work, and was taken up by them in ignorance of the mode in which it had come there," or that "it may have hidden in the hollow of a tree during the autumn and winter and on the return of spring found itself so far inclosed within its hiding place as to be unable to escape." This latter suggestion would be more worthy of attention were the winter season the period in which, in our climate, periodical additions were made to the living wood, so as to narrow the entrance, or in which augmentations of bulk occurred to

41: Philip Henry Gosse (1810-1888), a Zoologist and a Plymouth Brother, was the author of several books on natural history. A fascinating picture of the man and of the way in which he held on to his fundamental Christian beliefs about the origins of the earth and of life on it - despite the newer theories proposed by Science in the 19th Century - appears in the book 'Father and Son' by Edmund Gosse (1907).

42: Thomas Bell, 'A History of British Reptiles' (1839) p.112. In the early part of the 19th century, the term 'reptiles' still included the amphibians.

so as to prevent them from getting out they got in;- but unfortunately the reverse of both suppositions is true. As to the former suggestion, while it may possibly serve to diminish a few of the published statements, there are others which it would be absurd to explain thereby.

True to its principles of never shutting the door to the investigation of any natural history subject, 'The Zoologist' has, during the eighteen years of its existence, been a medium for collecting and preserving facts bearing on the question. The pages of this periodical form an invaluable storehouse to the philospohic naturalist, who wishes to pursue his science undeterred by the ridicule of sciolism or the frown of authority. Let us search its treasures, then, expecting to find stories of diverse grades of credibility, of which the editor wisely leaves his readers to judge for themselves.

In May 1844, the Rev. J.Pemberton Bartlett of Kingston, in Kent, an experienced naturalist, mentions the following fact as having just come under his own notice:- "Only a few weeks since, in cutting down a fir-tree here, the workman discovered, completely imbedded in the centre, a Toad which had doubtless been there some years, as the tree had completely grown over it; it must have been kept alive by absorbing the moisture of the tree. It was not in a completely torpid state, and after being exposed to the air a few hours, it crawled in true toad-like style. The age of the tree in which it was found was, as far as I could judge from the number of circles, about twenty-five years [43].

In reply to an inquiry whether he himself saw the Toad, and counted the timber-rings, Mr Bartlett favours me with the following note:

"Exbury Parsonage, near Southampton
February 22 1861

Dear Sir
...I quite believe that Toads DO live in stone, but I have found it very difficult to get the facts from eye witnesses. The imbedded Toad in the fir-tree mentioned by me in 'The Zoologist', I saw, and as stated there, I counted the rings of the tree. I believe it to have been the common Toad; but it looked rather more flabby, and not quite so round in its proportions, as Toads generally do; in fact, instead of being 'puffed up' as they commonly are, it was considerably 'down in the mouth', from its close imprisonment! The cavity in which it was fixed appeared to have been originally a crack or fissure in the side of the tree; whether caused by decay, or made by a nuthatch or some other bird, I cannot say. The wound appeared to have healed, as the bark had apparently closed over it. The question now arises, Was the Toad young when it got into the hollow? and did it grow after it became a prisoner? Or had it come to the years of discretion when it took that unfortunate step, or rather crawl, into the cavity where it was so long imprisoned? And why did it remain there so quietly, while the bark gradually grew over its prison-house? The answer that I would give to the first of these questions would be, that probably it had arrived at a state of Toad-hood when it took refuge in the tree, and did not grow afterwards. My theory why it remained ensconced there so quietly is, that probably it may have been accustomed for some time to take refuge by day in this hole, from whence it would set out on its nocturnal rambles and probably 'not go home until the morning'; that on some occasion, 'when daylight did appear', it returned to its accustomed haunt, and there squatted, winking and puffing, after the night's exploits, as Toads are wont to do; that, on that luckless day, so felled tree or trees were laid against the fir-tree that contained its abode, and that the tree or trees remained there till the bark closed so as to prevent its escape. What makes the idea more probable is that the place where the fir-tree grew had, for probably years, been used as a place to store felled timber, as it was used for this purpose at the time I saw the Toad.

"After the discovery of this Toad in the fir-tree, I tried several experiments upon Toads, by burying them in closely-sealed flower-pots, at a depth of nearly three feet. I much regret that I cannot find my notes on the subject; but I remember perfectly the main facts of one. The Toad was placed in a flower-pot, with another turned over it, and well cemented together - the two holes in both pots being also closely cemented up. It was buried between two and three feet deep in the garden. At the end of three months I took it up, and weighed the Toad, and found that it had lost a very little weight. This I did again at the end of three months more; it was then quite lively, and had lost again but little in weight. I replaced it as before, and on taking it up a third time, I found the pots had, probably the cement not having been dry when buried, slipped on one side, and the moisture had got in, and consequently the poor Toad was dead, as well as buried [44]. Now, surely if a Toad could live SIX MONTHS hermetically sealed in a flower-pot, without air or food, why not a much longer time?...

Believe me, yours faithfully,

J. Pemberton Bartlett."

The Rev. W.J. Bree of Allesley, also an excellent zoologist, alluding to some queries by Mr E.

43: J.Pemberton Bartlett, 'Anecdote of extraordinary duration of torpidity in a bat', 'Zoologist' Vol.2 (1844) p.613.

44: Experiments of this kind are reported in many sources, the most notable being Edward Jesse, in which a toad was said to have survived 20 years sealed in a buried flowerpot. (Jesse (1832) p.115)

communicated the following facts: "I e with you that the statements about found in solid stone are mostly very unsatisfactory. One instance of the kind I have seen, as briefly stated, [Mag. Nat. Hist. ix 316] [45]. The Toad appeared to me neither more nor less than our common species, although I certainly did not examine it scientifically. The stone was the new red sandstone of geologists; and was brought up, I was told, some yards from below the surface. I understood the Toad, and the two portions of stone in which it was found inclosed, were deposited in some medical museum in Birmingham [46]. The animal would not have been discovered but for an accident: the workmen were carting the stone away, and the block containing the Toad happened to be placed on the top of a great load, and accidentally fell from the cart to the ground, and, breaking by the fall, brought to light the incarcerated reptile, which, I conclude, was somewhat injured by the fall, as there was a fresh wound on one side of the head, and it appeared to be blind of one eye. The Toad died, I was informed, the second day after it was discovered, partly, in all probability, in consequence of the injury. When I say the block of stone was solid, this statement requires some qualification: the two parts of the stone fitted together exactly, and quite close, except where the cavity was in which the Toad lay; but from this cavity there was evidently a flaw on one side towards the extremity, and a discolouring of the substance of the sandstone, so that although the two portions fitted together, they might not have been (on one side of the cavity) very firmly united. This circumstance, perhaps, may detract from the value of the example; nevertheless, it is unaccountable how the animal could have got into the position in which it was found; it is not conceivable, I think, that it should have been there ever since the first formation of the rock, and there certainly appeared to be no means by which it could have entered the rock in its present state, even admitting (what we know to be the fact) that Toads have the power of getting in and out of a very small orifice [47].

The author of the next account, signed "E.Peacock", is unknown to me; and it does not appear whether he speaks from personal observation or not. He says, "A few days ago, two labourers, employed at a stone quarry at Frodingham, near Brigg, Lincolnshire, found, at a depth of five feet below the surface of the ground, and between two blocks of stone (lias), a living Toad: the interstice between the stones was filled with yellow clay, and there did not appear the least possible aperture by which anything could have passed." [48]

Even from remote India we have reports of the same phenomenon. A correspondent from Scrampore sends 'The Zoologist' the following:- "Last Wednesday, February 7, 1849, on severing the branch of a tree, apparently of the tamarind species, I found a Toad in the centre of the wood, entirely excluded from light and air. The appearance of the animal was rather extraordinary. The body seemed full of air, and the skin soft and puffy, and of a light yellowish colour, with the exception of the extremities of the feet, which were hard and dark. The creature when exposed to air seemed rather uncomfortable, and drew in its head just like a turtle when alarmed. It was thrown into a tank, when the water around, to the space of about a foot on either side, became perfectly white like milk. It jumped out of the water immediately, aparently not liking the coldness. I did not have the opportunity for observing it further, which I regret, as the animal got concealed in the long grass on the side of the tank,and was thus lost. The general supposition as to the mode by which animals get inclosed within trees, is their taking shelter in the cavity of the tree when very young, and the growth of the tree filling up the cavity, and thus imprisoning the animal. But this supposition, if true in the present case, makes the circumstance now related the more extraordinary. The tree is an old one, upwards of fifty feet high, and having a trunk more than three feet in diameter; and the height from the ground at which the Toad was found was about twelve feet. We must suppose the Toad to have got into the tree when within a foot from the ground: how many years old then must the animal be?"

The mention of the whitening of the water in

45: Bree's previous account is as follows [letter dated 19 December 1835]:

"Last summer a live toad was found incarcerated in solid sandstone by the workmen who were forming the railroad through Coventry Park. These things I am aware not infrequently occur (we often read of them in the newspapers) but this is the first and only instance that has ever come under my personal inspection. I saw the toad alive the day after it was found. It was a good example of its kind, the block or rather the rock of sandstone being solid, except the cavity in which the toad lay."

'Magazine of Natural History' Vol.9 (1836) p.316

46: In 'The Birmingham Saturday Half-Holiday Guide' (1879) there is a reference to a museum at the Midlands Institute in Birmingham which was exhibiting "a lump of rock in which a live frog was found at a depth of many feet in the ground, in the formation of the Beechwood Tunnel, near Coventry."

Interestingly, this reference had been dropped by the time the 8th edition was published in 1892. Whether this exhibit was the animal found at Coventry in 1835, or another example, is something that perhaps a railway historian may be able to clarify from the locations given.

47: W.T. Bree, 'Notes on toads found in blocks of stone', 'Zoologist' Vol.2 (1844) p.769.

The case is remarkable for its having several independent eye-witness accounts. The railway engineer who discovered the toad, John Brunton, wrote a manuscript autobiography for his grandchildren in about 1882, and in it included details of how he had found the toad - see the eye-witness accounts, p. . In addition to Rev. Bree's account, there is one by W.B. Baker, who saw the toad at Coventry shortly after its discovery, and mentions the case in a letter to 'The Field' Vol.19 (1862) p.489. T.Gooch, wrote an account of the find which was read at a meeting of the British Association that year - see 'Report of the British Association' (1835) Pt.2 p.72.

48: E.Peacock, 'Living toad imprisoned in stone','Zoologist' Vol.5 (1847) p.1879

ıe Toad was immersed is to my mind a strong corroboration of the veracity of the preceding narrative. It is not a circumstance at all likely to occur to a mere inventor, as it does not in the least bear on the question of incarceration, and there is no attempt to explain it. I have occasionally seen fluids rendered partially opaque by the outflow of a milky secretion from animals immersed in them, as in the case of the curious 'Peripatus' of Jamaica, which, when put alive into spirits, discharges a considerable quantity of white fluid, which diffuses in the alcohol. The Toad was probably distinct from our common English species, but we know that the latter secretes a yellow acrid fluid in some abundance in the follicles of its skin, and this might be poured out under the excitement of alarm or anger.

In the summer of 1851, the Académie des Sciences was interested (according to the public papers) with this question. In digging a well at Blois, in June of that year, "some workmen drew up from about a yard beneath the surface a large flint, weighing about fourteen pounds, and on striking it a blow with a pickaxe, it split in two, and discovered, snugly ensconced in the very centre, a large Toad. The Toad seemed for a moment greatly astonished, but jumped out, and rather rapidly crawled away. He was seized and replaced in the hole, when he settled himself down very quietly. The stone and the Toad, just as they were, were sent to the Society of Sciences at Blois, and became immediately the subject of curious attention. First of all, the flint, fitted together with the Toad in the hole, was placed in a cellar, and imbedded in moss. There it was left for some time. It is not known if the Toad ate, but it is certain that he made no discharge of any kind. It was found that if the top of the stone were cautiously removed in a dark place he did not stir, but that if the removal were effected in the light, he immediately got out and ran away. If he were placed on the edge of the flint, he would crawl into his hole, and fix himself comfortably in. He gathered his legs beneath his body; and it was observed that he took especial care of one of his feet, which had been slightly hurt in one of his removals. The hole is not one bit larger than the body, except a little where the back is. There is a sort of ledge on which his mouth reposes, and the bones of the jaw are slightly indented, as if from long resting on a hard substance. Not the slightest appearance of any communication whatsoever between the centre and the outside of the stone can be discovered, so that there is no reason to suppose that he could have drawn any nourishment from the outside. The committee, consisting of three eminent naturalists, one of whom has made Toads his peculiar study for years, made no secret of their belief that the Toad had been in that stone for hundreds, perhaps thousands of years; but how he could have lived without air, or food, or water, or movement, they made no attempt to explain. They accordingly contented themselves with proposing that the present should be considered another authentic case, to be added to the few hundreds already existing of Toads being found alive imbedded in stone, leaving it to some future savant to explain what now appears the wonderful miracle by which nature keeps them alive so long in such places. But the distinguished M. Majendie suggested that it was just possible that an attempt was being made to hoax the Academy, by making it believe that the Toad had been found in the hole, whereas it might only have been put in by the mischievous workmen after the stone had been broken. Terrified at the idea of becoming the laughing-stock of the public, the Academy declined to take any formal resolution the about Toad, but thanked the committee for its very interesting communication; and so the subject was dropped."

This statement does not, to be sure, bear about it that character of precision which should mark the report of a scientific body, nor is it verified by authority; but the terror ascribed to L'Académie at the idea of being hoaxed, and the instant quashing of the inquiry, are so true to nature,so accurately characteristic of our august associations of savans, that I cannot help believing the story [49].

Here is another, which has the air of a bona fide account, although I have no knowledge of the writer, nor does he himself pretend to personal autopsy of the discovery.

"On Monday last, September 20, while some workmen were engaged in getting iron ore at a place called Paswick, in the north of this county, [Derby], they came upon a solid lump of ore, which, being heavier than two men could lift, they set to work to break with their picks, when, to their surprise, in a cavity near the centre of the stone, they found a Toad alive. The cavity was much larger than the Toad, being nearly six inches in diameter, and was lined with crystals of what I suppose to be carbonate of lime. The stone was about four yards from the surface of the ground; it is now in the possession of Mr Haywood of Derby, by whose men it was found; but unfortunately the Toad was not preserved after its death, which took place almost immediately on its exposure to the atmosphere." [50]

'Audi alteram partem'. Mr Plant of the

49: An extremely full report of the investigation by the Committee of the Academy of Sciences in Paris is to be found in Duméril (1851). I was recently delighted to be sent a photocopy by Jean-Louis Brodu, taken from 'La Nature' (1885) which included an illustration of the toad and stone, based on a photograph taken at the time of the find. Further research is needed to discover whether the original photo or even the stone itself is still in existence. The details given by Gosse appear as 'Toad found in a flint' in the 'Zoologist' Vol.9 (1851) p.3266, which article is itself a reprint of an article in 'The Times' (19 August 1851). See illustration p. 18.

50: J.Evans, 'Occurence of a toad in a block of iron ore', 'Zoologist' Vol.10 (1852) p.3632.

um tells us, both in sorrow and in anger, a story, doubtless more amusing to us that read it than to him, of his adventures among the toad-finders. When geologising in the neighbourhood of Chesterfield, a quarryman, whom he had invited to share a bottle of porter, informed him in confidence that Toads inclosed in stone were plentiful thereabout. "He said he had often found them, and that he knew a stone before it was broken that would contain a Toad; giving me long and circumstantial accounts of the whole phenomenon: and, to convince me of the truth of his statement, he took me to the quarry (a carboniferous sandstone) that I might see the stones out of which he said the Toads had been released. I examined the stones and the whole quarry very attentively, and listened to the emphatic testimony of other miners present. After complying in an agreeable manner to their remark that the day was warm, and the water of the quarry not much in favour, I made a simple proposal of this nature:- I promised to pay any one of them the sum of twenty shillings for the next stone in which they found a Frog or Toad when the stone was broken in two. They should catch the Frog if he bolted out of the hole, replace him, and fit the stones together again, afterwards despatching it to me in that condition. I further promised to pay the sum of forty shillings to any one of them who should procure me a stone, unbroken, in which he considered a Toad and Frog was imprisoned, if, on breaking it myself, such turned out to be the case. These conditions were to remain in force for twelve months; and as the means of conveyance to my address, which I gave them, would occasion little or no trouble, the offer was readily accepted by the miners; who also, to express their confidence in soon being able to supply the order, proposed that it would be all safe if I advanced them some money on account, which however I resolutely declined doing. And what now will the credulous believers in these "Toads in stone" who read 'The Zoologist' say, when they learn that I visited the quarry twice during the twelve months, in order to fetch the Toads, which never came by rail? I always found the men there blasting tons of new rock, splitting stones for every building purpose, yet dry-throated and sullen; for, alas! most unaccountably during that long twelve months they found plenty of holes - not Toad-holes - in the sandstone, but the reptiles had been banished as effectually as ever they were from the Emerald Isle." [51]

This was disheartening certainly: and we do not wonder that Mr Plant became "a total disbeliever in these 'simple tales'". Still, it is just possible that immured Toads may exist, though Mikey of Chesterfield quarry did brag a little too confidently of the commonness of the occurrence. That, within one twelvemonth, within the limits of one quarry, no such Toad turned up, even under the stimulus of the proffered forty shillings, can scarcely be admitted to be absolutely conclusive proof of the negative, at least not to us who were not placed in the painful position of 'gullees'. Mr Arthur Hussey of Rottingdean justly remarks, when presenting some evidence 'per contra', that we should not think the innocence of the culprit was established by his asserting, when sundry witnesses affirmed they saw him commit the offence he was accused of, that he could produce ten times the number of witnesses who would swear that they did not see him.

"During the summer of 1846," writes Mr Hussey, "in the formation of a railroad, about half a mile from Pontefract, in Yorkshire, the works were carried a 'depth of four feet through a rock betwixt lime and sandstone, about the junction of the two formations:' the rock being so firm as to require blasting. 'It is entirely free from beds of any kind, or what the workmen call "backs", running up it', but therein are 'an infinite number of small nodules of a harder quality, entirely crystallised in the interior'. After blasting, the labourers were much surprised to find among fragments several of these nodules, each one containing a Frog, as many as seven having been counted after one 'shot'.

"These were not casually seen when exposed, and then disregarded, but were examined in their stone prisons through very minute holes, some even preserved in that state for a long period. For example, the relator states of one specimen, 'I kept this Toad in a cellar for about five

An illustration from "La Nature" (1885). The photograph, taken in 1851, shows a large flint containing a living toad which was found at Blois in France. The circumstances of this case were investigated and reported on by a committee of the Academy of Sciences of Paris.

51: J.Plant, 'Occurence of toads in stone', 'Zoologist' Vol.11 (1853) p.3808.

, during which time it ate nothing, and was without light, the hole in the stone being covered with a piece of clay, and the whole kept moist and cool with water.' Of another he says, 'The Frog lived only about a week, as I kept it in a place which I think was too warm for it, and also not sufficiently dark and quiet. When the Frogs were disturbed by the shots, their first desire seemed to be to get under the shelter of some stone, or into their old holes again, shewing thereby that sight was not wanting, and bodily activity was perfect, as far as could be seen. One thing struck me as singular with regard to the Frog I kept - its fresh, plump, and healthy appearance, its skin being soft and transparent. One day, when I was holding my finger over the hole in the stone, it pushed its head between my finger and the sides of the hole, and drew its whole body after it on to the table, where it appeared more like a skeleton than any living animal I have ever seen, but by degrees it extended itself to its former dimensions.' itself to its former dimensions.'

"Of the above curious occurrence, my only knowledge is derived from the account written to a distant friend, of which the substance has now been extracted. The writer is an utter stranger, but he was officially employed in the operations which resulted in the discoveries; and my information leads me to believe his report deserving of confidence, for which reason I have not hesitated to offer this abstract for publication in 'The Zoologist'." [52]

The Rev. Alfred Charles Smith, an excellent and genial naturalist, favours us with another case, introducing it incidentally in illustration of the general habit he is denouncing of wantonly destroying animal life:- "As an instance of this thoughtless cruelty, I must give an account that has just come to my notice. Some labourers were pulling down an old wall, in the thickness of which they found one of those phenomena - so frequently heard of and so unsatisfactorily accounted for - a Toad completely imbedded in stone and mortar. 'There was no doubt,' said the labourer who described it, 'that he had been there for a great number of years, for there was no hole or chink by which he could have entered or left the place of his long sojourn.' 'Well,' said the listener to his account, 'but you are sure that the Toad was alive when you found it?' 'No doubt of that, sir,' said the man, 'for he crawled away, when I knocked him on the head with my pickaxe.'

"So here was this poor harmless creature, whose long incarceration in his gloomy dungeon might have excited compassion in his favour, suddenly released from his prison, only to be slain by his liberator!" [53]

52: A.Hussey, 'Note on frogs and toads enclosed in stones', 'Zoologist' Vol.11 (1853) p.3848-9.

53: A.Smith, 'On the persecution of birds and animals...', 'Zoologist' Vol.11 (1853) p.3904.

The next is from the 'Caledonian Mercury'. Newspaper zoology is proverbially untrustworthy, and the editor of 'The Zoologist', who reprints the paragraph, kindly adds a caveat for the benefit of his readers:- 'Nimium ne crede Mercurio!' But, nevertheless, let us look at it: alone it would stand for little, but, remember, in such questions as this the evidence is cumulative. "There is at present to be seen at Messrs Sanderson and Sons, George Street, Edinburgh, an extraordinary specimen of natural history - a Frog which had been discovered alive in freestone rock. A few months ago, while some colliers in the employ of Mr James Naysmith (lessee of Dundonald Colliery, in Fife, the property of R.B. Wardlaw Ramsay, Esq. of Whitehill), were engaged in taking out the pavement of the seam coal, which was freestone, they discovered a cavity in which a Frog was lying. On touching it the Frog jumped about for some time, and a bucket of water being procured, it was put into it, and taken to the surface. On reaching it, the animal was found to be dead. It was at a depth of forty-five fathoms, or ninety yards from the surface, in a perpendicular line of strata, consisting of alternate layers of coal and freestone, with ironstone, and about four hundred yards from the outcrop surface. The Frog seems to have had much of the same character as the present species. It is very attenuated, which cannot be wondered at, considering its domicile for so many ages, its original existence being of course considered contemporaneous with the formation of the freestone rock in which it was contained." [54]

Now, again, we get the statement of a careful working naturalist, Mr Thomas Clark of Halesleigh. He cannot, indeed, give personal authority for what he records; but the confidence of such a man in his informant is an element not without its value. "March 25, 1859. In the early part of this month, two live Toads were dug out from the bottom of a bed of stiff brick clay, in the neighbourhood of Bridgewater, at a depth of fourteen feet from the surface of the ground; a third was killed by the spade before they were observed. This bed of clay rests on peat, and the Toads were found at the junction of the two beds, in a small domed cavity, about the size of the crown of a man's hat. On being exposed to the air, they uttered a squeaking cry, resembling that of a rat, but in about a minute they seemed reconciled to their new destiny, and moved freely about. They were kept in a jar for a few days, and then placed at liberty in a garden, where I suppose they are still living. The living ones were about two inches in length, but narrow in proportion, and of a rather lighter colour than Toads usually are; the one which was killed was very much larger. The clay under

54: Anon, 'Discovery of a living frog in the solid rock', 'Zoologist' Vol.16 (1858) p.5959.

...ey were buried had been gradually dug ... the surface since about the beginning of the year, but the last five feet of depth were not dug till the day on which they were discovered. After about two feet of the surface, the clay is very close and adhesive, and far too moist to admit of cracks being formed in it, even in the driest summers." [55]

To this communication inserted in 'The Zoologist', Mr Newman added a note asking the name of any scientific man who was present at the exhumation. Mr Clark replies:- "I am unable to give such a name, further than as the intelligent foreman of the brickyard, Thomas Duddridge (who witnessed the exhumation by one of the labourers of the yard), may be entitled to the appellation; but no-one, however high his scientific attainments, could be more scientific than he was to give me correct information, or more exact in his statements; and if, after minute inquiry, I had not been fully satisfied of the correctness of his account, I should not have sought to occupy the pages of 'The Zoologist' with its recital. On shewing him the notice in 'The *Zoologist*', he said it was impossible for anything to be more correct; and he added, that the little cavity which the Toads occupied was quite smooth in every part, apparently by their long-continued movements - as smooth, to use his own illustration, as the inside of a China bowl." [56]

Numerous experiments have been made with a view to test the possibility of these reputed facts. If Toads do so commonly become voluntarily or accidentally immured, and remain without light, food, or even air, for many years, and yet survive, let us put some Toads into similar circumstances, keep them shut up, and, after the lapse of a sufficient interval, examine them, and see whether they are alive or dead. 'Experimentum faciemus in corpore vili,' as the village doctor said to his assistant over the sick traveller.

'Probatum est!' Besides the case mentioned in Mr Bartlett's letter, the late Dr Buckland, in November 1825, instituted a series of careful experiments, which are thus narrated by himself:-

"In one large block of coarse oolitic limestone, twelve circular cells were prepared, each about one foot deep and five inches in diameter, and having a groove or shoulder at its upper margin fitted to receive a circular plate of glass, and a circular slate to protect the glass: the margin of this double cover was closed round and rendered impenetrable to air and water by a luting of soft clay. Twelve smaller cells, each six inches deep and five inches in diameter, were made in another block of compact siliceous sandstone, viz., the Pennant Grit of the coal formation near Bristol; these cells were also covered with similar plates of glass and slate, cemented at the edge by clay. The object of the glass covers was to allow the animals to be inspected, without disturbing the clay so as to admit external air or insects into the cell. The limestone is so porous that it is easily permeable by water, and probably also by air; the sandstone is very compact.

"On the 26th of November 1825, one live Toad was placed in each of the above-mentioned twenty-four cells, and the double cover of glass and slate placed over each of them, and cemented down by the luting of clay. The weight of each Toad in grains was ascertained and noted by Dr Daubney and Mr Dillwyn at the time of their being placed in the cells; that of the smallest was 115 grains, and of the largest 1185 grains. The large and small animals were distributed in equal proportion between the limestone and sandstone cells.

"These blocks of stone were buried together in my garden beneath three feet of earth, and remained unopened until the 10th of December 1826, on which day they were examined. Every Toad in the smaller cells of compact sandstone was dead, and the bodies of most of them so much decayed that they must have been dead some months. The greater number of those in the large cells of porous limestone were alive. No.1, whose weight when immured was 924 grains, now weighed only 698 grains. No.5, whose weight when immured was 1185 grains, now weighed 1265 grains. The glass cover over these cells was slightly cracked, so that minute insects might have entered: none, however, were discovered in this cell; but in another cell whose glass was broken, and the animal within it dead, there was a large assemblage of minute insects; and a similar assemblage also on the outside of a glass of a third cell. In cell No.9, a Toad which when put in weighed 988 grains, had increased to 1116 grains, and the glass cover over it was entire; but as the luting of the cell within which this Toad had increased in weight was not particularly examined, it is probable that there was some aperture in it by which small insects found admission. No.11 had decreased from 936 to 652 grains.

"When they were first examined in December 1826, not only were all the small Toads dead, but the larger ones appeared much emaciated, with the two exceptions above mentioned; we have already stated that these probably owed their increased weight to the insects which had found access to the cells, and became their food.

The death of every individual of every size in the smaller cells of compact sandstone, appears to have resulted in a deficiency in the supply of air, in consequence of the smallness of the cells, and the impermeable nature of the stone; the larger volume of air originally inclosed in the cells of limestone, and the porous nature of the stone itself (permeable as it is slowly by water,

55: T.Clark, 'Occurence of live toads underneath a bed of clay' 'Zoologist' Vol.16 (1859) p.6537.

56: T.Clark, 'Toads in clay', 'Zoologist' Vol.16 (1859) p.6565.

…ably by air), seem to have favoured the duration of life to the animals inclosed in them without food.

"It should be noted that there is a defect in these experiments, arising from the treatment of the twenty four Toads before they were inclosed in the blocks of stone. They were shut up and buried on the 26th of November, but the greater number of them had been caught more than two months before that time, and had been imprisoned all together in a cucumber frame placed on common garden earth, where the supply of food to so many individuals was probably scanty, and their confinement unnatural so that they were in an unhealthy and somewhat meagre state at the time of their imprisonment. We can therefore scarcely argue with certainty from the death of all those individuals within two years, as to the duration of life which might have been maintained had they retired spontaneously, and fallen into the torpor of their natural hybernation in good bodily condition.

"The results of our experiments amount to this: all the Toads, both large and small, inclosed in sandstone, and the small Toads in the limestone also, were dead at the end of thirteen months. Before the expiration of the second year all the large ones were also dead; these were examined several times during the second year through the glass covers of the cells, but without removing them to admit air; they always appeared awake, with their eyes open, and never in a state of torpor, their meagreness increasing at each interval in which they were examined, until at length they were found dead; those two also which had gained an accession of weight at the end of the first year, and were then carefully closed up again, were emaciated and dead before the expiration of the second year.

At the same time that these Toads were inclosed in stone, four other Toads of middling size were inclosed in three holes, cut for this purpose on the north side of a trunk of an apple-tree; two being placed in the largest cell, and each of the others in a single cell. The cells were nearly circular, about five inches deep and three inches in diameter; they were carefully closed up with a plug of wood, so as to exclude access of insects, and apparently were air-tight; when examined at the end of a year, every one of the Toads was dead, and their bodies were decayed.

"From the fatal result in the experiments made in the small cells cut in the apple tree and the block of compact sandstone, it seems to follow that Toads cannot live a year excluded totally from atmospheric air; and from the experiments in the larger cells within the block of oolitic limestone, it seems also probable that they cannot survive two years entirely excluded from food; we may therefore conclude that there is a want of sufficiently minute and accurate observation in those so frequently recorded cases, where Toads are said to be found alive within blocks of stone and wood, in cavities that had no communication whatever with the external air. The fact that of my two Toads having increased in weight at the end of the year, notwithstanding the care that was taken to inclose them perfectly by a luting of clay, shews how very small an aperture will admit of insects sufficiently to maintain life. In cell No.5, where the glass was slightly cracked, the communication though small was obvious, but in the cell No.9, where the glass cover remained entire, and where it appears certain, from the increased weight of the inclosed animal, that

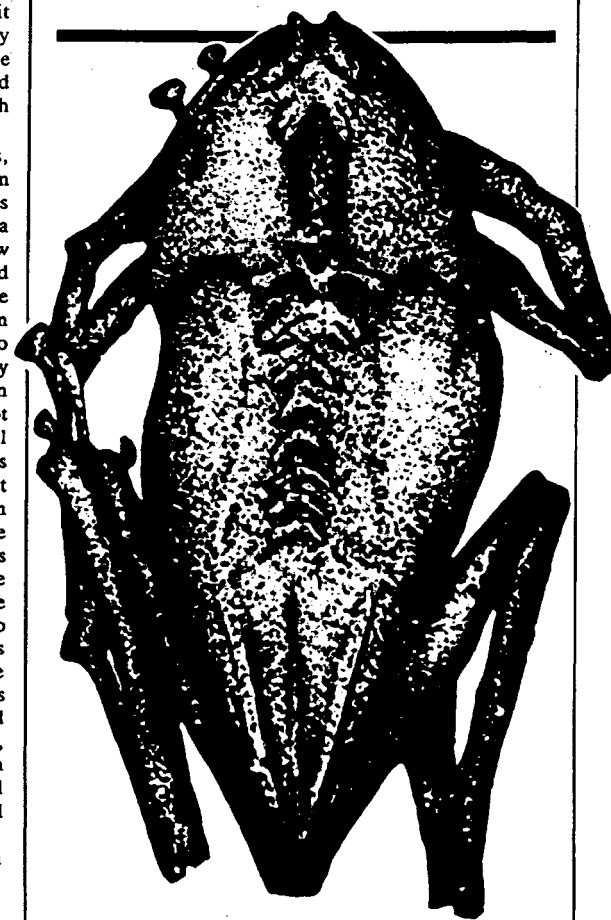
William Buckland, the first Professor of Geology at Oxford University, initiated experiments in 1825 which were designed to test the ability of toads to survive enclosed in cavities of rock. Unwarranted conclusions have been drawn by many authors from Buckland's results, and this led to an increase in sceptical attitudes to the phenomenon. Frank Buckland, William's son, also took an interest in the reports of toads found within stone, investigated several cases, and made his own experiments.

may have found admission, we have an of these minute animals finding their way into a cell to which great care had been taken to prevent any possibility of access.

"Admitting, then, that Toads are occasionally found in cavities of wood and stone with which there is no communication sufficiently large to allow the ingress and egress of the animal inclosed in them, we may, I think, find a solution of such phenomena in the habits of these reptiles, and of the insects which form their food. The first effort of the young Toad, as soon as it has left its tadpole state and emerged from the water, is to seek shelter in holes and crevices of rocks and trees. An individual which, when young, may thus have entered a cavity by some narrow aperture, would find abundance of food by catching insects, which, like itself, seek shelter within such cavities; and may soon have increased so much in bulk as to render it impossible to get out again through the natural aperture at which it entered. A small hole of this kind is very likely to be overlooked by common workmen, who are the only people whose operations on stone and wood disclose cavities in the interior of such substances.

"In the case of Toads, Snakes, and Lizards, that occasionally issue from stones that are broken in a quarry, or in sinking wells, and sometimes even from strata of coal at the bottom of a coal-mine, the evidence is never perfect to shew that the animals were entirely inclosed in solid rock. No examination is ever made until the repitle is first discovered by the breaking of the mass in which it was contained, and then it is too late to ascertain, without carefully replacing every fragment, (and in no case that I have seen reported has this ever been done,) whether or not there was any hole or crevice by which the animal may have entered the cavity from which it was extracted. Without previous examination it is almost impossible to prove that there was no such communication. In the case of rocks near the surface of the earth, and in stone quarries, reptiles find ready admission to holes and fissures. We have a notorious example of this kind in the Lizard found in a chalk-pit, and brought alive to the late Dr Clark [57]. In the case also of wells and coal-pits, a reptile that had fallen down the well or shaft, and survived its fall, would seek its natural retreat in the first hole or crevice it could find, and the miner dislodging it from this cavity, to which his previous attention had not been called, might in ignorance conclude that the animal was coeval with the stone from which he had extracted it.

"It remains only to consider the case (of which I know not any authenticated example) of Toads that have been said to have been found within blocks of limestone, to which, on careful examination, no access whatever could be discovered, and where the animal was absolutely and entirely closed up with stone. Should any such case ever have existed, it is probable that the communication between this cavity and the surface had been closed up by stalictitic incrustation, after the animal had become too large to make its escape. A similar explanation may be offered of the much more probable case of a live Toad being entirely surrounded with solid wood. In each case, the animal would have continued to increase in bulk so long as the smallest aperture remained by which air and insects could find admission; it would probably become torpid as soon as this aperture was entirely closed by the accumulation of stalictite or the growth of wood. But it still remains to be ascertained how long this state of torpor may continue under total exclusion from



This mummified frog was found in Pennsylvania, USA, within a block of coal that had been broken open on a fire.

57: Details of the case are given by Howitt (1863), who quotes a letter from Rev. Richard Cobbold dated 14 February 1818. The animals were said to have been newts, believed by Dr Clark to be of an unknown species.

[...]d from the external air: and, although the experiments recorded above shew that life did not extend two years in the case of any one of the individuals which formed the subjects of them, yet, for reasons which have been specified, they are not decisive to shew that a state of torpor or suspended animation, may not be endured for a much longer time by Toads that are healthy and well fed up to the moment when they are finally cut off from food, and from all direct access of atmospheric air.

"The common experiment of burying a Toad in a flowerpot covered with a tile, is of no value unless the cover be carefully luted to the pot, and the hole at the bottom of the pot also closed, so as to exclude all possible access of air, earthworms, and insects. I have heard of two or three experiments of this kind, in which these precautions have not been taken, and in which at the end of a year the Toads have been found alive and well.

"Besides the Toads inclosed in wood and stone, four others were placed in a small basin of plaster of Paris, four inches deep and five inches in diameter, having a cover of the same material carefully luted round with clay; these were buried at the same time and in the same place with the blocks of stone, and on being examined at the same time with them in December 1826, two of the Toads were dead, the other two alive but much emaciated. We can only collect from this experiment, that a thin plate of plaster of Paris is permeable to air in a sufficient degree to maintain the life of a Toad for thirteen months.

"In the 19th Vol., No.1, p.167, of 'Silliman's American Journal of Science and Arts', David Thomas, Esq. has published some observations on Frogs and Toads in stone and solid earth, enumerating several authentic and well-attested cases. These, however, amount to no more than a repetition of the facts so often stated and admitted to be true, viz., that the torpid reptiles occur in cavities of stone, and at a depth of many feet in the soil and earth; but they state not anything to disprove the possibility of a small aperture, by which these cavities may have had communication with the external surface, and insects have been admitted.

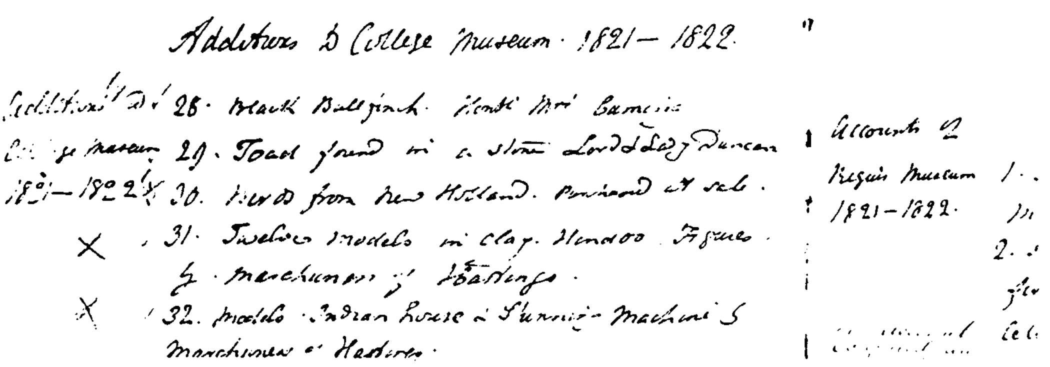
"The attention of the discoverer is always directed more to the Toad than to the minutiae of the state of the cavity in which it was contained." [58]

The importance of these experiments, the care with which they were instituted, the deserved reputation of the experimenter, and the philosophic character of his inferences, will, I trust, apologise for the extent of this quotation. I do no think, however, that the question is settled by them; and I will venture to make one or two comments on the facts and on the observations.

Dr Buckland allows that the circumstances of the incarceration of his Toads were not natural. This seems to me an element of more importance than he attributes to it. They were shut up while in active life, after having been confined for two months on scanty food;— "So that they were in an unhealthy and somewhat meagre state at the time of their imprisonment." We do not know what conditions, what natural provisions preceed torpidity and are essential to it; but possibly there are some, which in these cases were compulsorily precluded by human interference. It is stated that the animals that survived to the second year were always found awake when examined, — "never in a state of torpor". But Toads that had hid themselves would have been torpid during the winter months; and thus we have a sufficient proof that a natural condition of the body had been by some means prevented. The experiment would have been much more fair to the Toad, and much more conclusive to me, if the animal were inclosed

58: The experiments were first reported by Buckland in 'Zoological Magazine' Vol.5 (1831) p.314-320.

Extract from the Register of the Edinburgh University Museum (now part of the Royal Scottish Museum), recording a 'toad found within a stone' donated by Lord and Lady Duncan' in 1821. The specimen is no longer in the collection.
[From 'Pursuit' Vol.6 No.3 (July 1973) p.64]


Additions to College Museum 1821–1822

28. Black Bullfinch.
29. Toad found in a stone Lord & Lady Duncan
30. Birds from New Holland. Purchased at sale.
31. Twelve models in clay. Hindoo Figures. by Marchioness of Hastings.
32. Models Indian House & Spinning Machine by Marchioness of Hastings.

Accounts of Regius Museum 1821–1822

he depth of its winter–sleep,care being handle it as little as possible.

As it was, however, most of the Toads inclosed in the limestone survived upwards of thirteen months. This surely is a very remarkable fact. Take the case of No.9. Here was a Toad, nearly full grown, which had been shut up in a stone cell, covered with a plate of glass carefully luted down all round, so as to exclude air, buried under three feet of earth, so as to exclude the smallest gleam of light; yet, at the expiration of thirteen month, the cell being examined in winter, when normally all Toads ought to be sound asleep, this Toad was wide awake, not in the least emaciated, but so thriving in its strange dungeon as actually to have made 128 grammes of flesh! to have actually increased in weight at the rate twelve and a half per cent! [59]

Dr Buckland says, "It is probable there was some aperture in the luting by which small insects found admission." But this is altogether a 'petitio principii': it absolutely begs the question at issue. Are not these insects entirely gratuitous? The luting was, of course, carefully laid on: there could be no drying to cause contraction, buried as it was in the earth; the glass was uninjured; no orifice was detected; and yet, forsooth, it must be assumed that "small insects gained admission". Then, too, consider the problem. It is not the possibility that a microscopically minute insect or two may have managed in some inscrutable way to insinuate themselves, but insects sufficient to support this large Toad for thirteen months, and to make it at the end of that time 128 grains heavier than it was when first inclosed! There is the fact, as stated by this careful observer; and I am sure his hypothesis of intrusive insects will not account for it.

I might make similar remarks on No.5. The glass was "slightly cracked". No insects were discovered in it, nor is any perceptible orifice alluded to, yet this Toad had increased from 1185 grains to 1265 grains. The "slight crack" in the glass makes this example less remarkable at first sight than the other; but in reality it is equally inscrutable. Insects, however minute, do not pass through glass merely cracked; but the requirement is the admission of insects enough to make an increase of flesh of 80 grains' weight, besides maintaining the waste of the Toad for thirteen months. Where, in each case, was the excrement corresponding to such an augmentation? An insect–diet. as every naturalist knows, leaves a very considerable residuum of indigestible, incorruptible, chitinous mater: the foecal remains of an insect–diet sufficient to keep an adult Toad in condition for thirteen months, and leave him 128 grains heavier than at first, would form no inconsiderable or inconspicuous mass. Yet the silence of the observer on so conclusive an evidence proves that it was utterly wanting.

The Toads which survived longest were the largest specimens. Perhaps it requires a condition of peculiar vigour to bear the incarceration. Even these were all dead before two years had elapsed. But then it must be remembered that they had been disturbed: they had been taken out, handled, and weighed, and replaced; and during the second year they had been examined "several times". Air, it is true, was not admitted in these later examinations, but light was; and it may be that the absence of all external stimulus (and light is a potent one) is indispensible to the prolongation of vitality under conditions so abnormal.

No one supposes that incarceration in solid rock is a normal event in the life of even a Toad. However it occur,– granting that it may occur,– it must surely be a rare accident happening to an individual here and there, from which millions of Toads are exempt. We may reasonably suppose, too, that not one in a hundred so accidentally incarcerated would survive, the accident in the majority of cases proving fatal. If we bear in mind these not unreasonable presumptions, we shall not hastily decide that all recorded cases of Toads immured are proved false and impossible, because we have not succeeded in finding a case of longevity out of four–and–twenty Toads, many of them little ones, which we took and violently immured at our pleasure.

To my own mind these interesting experiments are far more corroborative than contradictory of the popular belief. The amazing fact remains, that an adult vertebrate air–breathing animal can certainly live, and increase in size, shut up in a stone cell, debarred from light and air and food, for a period of between one and two years! What have we parallel to this in the whole range of natural history? C'est le premier pas qui coute ["It's the first step that counts"]. After the first year has passed so auspiciously, why may not a second? a third? and so indefinitely – under circumstances peculiarly favouring? It is by no means certain that there are not such favouring circumstances, because we cannot precisely predicate what they are. And if we admit the reported cases to be– only a few of them – true, we cannot evade the conclusion , that the longevity of these imprisoned Toads must be immense, incalculable. For a Toad that emerges when a block of stone is split up, from a matrix that fits (say somewhat roughly, if you please) its form and size, must have been there ever since the stone was in a soft state, however long soever that may have been [60]. Nor does it in the least affect the

59: At the end of Buckland's original paper on his experiments, he cites the experiments of Dr Townson, in which the ability of both frogs and toads to absorb water through their skins was demonstrated. A frog can take up as much as half its body weight in this way in half an hour, and its full body weight in just a few hours. With such a fluctuation in weight possible, it could well be that the weight gains in Buckland's experiments were due to this factor, particularly as they occured with the toads entombed in cells in the porous limestone rock.

60: This conclusion may appear to be the only one possible, and its unacceptability to Science has been at the root of many doubts

that there may have been some minute the matrix through which insects, sufficient to support life, entered. This circumstance, I say, if satisfactorily proved, would not touch the question of time. And surely it is a marvel of colossal magnitude that a vertebrate animal should have maintained its life shut up in a mass of stone ever since the deposition of the matter in a solid form, even though we be able to eliminate from it the element of total abstinence during the entire period.

But facts are upon record which prove the possibility of Toads surviving a protracted incarceration, effected by man, and therefore without their will. In 1809, on opening a gap in a wall at Bamborough, in Northumberland, for a passage of carts, a Toad, which had been incarcerated in the centre of a wall, was found alive, and set at liberty. A mason, named George Wilson, when building this wall, sixteen years before, had wantonly immured the animal, in a close cavity formed of lime and stone, just sufficient to contain it, and which he plastered so closely as seemingly to prevent the admission of air. When discovered, it seemed at first, as must naturally be supposed, in a very torpid state; but it soon recovered animation and activity, and, as if sensible of the blessings of freedom, made its way to a collection of stones, and disappeared [61].

Mr F.W.L. Ross of Broadway House, near Topsham, an acute and experienced naturalist, narrates the following circumstances:— "In the year 1821, I was residing in the country, and in my court—yard was a set of stone steps for mounting on horseback. These being useless to me, I desired they might be removed. On taking them down, the lowest step, a coarse red conglomerate, measuring about three feet in length, ten inches in depth, and about fourteen inches in width, was raised by a heavy bar. It had been well bedded in mortar, in which, while soft, a Toad had evidently been placed, as there was no appearance of any way by which it could have found ingress or egress, the mould or cast being as perfect as if taken by plaster. On the removal of the stone, the Toad remained torpid for a few minutes, when it seemed to revive, and then crept out. From the owners of the property I ascertained that the steps had been placed there forty—five years before, and, to the best of their knowledge, had never been moved.

"A second account is from a clergyman, and originated in my informing him of the above. He caused a pit to be dug in his garden, six feet deep; at the bottom was laid a slate, on which a full—sized Toad was placed, with an inverted flower—pot over it. The hole and edges were well luted with clay; the pit was then filled in, and on that day twelve months [later] reopened, when the Toad was found alive, and as well as when inclosed in its living tomb. If, therefore, it could exist in such a state for twelve months, it is not impossible that it might do so for a much longer period." [62]

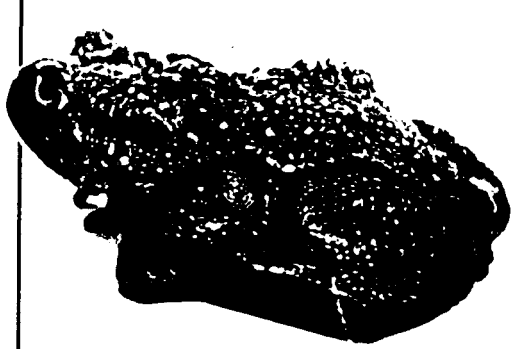
concerning the accuracy and truth of such observations. However there is an alternative explanation for some observations which does not require the toad to be coeval with the rock.

A toad that becomes trapped in a cavity in rock could subsequently be sealed in by debris and surrounded closely by fresh deposits of mineral that could closely resemble the original rock. In these circumstances the toad might eventually be so closely confined that some kind of impression of its body might be left it the (new) lining of the cavity after the toad has been released by the rock being fractured through the cavity. There is a high rate of cacareous deposition in some limestone districts, as is demonstrated at the sites where objects suspended in dripping water become coated in a layer of stoney deposition - for example at the Dropping Well at Knaresborough, Yorkshire. A good proportion of entombed toad cases occur in limestone areas, and this hypothesis may be valid in some of them - although it has not been conclusively shown for how long such a toad could survive.

61: Gosse cites M.A.Richardson, 'Borderer's Table Book' Vol.3 p.92, which appears to be also known as the 'Local Historian's Table Book of Remarkable Occurences'. To the best of my knowledge, the case first appears in E.Mackenzie, 'A Description and History of the Town and County of Newcastle on Tyne' (1827).

62: F.W.L. Ross, 'Toads buried alive', 'Zoologist' Vol.9 (1851) p.3266.

This live toad was discovered within a piece of coal that had been broken open by a poker, by a Mr WJ Clarke of Rugby in 1901. It was said to have no mouth or rectum, and was the subject of a stereoscopic photograph available at the time.



Some facts and fictions of zoology

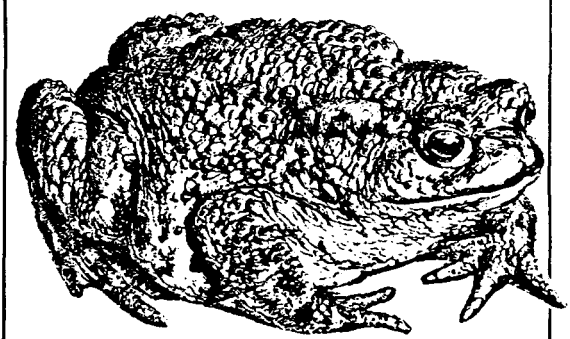
by Andrew Wilson in 'Leisure-time studies - mainly biological' (1879)

Passing from the sphere of the mythical and marvellous as represented in mediaeval times, we may shortly discuss a question which, of all others, may justly claim a place in the records of zoological curiosities - namely the famous and oft-repeated story of the 'Toad from the solid rock', as the country newspapers style the incident. Regularly, year by year, and in company with the reports of the sea serpent's reappearance, we may read of the discoveries of toads and frogs in situations and under circumstances suggestive of a singular vitality on the part of the amphibians, of more than usual credulity on the part of the hearers, or of a large share of inventive genius in the narrators of such tales [63]. The question possesses for everyone a certain degree of interest, evoked by the curious and strange features presented on the face of the tales. And it may therefore not only prove an interesting but also a useful study, if we endeavour to arrive at some just and logical conceptions of these wonderful narrations.

Instances of the discovery of toads and frogs in solid rock need not be specially given; suffice it to say, that these narratives are repeated year by year with little variation. A large block of stone or face of rock is detached from its site, and a toad or frog is seen hereafter to be hopping about in its usual lively manner. The conclusion to which the bystanders invariably come is that the animal must have been contained within the rock, and that it was librerated by the dislodgement of the mass. Now, in many instances, cases of the appearance of toads during quarrying operations have been found, on close examination, to present no evidence whatever that the presence of the animals was due to the dislodgement of the stones. A frog or toad may be found hopping about amongst some recently formed debris, and the animal is at once seized upon and reported as having emerged from the rocks into the light of day. There is in such a case not the slightest ground for supposing any such thing; and the animal may more reasonably be presumed to have simply hopped into the debris from its ordinary habitat. But laying aside narratives of this kind, which lose their plausibility under a very commonplace scrutiny, there still exist cases, reported in an apparently exact and truthful manner, in which these animals have been alleged to appear from the inner crevices of rocks after the removal of large masses of the formations. We shall assume these latter tales to contain a plain, unvarnished statement of what was observed, and deal with the evidence they present on this footing.

One or two notable exceptions of such verified tales are related by Smellie in his 'Philosophy of Natural History'. Thus, in the 'Memoirs of the French Academy of Sciences' for 1719, a toad is described as having been found in the heart of an elm tree; and another is stated to have been found in the heart of an old oak tree, in 1731, near Nantz. The condition of the trees is not expressly stated, nor are we afforded any information regarding the appearance of the toads - particulars of considerable importance in view the suggestions and explanations to be presently brought forward. Smellie himself, whilst inclined to be sceptical in regard of the truth or exactness of many of the tales told of the vitality of toads, yet regards the matter as affording food for reflection, since he remarks, "But I mean not to persuade, for I cannot satisfy myself; all I intend is, to recommend to those gentlemen who may hereafter chance to see such rare phenomena, a strict examination of every circumstance that can

63: The 'Toad-in-a-Hole', Sea Serpent and Giant Gooseberry were all classed together in the minds of some authors as the kind of stories now known as 'Silly Season' tales. It is interesting to conjecture what their modern counterparts might be.



The common toad 'Bufo Bufo'.
Illustration from Woods' 'Natural History'.

light upon a subject so dark and us; for the vulgar, ever inclined to render uncommon appearances still more marvellous, are not to be trusted."

This author strikes the key-note of the inquiry in his concluding words, and we shall find that the explanation of the matter really lies in the clear understanding of what are the probabilities, and what the actual details, of the cases presented for consideration. We may firstly, then, glance at a few of the peculiarities of the frogs and toads, regarded from a zoological point of view. As every one knows, these animals emerge from the egg in the form of little fish-like 'tadpoles', provided with outside gills, which are soon replaced with inside gills, resembling those of fishes.

The hind legs are next developed, and the fore limbs follow a little later; whilst, with the development of lungs, and the disappearance of the gills and tail, the animal leaves the water, and remains for the rest of its life an air-breathing terrestrial animal. Then, secondly, in the adult frog or toad, the naturalist would point to the importance of the skin as not only supplementing, but, in some cases, actually supplanting the work of the lungs as the breathing organ. Frogs and toads will live for months under water, and will survive the excision of the lungs for like periods, the skin in such cases serving as the breathing surface. A third point worthy of remembrance is included in the facts just related, and is implied in the information that these animals can exist for long periods without food, and with but a limited supply of air. We can understand this toleration on the part of these animals when we take into consideration their cold-blooded habits, which do not necessitate, and which are not accompanied by, the amount of vital activity we are accustomed to note in higher animals. And, as a last feature in the purely scientific history of the frogs and toads, it may be remarked that these animals are known to live for long periods. One pet toad is mentioned by Mr Arscott as having attained, to his knowledge, the age of thirty-six years; and a greater age still might have been recorded of this specimen, but for the untoward treatment it sustained at the hands, or rather the beak, of a tame raven [64]. In all probability it may be safely assumed that, when the conditions of life are favourable, these creatures may attain a highly venerable age - regarding the lapse of time from a purely human and interested point of view.

We may now inquire whether or not the foregoing considerations may serve to throw any light upon the tales of the quarrymen. The first point to which attention may be directed is that involved in the statement that the animal has been imprisoned in a SOLID rock. Much stress is usually laid on the fact that the rock was solid; this fact being held to imply the great age, not to say antiquity, of the rock and its supposed tenant. The impartial observer, after an examination of the evidence presented, will be inclined to doubt greatly the justification for inserting the adjective 'solid'; for usually no evidence whatever is forthcoming as to the state of the rock prior to its removal. No previous examination of the rock is or can be made, from the circumstance that no interest can possibly attach to its condition until the removal reveals the apparent wonder it contained, in the shape of the live toad. And it is equally important to note that we rarely, if ever, find mention of any examination of the rock being made subsequently to the discovery. Hence, a first and grave objection may be taken to the validity of the supposition that the rock was solid, and it may fairly be urged that upon this supposition the whole question turns and depends. For if the rock cannot be proved to have been impermeable to and barred against the entrance of living creatures, the objector may proceed to show the possibility of the toad having gained admission, under certain notable circumstances, to its prison house.

The frog or toad in its young state, and having just entered upon its terrestrial life, is a small creature, which could, with the utmost ease, wriggle into crevices and crannies the size of which would almost preclude such apertures being noticed at all. Gaining access to a roomier crevice or nook within, and finding there a due supply of air, along with a dietary consisting chiefly of insects, the animal would grow tolerably rapidly, and would increase to such an extent that egress through its aperture or entrance would become an impossibility. Next, let us suppose that the toleration of the toad's system to starvation and to a limited supply of air is taken into account, together with the fact that these creatures will hibernate during each winter, and thus economise, as it were, their vital economy and strength; and that after the animal has thus existed for a year or two - no doubt under singularly hard conditions - let us imagine that the rock is split up by the wedge and lever of the excavator. We can then readily enough account for the apparently inexplicable story of the 'toad in the rock'. "There is the toad and here is the solid rock," say the gossips. "There is an animal which has singular powers of sustaining life under untoward conditions, and which, in its young state, could have gained admittance to the rock through a mere crevice," says the naturalist in reply. Doubtless, the great army of the unconvinced may still believe in the tale as told them; for the weighing of evidence and the placing of pros and cons in fair contrast are not tasks of congenial or wonted kind in the ordinary run of life.

Some people there will be who will believe in the original solid rock and its toad, despite the assertion of the geologist that the earliest fossils

64: The story originates from T.Pennant, 'British Zoology' (1766).

ls appear in almost the last-formed rocks, it a live toad in rocks of very early age - presuming, according to popular belief, that the animal was enclosed when the rock was formed - would be as great an anomaly and wonder as the mention, as an historical fact, of an express train or the telegraph in the days of the patriarchs. In other words, the live toad which hops out of an Old Red Sandstone rock must be presumed, on the popular belief, to be older by untold ages than the oldest fossil frogs and toads. The reasonable mind, however, will ponder and consider each feature of the case, and will rather prefer to countenance a supposition based on ordinary experience, than an explanation brought ready-made from the domain of the miraculous; whilst not the least noteworthy feature of these cases is that included in the remark of Smellie respecting the tendancy of the uneducated and superstitious persons to magnify what is uncommon, and in his sage conclusion that, as a rule, such persons in the matter of their relations "are not to be trusted."

Toads have often been the objects of both curiosity and revulsion. This Victorian engraving illustrates the toad, mentioned by Thomas Pennant, which lived as a family pet for nearly 40 years. The fact that toads can attain such venerable ages is of great significance in considering the phenomenon of entombed toads.

But it must also be noted that we possess valuable evidence of a positive and direct kind bearing on the duration of life in toads under adverse circumstances. As this evidence tells most powerfully against the supposition that the existence of those creatures can be indefinitely prolonged, it forms of itself a veritable court of appeal in the cases under discussion...

[Details of Dr Buckland's experiments, as described elsewhere in this paper, are given at this point.]

These experiments may fairly be said to prove two points. They firstly show that under circumstances even of a favourable kind when compared with the condition popularly believed in - namely, that of being enclosed in a SOLID rock - the limit of the toad's life may be assumed to be within two years; this period no doubt being capable of being extended when the animal gains a slight advantage, exemplified by the admission of air and insect-food. Secondly, we may reasonably argue that these experiments show that toads, when rigorously treated, like the other animals, become starved and meagre, and by no means resemble the lively, well-fed animals reported as having emerged from an imprisonment extending, in popular estimation, through periods of inconceivable duration.

These tales are, in short, as devoid of actual foundation as are the modern beliefs in the venemous properties of the toad, or the ancient beliefs in the occult and mystic powers of various parts of its frame when used in incantations. Shakespeare, while attributing to the toad venemous qualities, has yet immortalised it in his famous simile by crediting it with the possession of a 'precious jewel' [65]. But even in the latter case the animal gets but scant justice: for science strips it of its poetical reputation, and in this, as in other respects, shows it, despite fable and myth, to be zoologically an interesting, but otherwise a commonplace member of the animal series.

65: The history of the belief in the stone in the head of the toad is as curious as that of the toad in the stone. John Aubrey gives the instance of a toad that was enclosed in a wooden box that had been bored full of holes, which was then buried in an ant-hill with the intention of retrieving the legendary stone reputed to be in the toad's head once the ants had consumed its flesh. After two years the box was unearthed - the ants had gone and the toad was alive. (From 'Observations', reproduced in 'John Aubrey, three prose works' by J.Buchannan-Brown, 1972.)

Some eye-witness accounts

Bob Skinner

c.1575. MEUDON, FRANCE

"In the course of this year, being in my vineyard near the village of Meudon, where I had ordered some large stones to be broken up, there was found in the middle of one of them a big living toad. There was no trace of an outward opening, and I wondered how the animal had been born and been able to grow and stay alive. The quarryman said there was no need for any amazement, because he had more than once found toads and other animals in the very heart of stones without any opening towards the outside."

Ambroise Paré, 'Des Monstres et Prodiges' (1575), p.826 of 'Les Oevres...'

c.1664. COLOGNE, GERMANY

"The most illustrious Count Hermann of Gleichen and Hatzfeld, Lord of Trachenberg, Prausnitz etc, a warrior extremely well-versed in matters of nature, when in 1664 he was dying at Prausnitz in Silesia and had called me to him, kindly told me he had seen with his own eyes how near Cologne on the fortified hill of Schellenberg, which belongs to the Count of Furstenberg, a stone was kept inside which a frog was heard croaking, not in a whisper, but fairly roaring its Aristophanic call "koak brekekex" [66]. When in the end the stone was broken, the frog was seen to jump out alive."

P.J. Sachs, 'Gammarologia Curiosa' (1665) p.147

1716. GREAT YARMOUTH, NORFOLK

"On the 14th day of June last at Great Yarmouth I took a live toad out of a solid free-stone that was brought from Rutlandshire of these dimensions: The stone was in length four feet, in breadth three feet six inches and in thickness one foot six inches. When I had sawn this stone in the middle, upon dividing the two parts of the stone, I observed a hole about six inches from the edge of the stone in which lay this toad. I took the toad out of the hole with my compass; I did not observe that I in any ways hurt it in taking it out of the hole. When it was on the ground it hopped about, and died in less than one hour. There was a yellow list on the back, which changed colour soon after the toad died. The hole was about three inches long and almost as deep. I strictly viewed the stone and could not perceive any flaw or crack in it; the inside of the hole was smooth and it looked as if it had been polished.

Witness my hand this five and twentieth day of July 1716
John Malpas"

"I was present and saw the toad alive. Witness my hand,
Peter Hurford, Mason"

'Gentleman's Magazine' (1756) p.240

1753. BURGSVIC, GOTLAND, SWEDEN

On the 8th May in the year 1733, around noon, I was in the quarry called Nybo, in the parish of Vamlingbo, on Gotland. My task was, as usual, to survey the measuring of stone blocks destined for public buildings; also I had to see that two ships lying in Burgsvik were loaded with stone for the Royal Arch in Stockholm. In the previous two weeks, some new levels or layers of stone, quite deep in the quarry, had been exposed at my order, and already in a place between two fissures (called in the trade 'snidae') the quarrymen were occupied in removing whatever still obstructed the layer in question. One of them, Andreas Halfvader, from the parish of Vamlingbo was breaking some surroundings of the layer with hammer and wedge. Then a part of the stone split, another stroke of the hammer broke it off, and in the same moment the man saw a living toad stuck inside the stone. However, as the part nearest to the toad was very thin, the violence of the stroke fragmented it, so that the impression of the toad's body was destroyed. Andreas Halfvarder and another quarryman, Olaf Sigraefer, were frightened because they had never seen such a thing, and called me, and I climbed down.

I saw the toad, half covered with grit and fragments of stone; it had been imprisoned in the solid layer at a distance of 3 to 4 quadrants from the one, and 4 quadrants from the other, snida or

66: This is an allusion to the frogs' chorus in Aristophanes' play 'The Frogs'.

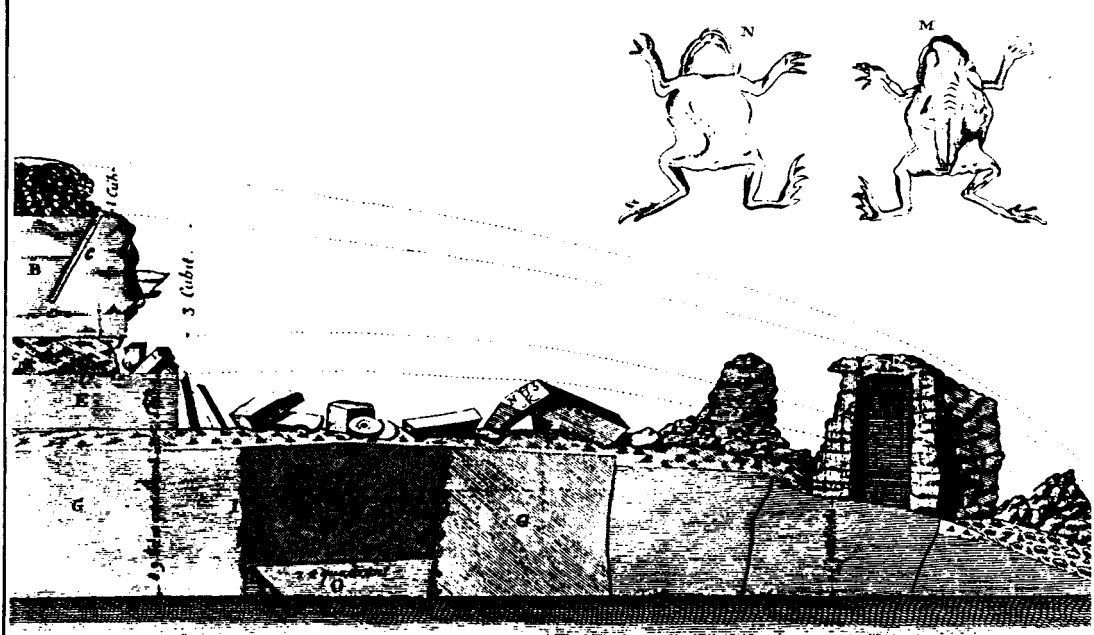
at a depth of approximately one cubit. I he toad out on a spade; it did not move. I examined it from all sides: its colour was dark, nearly black, with some speckles on the back, rather as if small pebbles had adhered to the skin and left marks – see the preserved skin. Under the belly the colour was paler. The eyes were very small and round, covered with a membrane under which they could be seen glowing like pale gold. Henriks Skogs, another quarryman, passed me a stick, with which I touched the toad's head; thereupon it closed its eyes as if going to sleep, but when the stick was taken away it opened them again very slowly. However, although I touched it repeatedly, it never moved its body or its legs. Then I saw the mouth was closed, and covered by a yellow membrane [67]. Finally I prodded it rather hard in the back; it discharged a clear fluid from the anus, and all of a sudden it died.

As I had a lot to do, I had to stop looking at the toad; I placed it between some flat chips of stone and put it away in the quarrymen's shelter. On the way back, I was displeased with myself for having caused the death of the animal, which had perhaps lived for countless years in its safe hiding place. The next day I returned to the quarry and had the toad skinned. Examining the skin, I saw that the mouth was open in the middle, but the corners of the mouth I found to be overgrown with parts of a yellow membrane. Where the mouth was open it showed in each jaw pointed, not very sharp, bright red teeth, as can be seen when the preserved skin is examined under the microscope. In the living animal they cannot have been conspicuous, and I do not think they were of any use, although when alive the toad was fat enough for its size.

A few days later, the quarryman Andreas Halfvarder fell ill. He was convinced that his

67: The sealed or 'absent' mouth is a feature reported in several cases. E. Kay Robinson, who wrote about this feature - said by some to indicate long disuse of the mouth - explained it by saying that toads always closed their mouths so tightly that they appeared as mere lines. He said that it was not proved that their mouths could become hermetically sealed through disuse. This is true, and his explanation may apply in a few cases. ('Countryside' Vol.3, 1906 pp.51, 109.) However, there are other references to the fact that the mouths of toads and frogs can become sealed over during hibernation, something that does not appear to be generally known or accepted as a physiological feature. For further discussion on this topic, see the letter by T.Row, 'Scots Magazine' September Vol.31, 1769, and 'D.P.', 'Toads in winter', 'Hardwicke's Science Gossip', Vol.2 1866, p.213.

Accompanying a full report in "Analecta Transalpina" (1741) of the finding of a toad in the quarries of Burgsvic in 1733 is this plate, illustrating the toad itself, and the position in the strata in which it was found enclosed in rock. Reproduced with acknowledgements to the British Museum (Natural History)



caused by the toad, which in his ignorance he believed to be a malignant mountain spirit. It took six weeks for him to regain some of his forces.

To testify to this I have signed my name above [I.M. Graeburg] and add the signatures of my eyewitnesses:

Andreas Halfvarder (64 years); Olaf Sigraefs (47 years); Hans Anderson and Hans Siffrid, all from the parish of Vamlingbo; Henrik Skogs and Siffrid Langengra, from the parish of Hamra."

"I know and declare these men to be honest and reliable, and to be, for the most part, my parishoners. In testimony of which I sign, at Vamlingbo, on 29th
October 1733 – Is Canutis, parson of the place."

I.M. Graeburg 'Anelecta Transalpina' Vol.1 (1741) p.177ff

c.1743. WISBECH, CAMBRIDGESHIRE

"I will relate a story..., which happened around the year 1743 when I lived at Wisbech in the Isle of Ely, and which I saw with my own eyes. Mr Charleton, a stone cutter, who lived at the bottom of the yard next to the river, came up to my house, and desired me to walk down to his shop, and he would show me a great curiosity. The marble [68] was just sawn asunder as I got there, and a living toad of more than ordinary size was lodged in the middle of the block. The cavity was pretty near the shape of the toad, but something larger than the animal itself. The cavity, to the best of my remembrance, was of a dusky yellow colour, but the toad itself was surrounded, exclusive of the cavity, with several inches of clear, solid marble on both sides. He seemed healthful and well, and not at all the worse for his long confinement. This is the naked fact which I am fully satisfied of from my own knowledge, and I appeal to Mr Charleton, now living at Wisbech, for the truth of it.
T. Whiston."

'Gentleman's Magazine' (1756) p.240

1770. HEBRON, CONNECTICUT [69]

"Agreeable to your Request I have Stated A Phenominon which was manifested to me at Hebron in the Colony of Connecticut A.D. 1770 – The Case was here as follows:–

A Rock nearly 20 feet Square on its Superficies & about 10 feet thick lay in the high Road opposite my House, and as Report Said had been growing higher for 150 years whereby it had become a Nuisance to Carriages & Travellers.

To remove the Inconvenience I ordered my Negroes to dig a ditch around the Rock three feet wide, & to go down with the Ditch to its Bottom – this being done I engaged a Miner to perforate the Rock with an Auger near the middle of the Surface – the Auger was two Inches wide & with it he made an Hole five feet deep – He then charged the Rock with half a Pound of Gun Powder & fired it off with a Match, while the Spectators stood at a proper Distance to shun danger & to See the Effect –

The Explosion was very great: The Rock was rent into Eight or Ten large Pieces, besides many fractional ones – We soon hoisted up the Fragments; at last we came to the two Center and largest Pieces between which the Auger had passed.

Having taken up the Smallest, the largest Piece stood up edgeways – I then went down & viewed the Path of the auger, which had passed by a Cavity as large as a Goose Egg, in which lay a Frog who compleatly filled the Cavity...His Thigh was bleeding by Reason of a wound... The Orifice was too small to pull him out... The Miner soon enlarged the Orifice and I took out the Frog, bound up the wound and placed him on some Mud near a puddle of Water, which I enclosed with a Board Fence – The Frog was alive and struggling for delivrance when I first discovered him in his Bed; which was as smooth as the inside of a Glass Tumbler –

He appeared in perfect & high Spirits, though he had no visible means of living in his Hole four feet & a half down from the Top of the Rock to his bed, (all around him was firm & hard as a flint Stone) excepting by what Water, Air and Heat that reached him through a Small crivice not so large as a Knitting Needle, & that Crivice was filled with fine dust from the Top of the Rock down to his Bed in which he lay, in so close a mannher, that with difficulty I dug it out with a Steel Pointer – I kept the Frog imprisoned for many weeks for the Inspection of the Curious..."

Letter dated 10 January 1806 sent to Samuel Harrison of New York by Samuel Peters, from the archives of the American Philosophical Society, quoted by Sabina Sanderson in 'Pursuit' Vol.6 No.3 (July 1973) pp.61–2

EARLY 1800s. ENGLAND

"I myself once cut a live toad out of a growing tree, when pruning it, four and a half feet from the ground; the toad was but a little one, about

68: The use of the term 'marble' in accounts of entombed toads has caused many a sceptical smile as the rock was formed metamorphically under pressure and heat. However, marble is the generic term used by stonemasons to describe 'almost any rock that can be easily polished - more especially limestones - which have not been metamorphosed.' (W.G.A. Whitten, 'Dictionary of Geology', 1972 p.282)

69: Original spelling and capitalisation have been retained in this eye-witness account.

size of a walnut shell, like one about half ld, yet it must have been there at least five or six years, as the wood had grown over it to a full inch and a half of thickness, exclusive of the bark. The place I cut it out from was an unsightly protruberance, the effect of bad pruning. Its lodging-room was beautifully polished on the inside, either, as some supposed, from its rough skin acting on the wood like a burnishing file or sand-paper; or rather, as I supposed, from the creature licking with its tongue the juices of the tree, which probably were sufficient to support animal life in such a confined state.
John Howden."

Communication dated 5th July 1829, 'Magazine of Natural History' Vol.6 (1833) p.459

EARLY 1800s. ENGLAND [70]

"I remember some years ago getting up into a mulberry tree and finding in the fold of the two main branches a large toad almost embedded in the bark of the tree, which had grown over it so much, that he was quite unable to extricate himself, and would probably in time be completely covered over with bark. Indeed, as the tree increased in size, there seems no reason why the toad should not in the process of time become embedded in the tree itself."

Edward Jesse, 'Gleanings from Natural History' (Series 1) (1832), p.115

1832. STAINMOOR, WESTMORELAND

"We the undersigned John Stockdale, Thomas Steel, John Mason and Michael Steel of Brough in the county of Westomoreland, masons and quarrymen, do hereby make oath that on the 25th day of July One thousand eight hundred and thirty two, being employed on Stainmoor, about three miles from Brough, at a place called Little Raize, in preparing blocks of stone called millstone grit for rebuilding a public highway called Bayside adjourning the river which runs through Brough, commonly called Brough-Beck, were astonished on splitting a large block of more than a ton in weight, by a lively yellow Frog springing out of a cavity in the said rock, where it had been as closely embedded as a watch in its outer case, without any communication with the surface nearer than eight inches. The said Frog was taken up by one of us, when it discharged a considerable quantity of black fluid; it was safely conveyed to Brough where it was given to Mr Rumney, jun. Surgeon, in whose possession it now continues in a healthy living state.

Witness our hands this 21st day of January 1833."

'Gentleman's Magazine' (August 1834) p.145

1835. COVENTRY, WEST MIDLANDS

But I have forgotton to mention a circumstance which occurred to me while carrying on the works on the London & Birmingham line which is of interest in many ways.

While making a cutting for the railway near Coventry, in the new Red sandstone formation, one day when I was standing at the easterly end of the cutting, some loaded wagons were running down towards the embankment; as they passed one piece of stone fell from a wagon; in falling it broke across the middle and disclosed a hole in the heart of the stone out of which fell a live toad. I immediately picked it up, as well as the two broken pieces of rock.

I placed the toad on the stone and the poor animal, injured about the head in the fall, crawled back to the hole it had inhabited for so many hundreds of years.

I carefully carried it up to our office in Hertford Street. Great was the sensation caused in the city of Coventry when the news of a live toad being found embedded in the sandstone was circulated. Crowds came to see it, and I was the principal exhibitor. I clayed him up in his den every night. When first discovered he was of a bright yellow colour, but he gradually became brown, and evidently was suffering from the damage he had received, one eye being crushed. On the tenth day he died and I put him in a bottle of spirit.

The Railway Directors heard of this "find" and demanded that I should give it up as they had passed a resolution presenting the curiosity to the Birmingham Museum. A full statement of all the particulars of its being found was drawn up and signed and forwarded to the Museum, where I believe it now is. Since that other instances have been discovered [71].

John Bruton, 'John Bruton's Book' (written c.1882, published 1939) pp.40-2

1866. WALTHAM, LEICESTERSHIRE

I, William Munton, of Waltham in the County of Leicester, quarryman, hereby certify that I was the witness to the discovery of the stone and frog now before me (in the possession of Mr

70: Although this is not a case in which the toad was fully entombed in wood, it is included as a relevant observation of great interest.

71: This case has several seperate eye-witness accounts; see page 16.

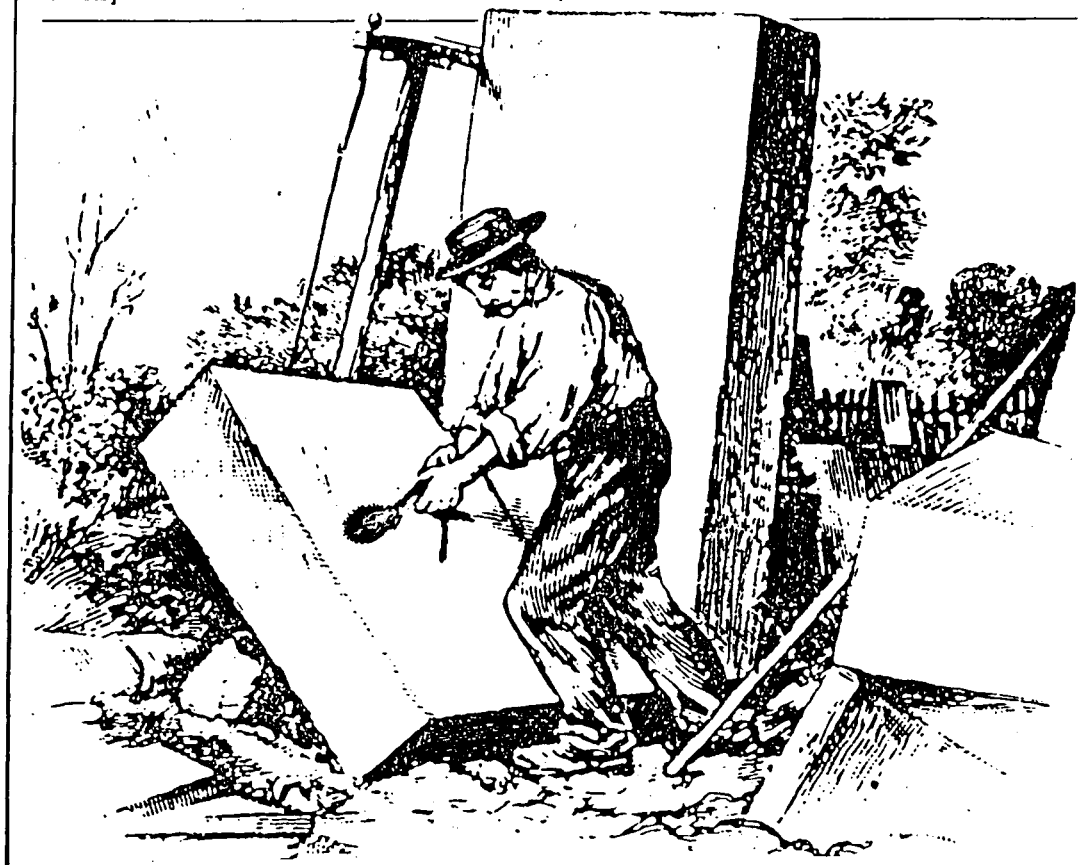
Hutchinson, of Manthorpe Lodge, Grantham) in the stone quarry of Waltham, from ten to twelve feet below the natural surface of the ground, in solid rock. When the stone was split, the frog appeared alive: in size equal to the cavity therein. It continued to live about ten days after its release, and was afterwards preserved in spirits by the late Mr Stow of Waltham. Before the stone was broken, no crack was anywhere visible. As witness my hand, this first day of December 1866.

'Hardwicke's Science Gossip' Vol.3 (February 1867) p.45

c.1869. CORNWALL

I can with confidence depend on the truth of the account given me by an acquaintance, of whose correctness of observation and general veracity I have no doubt, and the circumstances attending it were written down at the time when the particulars of the case were fresh in the memory. It is general in Cornwall that the hedges are high and wide, while in many places the roads are so limited as to be inconvenient for the passage of carts and wagons, which indeed were little in use when these hedges were first made. Formed of the most part of earth only, these hedges are liable to decay as well as injury, so that not infrequently the lower portion as it faces the road will fall away, and thus lay bare the roots of trees that crown the summit. From this cause it happened that a stout portion of the root of an oak tree was left projecting from the lower part of the side of the hedge, in such a manner as to be inconvenient in the passage of vehicles, and in consequence it was removed with a saw, after which it was conveyed to the house of my informant, in the open court of which it lay for the space of about three months, when it had appeared to become dry, and during which it had been used as a block on which to chop wood for the fire. Its diameter was five or six inches, and the

"I took the toad out of the hole with my compass."
[Based on a contemporary illustration of a mason at work]



of its surface was sound, without any appearance of a flaw. But at last its fate was to be prepared for the fire, and my informant himself, who was the national schoolmaster for the village, proceeded to cut it into the requisite lengths, after which it was split so as to be seperated into sections; in the cleaving of which, close below a knot, he discovered a cavity that was shut up on all sides, and within which he found a living toad - which he closely examined and described to me. One noticed that it completely filled the hole in which it was contained, but he judged it to be somewhat less than the ordinary size of the generality of its race; its colour all over, as well the sides as the back, very dark, while the eyes appeared bright, and its active powers were shown in moving about; tubercles were well marked on the skin. The creature thus suddenly produced today was carried to the house and shown to his wife, and then to several persons who chanced to be in the way, after which it was set at liberty. It was particularly observed in this case, that externally there was no mark on the surface of the wood of a wound or opening through which this creature could have passed into the cavity in which it was found.

Jonathan Crouch, 'The Naturalist's Notebook' Vol.3 (1869) No.33, p.278

C.1910 FITZCRAIG, VICTORIA
C.1929 MOUNT GAMBIER, SOUTH AUSTRALIA

I received a telephone call from Mr Bill Castle of Adelaide, who was...a retired stone mason, and as a boy had seen a frog discovered at Mount Gambier in a solid block of limestone...Bill Castle had been watching his father cut a block of stone. His father (Bill Snr) was still alive, aged 86, and hence I arranged to visit the two men. Two observers of one phenomenon were too good to miss. The Mount Gambier sighting had taken place in 1929 or 1930. A block of limestone more than 1 metre cubed had been split, exposing a small cavity, from which hopped a frog. Bill (Jnr) remembered it vividly, describing its colour - appropriately for a mason - as "like tiger-eye stone, golden."

His father remembered another sighting at Fitzcraig in Victoria in about 1910 in dry bluestone. He described in detail the back-breaking work of drilling and splitting the hard rock, and told me: "As soon as the stone is split you sometimes find a little pocket, not quite as big as my hand, and it's got little knobs, just like quartz. The frog was nestled in there, and was alive at the time the stone was split...The poor frog, he jumped out of the pocket and landed on the ground and that was the last hop he does. Well of course it's finished, he died straight away. That's due to the fact, I should say, of being enclosed and not getting any air."

Extract from an Australian radio broadcast by Michael Tyler of the Zoology Department of the University of Adelaide (Nov. 1983).

1939. MAYTOWN, NORTH QUEENSLAND, AUSTRALIA

My brother and I were mining for reef gold in a place called Maytown on the Palmer goldfields in North Queensland. We were at least 50ft underground, working in solid rock. We fired some charges, and after waiting for the smoke to clear we used picks to break away any lose rubble. After breaking one of these pieces of rock away, I was amazed to find a large toad sitting in a hole like a half tennis ball, the other half of which was still on the rock face. There was no way in which the toad could have got in or out. It was full of water apparently, and slowly crawled out and away. Well, it doesn't seem possible for it to have been there since that rock was mud, but how else could it have got there?

Exact from a letter by a Mr Silk, quoted by Michael Tyler in an Australian Radio broadcast, (November 1983)

1943. ALGERIA

In Algeria in the early part of 1943, I was working with a team whose job it was the quarry stone that was then used for making roads and filling bomb craters. The method we used was to set small charges of explosives into the rock face and crack open the rock, which we then prised away and broke down before it was used. One morning, we had set off the charges as usual and I started to prise away the rock away from the quarry face when I saw in a pocket in the rock a large toad, and beside it a lizard at least 9 inches (20cm) long. Both these animals were alive, and the amazing thing was that the cavity they were in was at least 20 feet from the top of the quarry face. Try as we might, we couldn't find how it was possible for the two creatures to be where they were - there were no inlets, cracks or fissures leading to the cavity. In fact, it was quite a topic of conversation among us all for some days.

Letter from M.Laver of Horndean, Hants, to 'The Unexplained', letters page of No.24 (opposite page 480), (1981)

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Bob Skinner

The following bibliography consists of major sources on the phenomenon, together with other interesting and significant references. On the whole, small communications to magazines and newspapers have been omitted, although they in fact provide the first written account of cases in the majority of instances; this bibliography would have been nearly four times as long if all such references had been included. Page references have been given where possible – where more than one date for a source is given, the later date is that of the edition consulted.

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The O.P. series

The Fortean Times 'Occasional Papers' are intended to present material of greater length and depth than is possible in the magazine itself. It is hoped that they will meet the normal standards of scholarship, and it is planned that they should fall into two broad categories. The first, of which this paper is an example, is that of annotated editions of scarce or hard–to–find source material; the second type will be original essays of up to 20,000 words in length. Readers with ideas for future papers are urged to contact the General Editor at the magazine address.

Acknowledgements

Grateful thanks are due to those who have taken an interest in and supported my research into entombed toad phenomenon, and to those who have sent me information relevant to the study. I would particularly like to acknowledge my indebtedness to Dr M.I. Gerhart of Domberg, Holland, who kindly offered her services and has translated early Latin sources and French material for me.

Research is still continuing into the entombed toad phenomenon, and any information or data which may be relevant and useful is being collected. Reports of the phenomenon from old newspapers, journals and books are particularly required, but any references of allusions in print to entombed animals in print - even in literature or poetry - would be gratefully received.

Bob Skinner, 16 Hillside Lane, Heath End, Farnham, Surrey GU9 0LB

Fortean Times

THE JOURNAL OF STRANGE PHENOMENA

... was established in 1973 to continue the work of the American iconoclastic philosopher Charles Fort (1874-1932), collecting and circulating accounts of strange phenomena and experiences, curiosities, mysteries, prodigies and portents. The magazine has regular correspondents in 18 countries, and each fat issue is crammed with articles, annotated summaries of weird news, letters, book reviews, journal listings and illustrations.

Just about anything is grist to the Fortean mill: showers of frogs, toenail painters, ectoplasmic erotica, wild kangaroos in Wisconsin, appearances of the Virgin Mary, exploding telephones, crop circles, houses that drip blood, feral children, weird archaeological discoveries... Some of it may be true, some of it may be hogwash (and if we think it's hogwash we say so)... but a good Fortean always names his sources.

Britain's most astounding magazine
TIME OUT

[FT] exudes a delightful sense of humour and a healthy excitement for all things strange and wonderful... [It] offers eccentric columnists, odd comic strips and elegant shoestring design
WHOLE EARTH REVIEW

Fortean Times acts as a sort of quarterly vitamin pill for the incurably sane
MIDWEEK

Must reading for serious students of the unexplained
FATE

In a world in which the imagination is devalued daily, we salute the magazine that believes there's more to life than meets the eye, and that if it can happen, it will happen, and no-one will know why
CITY LIMITS

The stuff of dreams externalized... Fortean Times comes on chatty, like an affable old geezer who delights in the strangeness of the human condition
CO-EVOLUTION QUARTERLY

Far and away the best magazine to probe the mysteries of our world. Every issue stretches the mind by a quantum leap
METAPSYCHOLOGY

Invaluable and invariably ahead of the game
HEATHCOTE WILLIAMS

To describe it as probably the most remarkable magazine in the English-speaking world is to be needlessly restrained
EDINBURGH REVIEW

I rate Fortean Times considerably higher than publications with similar names such as the Sunday Times and New York Times, not just because its selection of news reporting is much more interesting but because it doesn't have a sports section or colour supplement
MILES KINGTON

The only magazine in the whole world that I enjoy so much I read every page
ROBERT ANTON WILSON

A continual and amusing reminder of the strangeness of the world, defying dogma and subverting rationalism. Essential reading for the curious
RUPERT SHELDRAKE

Fortean Times, for all those with enquiring minds and a love of the surreal, the strange or the absurd, is indispensible and utterly absorbing
ALEXIS LYKIARD

There are very few things in the world which are consistently rewarding, revealing or worth receiving. Fortean Times is one of them
LYALL WATSON

My FT travels with me around the world. I read it from cover to cover and I love it.
URI GELLER

For the past fifteen years, Fortean Times has been my very favourite magazine in the world, material or otherwise
ALAN MOORE

I know [FT] well and take this opportunity of congratulating you on your skilful editing and judicious selection of material
DR ERIC J. DINGWALL

[FT] is appropriately ironic, skeptical and commpassionate. You seem to have a sure touch, delving into the unknown with scholarship, skeptical without being cynical, and with a sympathetic view of human folly
MARTIN LASKO

Once again FT was a cover-to-cover read. It is the greatest journal in existence and more fun than a backyard swing
LOREN COLEMAN

FT, as ever, combines the mind-blowing, macabre and hilarious in a unique fashion
R.M. CALVERLEY

I have always had an interest in strange phenomena, but have never been able to accept either unquestioning belief or dismissal as a very intelligent response to anything beyond our understanding. The Fortean attitude is one I can relate to, and is a welcome change from mainstream viewpoints
LYN JOLLIFFE

Essential reading
BLITZ

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FT

OPTIONS

TINGS FROM

NEW YORK TIMES

LIVE FROG IN A COAL LUMP.

Surprising Discovery Described by a Maryland Miner.

Special to The New York Times.

CUMBERLAND, Md., Dec. 23.—John Savage, a miner in the Enterprise mine, at Buck Hill, a suburb of Lonaconing, this county, was very much astonished yesterday, he says, when, in breaking a lump of coal, a live frog jumped out of it and hopped around his feet.

Savage says the hole in the lump in which the animal may have snoozed for centuries was not large enough to allow any room for exercise.

Many other miners say they saw the discovery. The frog measured six and a half inches. It lived for some time after it was released. 24 DEC 1906

TESTS FOR TOADS

4 MAR 1928

Temperament Should Be Considered in Fort Worth Trial.

To the Editor of The New York Times:

Eastland, Texas, has been made famous by a horned toad. It is claimed that this particular toad was officially sealed up in the cornerstone of the Court House on July 29, 1897, for the purpose of testing the legend that toads live under some conditions for hundreds of years. Scientists and biologists in Washington and elsewhere are now asserting that this is a fake. In other words, they claim that their peculiar intelligence at a long distance is even more reliable than the testimony of those who were on "location."

At the very time that scientists were explaining some years ago that ballplayers could not throw curved balls, a ballplayer was doing it at Cincinnati, Ohio. Many years ago when I was a young man in Columbiana County, Ohio, one of the workmen in a small stone quarry, in splitting a large solid sandstone, accidentally liberated, in my presence and in the presence of others, a toad that on being given air and sunlight, immediately became alive. This sandstone had been blasted out from under ten to fifteen feet of earth, after which it was then split open. The imprint of the toad was impressed in the solid sandstone. The toad had evidently been embedded in the stone for thousands of years.

I notice that the Riverside Civic League of Fort Worth, Texas, intends to make a test of this question by sealing up a live toad in solid concrete. In my opinion this would hardly be a fair test, as the elements in concrete may be entirely different from those in sandstone. Furthermore, toads, like human beings, are different. One toad might stand the ordeal and another one might not. To make a real scientific test of this phenomenon at least one hundred toads should be used, and under such circumstances and with such materials as to parallel nature.

H. H. EMMONS.

Canton, Ohio, Feb. 28, 1928.

MINERS FIND CLAWED FROG.

17 NOV 1929

Freak Removed Alive Fifty Feet Underground in Oregon.

MARSHFIELD, Ore., Nov. 16 (AP).—A frog with claws, found alive fifty feet underground in a mining claim in the Sixes Mountains, has been sent to the University of Oregon.

The head is twice as big as an ordinary frog's and much out of proportion to the body. The color of the body is that of the clay in which it was buried.

Three Toads, Buried 300 Years, Hop When Dug Out of Mound

30 SEP 1934

By The Associated Press.

OKLAHOMA CITY, Okla., Sept. 29. — Three small toads, estimated by J. B. Thoburn, curator of the State Historical Society, to have been buried in an Indian mound for at least 300 to 400 years, have been excavated alive near Gate in Northwestern Oklahoma.

Mr. Thoburn found the toads at depths varying from three to four feet. They were brought to the State Historical Society Museum at the Capitol, but later may be turned over to biologists of the University of Oklahoma.

"Each of these creatures was found in a dormant condition, with eyes and lips sealed shut, in a small cavity in the midst of compact earth," the curator said.

"Within the brief space of a few moments, however, the eyes opened and the small amphibian recovered its long-lost ability to hop about with all of the agility of a toad which always lived in the open."

Pennsylvanians Say Toad Lived 63 Years Buried Alive

13 JULY 1931

Special to The New York Times.

FRANKLIN, Pa., July 12.—Buried alive in masonry laid sixty-three years ago, a toad, which workmen say must have been trapped there all that time, was discovered in demolition operations, hopped blindly around in the unaccustomed daylight, and twelve hours later died.

The toad was found yesterday trapped in a crevice in the stone steps to the Venango County Court House, to which an addition is being erected.

J. E. Ludwig, the contractor, said the steps were put in place in 1868. Close inspection showed that the toad had no opportunity to find its way into the crevice after the steps were constructed, he declared.

ASSERT 'GLACIAL' TOAD IS ONLY 2 YEARS OLD

Washington Experts Explode the Myth of Reptile Having Lived 300,000 Years.

2 APR 1928

WASHINGTON, April 1 (AP).—The live toad found recently near Frederick, Okla., in the same clay strata which has yielded relics of the Pleistocene or glacial age of approximately 300,000 years ago, arrived at the National Museum yesterday and after undergoing the careful scrutiny of reptile experts and biologists was pronounced a perfect specimen of a two-year-old Western toad.

Dr. Oliver P. Hay, vertebrate paleontologist of the Carnegie Institute, and Dr. Lionel Steineger, head curator of biology and chief of the reptile division of the Smithsonian Institution, bestowed the name of Bufo campactilis on the toad and announced that it would be shipped back to its native heath, the gravel pit of the Red River.

The scientists explained that Bufo had in some way slipped through a fissure in the ridge and become lodged in the red clay strata. Toads have been known to live for sixteen months in this way, directly cut off from food and water, they said, but they were unable to explain how the toad managed to wrap itself up in its clay ball. Other instances of this are not unknown, however, Dr. Hay said, but he declared that the toad was certainly not existent more than two years ago.

Experts at Denver had declared the toad's earthen chamber appeared to belong to an age that would make it 750,000 years old.

Toad, Sealed in Wall 50 Years Lives When Freed in Jersey

5 MAR 1932

Special to THE NEW YORK TIMES.

BAYONNE, N. J., March 4.—Another toad, which apparently had lived for more than fifty years without food or exercise, was found here today by Daniel Boyle, a bricklayer, in a basement wall of the City Park House, an old mansion on the shore of Newark Bay. The finder, who has been engaged in tearing down the wall, said there was no way for the toad to get in or out of the space between the bricks after the wall had been built.

The toad appeared to be dead, but after fifteen minutes beside a warm fire it revived. Within two hours it had opened its eyes and was hopping around.

The building is said to be fifty or sixty years old. It was formerly a part of a large estate.