

The mummified cats of ancient Egypt.

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(With 1 figure in the text.)

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INTRODUCTION.

In 1907 the Egypt Exploration Fund, through Professor W. M. Flinders Petrie, presented to the British Museum a collection of skulls of mummified animals from Gizeh dating from approximately 600–200 B.C. and consisting of one hundred and ninety-two cats, seven mongooses, three dogs and a fox.

The cats were examined by the late Mr. Oldfield Thomas (1907), who, exhibiting an unwonted hesitancy, said: "The skulls form a wonderfully fine set, which will no doubt prove of great value when someone arises with time and taste to work out such things in detail. I never saw so fine a series before. There are one hundred and ninety-two cats' skulls*, mostly *Felis ocreata*, but no doubt some are *F. chaus*. They are, however, a wonderfully varying lot, and would require much work for every one to be certainly and exactly determined." The box containing the specimens seems then to have been put in store and forgotten, and Pocock (1951) recorded only one skull of an Egyptian mummified cat in the British Museum.

During the latter part of the nineteenth century and the first few years of the twentieth century mummified cats were dug up in very large numbers at Bubastis and other places in Egypt. They were spread upon the land as manure and also shipped abroad for the manufacture of fertilizers; the single specimen referred to by Pocock being from a consignment of nineteen tons sent to England for this purpose. It seems that this is one of those cases where an object is considered to be so common as to be unworthy of preservation in museums—until it is too late. For it appears that specimens are now scarce and that the collection under consideration is likely to be one of the largest preserved from any one locality.

VIEWS OF PREVIOUS AUTHORS.

Ehrenberg (1833) was one of the earliest authors to discuss the systematic position of these mummified cats. He described them as being intermediate

* There are now one hundred and ninety skulls in the collection: numbers B.M. 7.8.3.1–150 and 163–202.

in size between *chaus* and *catus*, and having a long snout and medium tail. He named the species *Felis bubastis*, adding that *maniculata* was also sacred and that both *bubastis* and *maniculata* were domesticated.

Blainville (1843) identified some specimens of mummy cats as *maniculata* [= *Felis libyca libyca* Forster] and others as a larger form agreeing with *bubastis*. In addition, he referred to *Felis chaus* a mummied head, which came to him through M. Desnoyers, the librarian of the Paris Museum.

Nehring (1889) examined a series of eighty-nine skulls from Beni Hasan dating from about 2000-1000 B.C. and found four or five skulls which he identified as *F. chaus* or possibly *F. serval*. The largest of these had an overall length of 144 mm., a zygomatic width of 86 mm. and a Pm⁴ of 15.8 mm. The remainder he divided into two forms, a larger one with basilar length about 85-98 mm. [condylobasal lengths approximately 96-108 mm.] and a smaller with basilar length about 70-83 mm. [condylobasal lengths approximately 79-94 mm.]. The larger he assigned to *F. caligata* [*F. libyca ocreata* Gmelin] and the smaller to *F. maniculata*. But he added that the dividing line between the two was not clear.

Lortet & Gaillard (1903), in their work on the mummified fauna of Egypt, examined a series of over fifty skulls of mummified cats from Sabl-Antar belonging to the Lyon Museum. These they divided into two forms: a larger, corresponding to the wild *F. maniculata* Cretzschmar of Tunisia [= *Felis libyca libyca* Forster] and a smaller, which they referred to as *F. maniculata* var. *domestica*, and which they compared to the modern domestic cat of Europe and Egypt. They advanced the theory that the larger form was only loosely domesticated, living amongst human habitations but finding its own food, whereas the smaller form was truly domesticated.

Lortet & Gaillard gave the following measurements (in millimetres) for the two forms (four specimens of each):

	Basilar length.	[Condylobasal length approximately.]	Pm ⁴ .
<i>F. maniculata</i>	84, 86, 87, 90	94, 96, 97, 100	11-12
<i>F. m. var. domestica</i>	78, 79, 79, 84	88, 89, 89, 94	10-11

Apart from these measurements, Lortet & Gaillard said that the larger form may be distinguished from the smaller by the different ratio of the facial length to the cranial length*. In the larger form it is over 50 per cent and in the smaller it is under 50 per cent (the two examples they gave were 54.6 per cent and 47.3 per cent respectively). The smaller ratio, they said, corresponds to that of the modern domestic cats of Europe and Egypt. These authors went on to say that in the larger Felidae the ratio facial-length/cranial-length increases, and they mentioned as an example a leopard skull from Cochin China in the Lyon Museum in which the ratio was 63.4 per cent. It seems odd, then, that Lortet & Gaillard, having made this observation, should yet regard this particular ratio as a taxonomic character of importance in itself. It would appear that this is a case of allometric growth, and that the larger ratio is simply a reflection of larger absolute size; perhaps correlated with a requirement for proportionately larger and stronger masticating arrangements. With this in mind, the series of domestic cats in the British Museum has been examined. There is much individual variation, but the largest individuals have the above ratio about 55.5 per cent and the smallest 46.1 per cent (other members of the Felidae give the following approximate results: *F. chaus* 56 per cent, *F. lynx* 60 per cent, *F. tigris* 80 per cent, *F. leo* 81 per cent).

* Their facial length is measured from the incisive alveoli to the fronto-nasal suture, and their cranial length from the fronto-nasal suture to the upper edge of the foramen magnum.

This ratio appears, therefore, to be invalid as a diagnostic feature in itself, and since, as Lortet & Gaillard themselves observe, their material is not clearly separable by absolute size, it would appear that their supposed two forms are invalid. It would seem that they were influenced by Nehring, whom they quote, and who in turn may well have been influenced by Ehrenberg. Further, it is difficult to imagine two forms of cat so indistinctly separable and both living amongst human habitations and yet maintaining genetic distinctness. On the evidence so far presented these cats must surely have formed a single breeding population.

THE SKULLS FROM GIZEH.

To turn now to the collection of one hundred and ninety skulls from Gizeh, which all appear to be adult. Three of these are clearly separable from the remainder by reason not only of the size of the skull itself but also of the size of the teeth; they appear to be *Felis chaus*. Their measurements (in millimetres) compared with modern *chaus* from Egypt are:

	Overall length.	Condylbasal length.	Zygomatic width.	Pm ¹ .
<i>Mummified cats</i>				
B.M. 7.8.3.1	144.4	129.4	90.0	17.0
B.M. 7.8.3.2	127.4	117.0	83.4	15.3
B.M. 7.8.3.3	126.5	115.8	81.3	15.4
<i>F. chaus nilotica</i>				
B.M. 97.3.12.1♂	125.6	118.3	(84.6)	16.0
B.M. 98.6.5.2♂	118.8	110.5	76.9	15.5
B.M. 19.7.7.3494♂	126.0	117.7	83.2	15.2
B.M. 09.7.1.15♂	130.9	119.8	87.0	14.9
B.M. 98.6.5.3♀*	98.4	91.3	64.9	14.3
B.M. 92.5.22.1♀	112.6	105.5	74.8	14.1
B.M. 99.7.15.1♀	113.6	106.1	74.9	14.1
B.M. 98.6.5.4♀	105.2	98.3	69.8	13.5

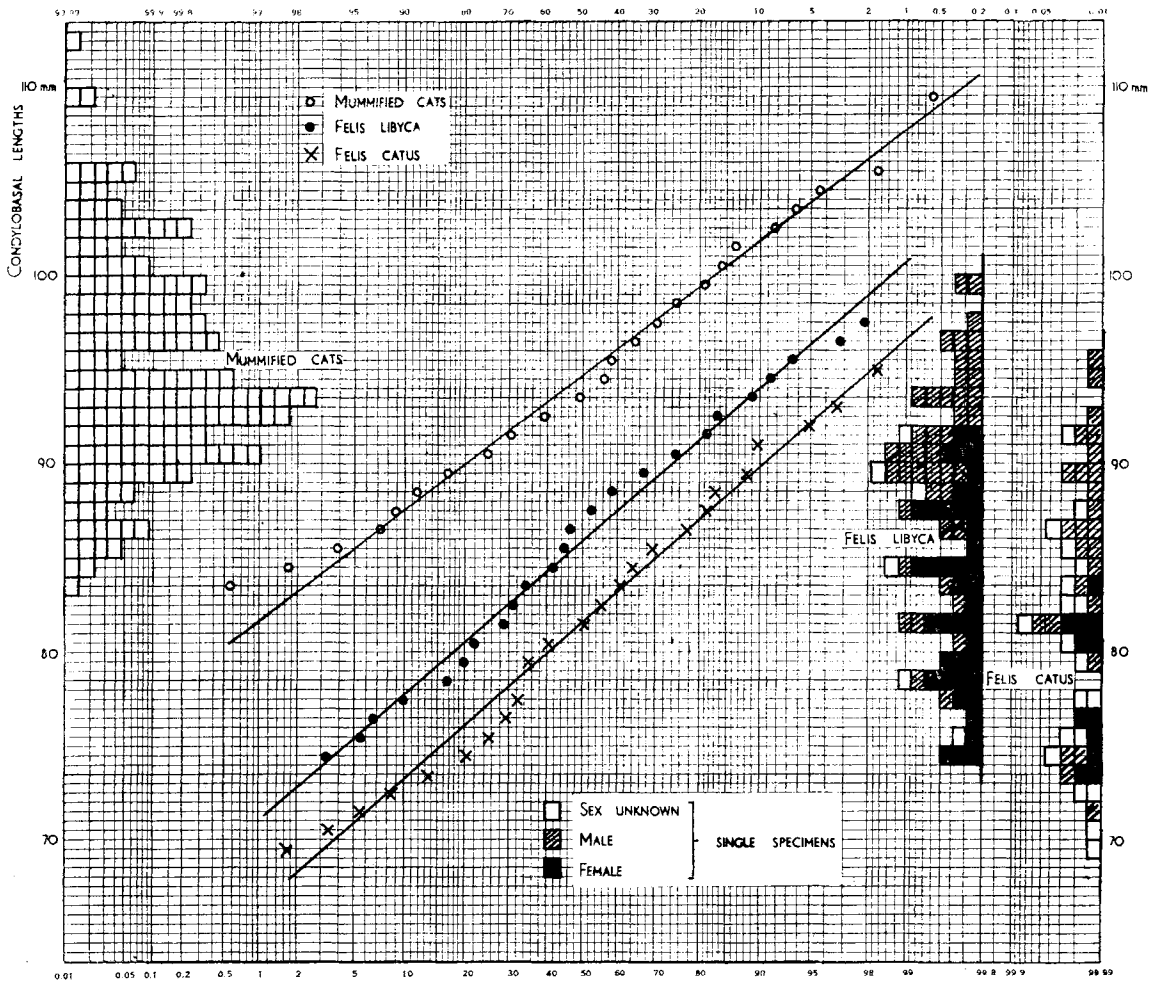
* Sub-adult.

The remainder do not appear to be separable from each other. A difficulty which presents itself at once is, of course, that the sex of the specimens is unknown. It is possible that the collection represents two distinct species, separable by size, and that the measurements of the male skulls of the smaller form overlap those of the female skulls of the larger. But if this were the case it should be possible with a series such as this to detect the fact statistically—and the figures do not yield any such result. And as suggested above, it seems improbable that two races of the same species of domesticated or semi-domesticated cat, so similar in size, should remain distinct while living together. One would certainly expect them to interbreed and that this would lead to the differences between them becoming obliterated.

Apart from *F. chaus*, which occurs relatively infrequently as a mummy and may therefore not have been domesticated at all, there seems to be no good evidence for there having been more than one species of cat domesticated and held sacred by the ancient Egyptians; this form of cat has not survived to the present day. What light do the Gizeh specimens throw on its status and probable origin?

Fig. 1 shows the distribution of the condylbasal lengths of one hundred and seventy-eight of the skulls of mummified cats from Gizeh (the whole collection of one hundred and ninety skulls appears, as mentioned above,

Figure 1.



Condylobasal lengths of the skulls of mummified cats (other than *catus*) from Gizeh, compared with those of *Felis libyca* and domestic cats (*Felis catus*). (Arithmetic probability paper.)

to be composed of adult individuals but twelve of them are imperfect), both as a histogram and as a curve drawn on arithmetic probability paper. Condylobasal lengths are similarly shown for all the available adult skulls in the British Museum of *Felis libyca* (forty-three males, forty-two females and six not sexed), and of domestic cats (*F. catus*, twenty-six males, twelve females and twenty not sexed, from different parts of the world).

Harding (1949) proposed the use of arithmetic probability paper in systematics for the analysis of polymodal frequency distributions, but this method of discriminating between different forms seems to involve certain assumptions which should only be made with considerable reserve, especially in relation to material such as these mummified skulls. However that may be, probability paper does, as he points out, provide a quick and simple method of estimating means and standard deviations of populations; that is the use to which it has been put in this case, and I am indebted not only to Dr. J. P. Harding

but also to Dr. H. W. Parker for advice on statistical treatment. The results are as follows :

	Number of specimens.	Mean condylobasal length.	Standard deviation.
<i>Mummified cats</i>	178	94.75 mm. (83-112)	5.55
<i>Felis libyca</i>	91	85.75 mm. (74-99)	6.35
<i>Felis catus</i>	58	81.60 mm. (69-95)	6.40

The difference (9.00 mm.) between the means of the condylobasal lengths of the mummified cats and the series of *F. libyca* is 11.46 times greater than the standard error of the difference between the means and is therefore significant.

It will also be seen from fig. 1 that the mummified cats are even further removed from *catus* in size, as indicated by condylobasal length. Incidentally, the difference (4.15 mm.) between the means of the condylobasal lengths of *libyca* and *catus* is 3.87 times greater than the standard error of the difference between the means and is therefore also significant.

To turn now to that other useful diagnostic character in the genus *Felis*, the length of the upper carnassial tooth, Pm⁴. The following measurements were observed, the *libyca* being made up of fifty males, fifty-four females and nine not sexed ; the *catus* of twenty-eight males, thirteen females and twenty not sexed :

	Number of specimens.	Mean length of Pm ⁴ .	Standard deviation.
<i>Mummified cats</i>	160	11.27 mm. (9.5-13.1)	0.68
<i>Felis libyca</i>	113	11.00 mm. (9.2-12.5)	0.73
<i>Felis catus</i>	61	9.85 mm. (8.4-10.9)	0.55

The difference between the means of the lengths of the Pm⁴ in the mummified cats and in the series of *libyca* is 3.10 times greater than the standard error of the difference between the means and is therefore likely to be significant, though by no means so certainly as the difference between the means of the condylobasal lengths. Though perhaps not relevant to the problem under consideration, it may be mentioned that the difference between the means of the lengths of Pm⁴ in *libyca* and *catus* is markedly significant.

Other criteria were examined in an attempt to further differentiate the mummified cats from *libyca*, and to see whether perhaps the former showed any discrimination amongst themselves, such as the proportion of zygomatic width to condylobasal length, and maxillary width to condylobasal length, but without result. These cats show considerable individual variation in the shape of the skull.

PAINTINGS OF ANCIENT EGYPTIAN CATS.

Before drawing a tentative conclusion from the above evidence what is to be learnt from the paintings and figures of cats found in Egyptian tombs ? The paintings mostly show a rather long-eared animal, ginger-coloured and with a long, dark-ringed tail. The backs of the ears in some, for example in the tomb paintings at Thebes dating from about 1500-1200 B.C. (well reproduced by Davies & Gardiner, 1936), have three or four transverse black bands. This last feature is reminiscent of the serval, which has two transverse black bands, or, to express the matter another way, has black ears with one light-coloured band. But the serval's tail is very short and, in any case, these animals do not seem to have been regularly mummified. Incidentally, two of these Thebes paintings show cats sitting under a chair, in one case (1250 B.C.) wearing a

collar and gnawing a bone, thus indicating complete domestication. Another good illustration is the painting in Tomb III at Beni Hasan (Griffith, 1900). This shows a slender, long-legged cat with a long, ringed tail and long ears, the latter with no markings. The face is long and the bridge of the nose convex. The fore legs have dark transverse bands. The animal is balanced on a papyrus stem, as is the cat which is acting as a retriever in the well-known Thebes painting, one of the ones mentioned above, called "Fowling in the marshes".

Writers on ancient Egypt seem confused about the nature of the cats depicted, as well they might be, and appear to be quoting from early authors such as the ones mentioned at the beginning of this paper, and from each other. It is truly remarkable what force opinions seem to acquire through being put into print, especially the pronouncements of nineteenth century professors. One writer (Morant, 1937) makes it yet more difficult by misquoting Lortet & Gaillard to the effect that there were two species of cat sacred to the ancient Egyptians: the commonest being a large form (*F. maniculata*) and the other being smaller and like our domestic cat (*F. chaus*)!

Mr. & Mrs. Langton (1940), in their monograph dealing with statuettes, amulets and all kinds of figures of cats in ancient Egypt, say that the animals seem to be divisible into two kinds: (1) long-eared and sharp-nosed, which they refer to *chaus* and (2) short-eared and blunt-nosed, which they call *ocreata*. The Langtons add: "Another strange happening is the variation in the length of the tail, which in nature is fairly constant, but in Egyptian art is very unequal". But *chaus* is noticeably short in the tail whereas *ocreata* [*- libyca*] is long-tailed (the ratio of tail to head-and-body is under 40 per cent in the former and over 60 per cent in the latter). So if their ascriptions are correct then there is nothing very strange in the figures reproducing this difference. It is not clear, however, on what evidence the ascription to *chaus* rests, since the tails of the figures illustrated, though somewhat variable, do not seem to include any short enough for *chaus*. This may be yet another result of the confusion mentioned above. I am indebted to my colleague Mr. I. E. S. Edwards, of the Department of Egyptian and Assyrian Antiquities, for bringing the above works to my notice.

SUMMARY.

A series of one hundred and ninety skulls of mummified cats, excavated at Gizeh, and dating from approximately 600-200 B.C., has formed the basis of an enquiry into the identity of the cats of ancient Egypt. Statistical analysis of the measurements of these skulls, and a critical examination of the available evidence, lead to the view that two forms of cat were mummified. The larger form, which is not so common as a mummy, and which may or may not have been domesticated, represents *Felis chaus*. The smaller, and by far the commoner, mummies were thought by Ehrenberg (1833) to represent two forms, one larger than the other, and Ehrenberg's view has been adopted by many subsequent authors. But the evidence does not support this view and, apart from the large *chaus*, the cats mummified by ancient Egyptians appear to represent one form only, the skulls of which agree closely with those of the wild *Felis libyca* Forster, from which it was probably derived. If this view is correct this form should be known as *Felis libyca bubastis* Ehrenberg, 1833.

From paintings and figures it seems that *bubastis*, which was certainly domesticated, was a ginger-coloured cat, with rather long ears and legs, and with a long, ringed tail.

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