A contribution to the study of mummification in Egypt : with special reference to the measures adopted during the time of the XXI dynasty for moulding the form of the body / by G. Elliot Smith.

Dr. Acland
with the
writer's kind regards

MÉMOIRES

PRÉSENTÉS A

L'INSTITUT ÉGYPTIEN

ET PUBLIÉS

SOUS LES AUSPICES

DE

S. A. ABBAS II

KHÉDIVE D'ÉGYPTE

TOME V — FASCICULE I

A CONTRIBUTION TO THE STUDY OF MUMMIFICATION IN EGYPT

WITH SPECIAL REFERENCE TO THE MEASURES
ADOPTED DURING THE TIME OF THE XXI DYNASTY FOR MOULDING THE FORM OF THE BODY

BY

G. ELLIOT SMITH

LE CAIRE
1906

Viscera from Mummies
containing Ushabtiu
figures to protect them.

Fig. 1.

A. Liver containing Amset
B. Intestines - - Horus
C. Lung - - Harpi
D. Stomach - - Anubis

— " —

B.B. same as B. Fig. 1. enlarged.

— " —

A contribution to Mummification
by
G. Elliott Smith.

—

MÉMOIRES

PRÉSENTÉS A

L'INSTITUT ÉGYPTIEN

ET PUBLIÉS

SOUS LES AUSPICES

DE

S. A. ABBAS II

KHÉDIVE D'ÉGYPTE

TOME V — FASCICULE I

A CONTRIBUTION TO THE STUDY OF MUMMIFICATION IN EGYPT

WITH SPECIAL REFERENCE TO THE MEASURES

ADOPTED DURING THE TIME OF THE XXI DYNASTY FOR MOULDING THE FORM OF THE BODY

BY

G. ELLIOT SMITH

LE CAIRE
1906

LE CAIRE, IMPRIMERIE NATIONALE

A CONTRIBUTION

TO THE

STUDY OF MUMMIFICATION IN EGYPT

WITH SPECIAL REFERENCE TO THE MEASURES ADOPTED DURING THE TIME OF THE 21st DYNASTY FOR MOULDING THE FORM OF THE BODY

BY

G. ELLIOT SMITH

When we consider how much of our information concerning the ancient Egyptians has been derived from the study of tombs, and recall the vast numbers of graves that have been opened within recent years it is very suprising to find that so little accurate knowledge has been gained concerning the treatment of the body itself, which is presumably the chief object in the tomb and the raison d'etre of all the furniture and pictorial art.

Nevertheless it is a fact that since Pettigrew,[1] seventy two years ago, published his remarkable monograph, which is a very complete record of all the facts relating to Egyptian mummies ascertained or perhaps, considering the state of knowledge, ascertainable, at that time, not only has very little been added to our store of information on this subject, but most writers have forgotten or neglected the solid foundation of established facts which he so laboriously gathered together. In making this statement I am not unmindful of the vast amount that has been written during the last seventy years upon the subject of mummies and the ancient practice of embalming: but it is no exaggeration to state that in almost every case modern writers who have given us a small scrap of new information have at the same

[1] THOMAS JOSEPH PETTIGREW, F.R.S., *A History of Egyptian Mummies, and an Account of the Worship and Embalming of the Sacred Animals by the Egyptians; with Remarks on the funeral Ceremonies of Different Nations, etc.* London, 1834.

time added far more that is inaccurate and misleading; so that the errors of observation and inference utterly obscure the few new facts.

We have no definite information as to the time when the practice of mummification was first attempted: nor is there much chance of ever being able to speak decisively on this subject. For it is only natural to suppose that the earliest attempts at the artificial preservation of the body would yield crude and imperfect results, which would be the least likely to persist and give us the information we need.

We can assert without any fear of reasonable contradiction that there is no evidence whatever to suggest the idea that the excellent state of preservation of many bodies buried during the earlier part of the Ancient Empire and in predynastic times is anything else than the result of the action of natural agencies unaided by art. Nor have we any *certain* evidence that any attempts were made at any period of the Ancient Empire to resist by artificial means the natural decay of the body. I am well aware that there is a well preserved body in the Cairo Museum said to be the "Momie du roi Mihtimsaouf — Métésonphis 1er, fils de Papi 1er découverte à Sakkarah dans sa pyramide (VIe dynastie)"[1]; but no definite reasons have yet been given for regarding this body as a mummy or for excluding the possibility that it may not have been put in the pyramid at a much later time than that assigned to it. Until such information is forthcoming concerning this specimen and other supposed early mummies mentioned in the catalogue of the British Museum their value as evidence must be ignored.

With reference to the body (now in the Cairo Museum) found in a 5th dynasty coffin at Deshasheh by Professor Flinders Petrie,

[1] G. Maspero, *"Guide du Visiteur au Musée du Caire,"* 1902, p. 397.

M. Maspero remarks :—"La momie paraît avoir été desséchée plutôt qu'embaumée" [1]

Apart from these doubtful examples of embalming all the real mummies in the Cairo Museum belong to the period included between the latter part of the 17th dynasty and the beginning of the 6th century of the Christian era.

During this period of almost two thousand years the mode of embalming underwent very considerable changes. In the 18th, 19th and 20th dynasties the methods adopted aimed solely at the preservation of the tissues of the body itself; and this was accomplished with a success that can only have been the result of long ages of experiment. At the beginning of the 21st, or possibly in the last years of the 20th, dynasty the embalmers introduced an entirely new practice, to the study of which this memoir will be mainly devoted. This new practice was an attempt to restore to the shrunken and distorted body the form which it had in great part lost during the early stages of the embalming process: this was done by packing under the skin linen, sawdust, earth, sand and various other materials to be mentioned later. At a later period the embalmers abandoned this extraordinary practice and devoted there chief attention to simulating the form by means of the wrappings rather than by stuffing the body itself: then we find a rapid deterioration in the manner of preservation of the body and at the same time a great elaboration in the art of bandaging. This reached its height in Ptolemaic times. In the later (Roman) period the extensive use of bitumen as a preservative led to the rapid degeneration of the art; and in Christian times when the use of pitch was discarded the embalmers returned to the use of common salt, which may possibly have been the earliest means employed for the preservation of the body.

[1] MASPERO, *op. cit.*, p. 397.

At the period called by Egyptologists the "New Empire"—from the 17th to the 20th dynasties inclusive—it was customary to remove the viscera from the body and place them after treatment with preservative materials in four vessels commonly known at present as "Canopic Jars." This we know from the examination of the bodies and the contents of the Jars. So far as is known these Jars were never used for any purpose other than the reception of the viscera. Hence the fact that Canopic Jars containing linen parcels which are said to enclose viscera [1] have been found in tombs of the 11th and 12th dynasties seems to point to the conclusion that the organs were removed from the body cavity at this period, presumably with the view of preserving both the body and the parts removed ; or, at any rate, of hindering the processes of putrefaction by removing those parts of the body which experience had shown to be most prone to decompose. M. Maspero permitted me to examine the contents of some of the Canopic Jars of this period in the Cairo Museum. On removing the linen wrappings I found a dirty resinous mass. Dr. Schmidt was unable to recognise anything in this mass other than resin such as was employed in the new Empire for the preservation of the body. The presence of such resin would be inexplicable if we do not admit that the viscera were originally contained in the parcels.

The excavations conducted by M. de Morgan at Dashûr in 1894 brought to light a series of royal tombs of the 12th dynasty containing human remains and some of the series of Canopic Jars now in the Cairo Museum. Dr. Fouquet furnished a report on these human remains which was published along with the archaeological record of the excavations.[2] M. Maspero has recently

[1] George Reisner, "*The Dated Canopic Jars in the Gizeh Museum*, Auszug aus der Zeitschrift für Agyptische Sprache, XXXVIII, Band, p. 3.

[2] J. De Morgan, *Fouilles à Dahchour*, Vienna, 1895.

presented to the School of Medicine seven crania, which are said to have come from M. de Morgan's excavations. If these crania really belong to members of the royal family, who are more likely than mere commoners to have been embalmed, they should be of decisive value in settling the problem whether or not mummification was practised in the Middle Empire. One of the seven crania can be at once excluded because it has been treated by the crude bitumen-process, which is distinctive of the Graeco-Roman period. The cranial cavity is filled with pitch which has been introduced via the nose through a perforation in the ethmoid bone: and the surface of the head is coated with layers of cloth soaked in bitumen.

One of the others cannot be identified with any of those mentioned by M. de Morgan.

The other five are labelled with the names of "King Hor," "Princess Noub-Hotep," "Princess Ita," "Princess Khnoumit" and "Princess Ita-ourt."

In his "*Note sur les Crânes de Dahchour*" accompanying M. de Morgan's work, to which I have already referred, Dr. Fouquet gives a description of the first two of these five named crania and of four others which I have not seen.

In the time of the new Empire and afterwards until the Roman period it was customary for embalmers to break through the roof of the nose, where this is formed by the ethmoid bone (Pl. I, figures 1, 2 and 3), and remove the brain through the aperture thus made. If we could adduce evidence of such a practice in the Middle Empire it would settle once for all the question whether embalming were practised at that time. In describing one of his six specimens M. Fouquet makes the remarkable statement:— "L'ethmoïde a été détruit par les embaumeurs comme dans tous les autres crânes de cette série" (p. 150), although I have found this bone perfectly intact and unbroken in the cranium of King

Hor, who is the first of his series. Although M. Fouquet gives somewhat detailed account of the nasal cavity of King Hor (p.149) he does not make any reference to any break in the roof or in fact in any part of the nose.

In the case of the Princess Noub Hotep the ethmoid is certainly broken, but as the skull is damaged we cannot attach much importance to the fact that such a fragile bone as the ethmoid is not intact, especially when there is no sign of the break having been intentional, no rounding of its edges and no trace of any material having been pushed through the nose into the cranium.

The ethmoid and in fact the whole nasal skeleton is perfectly intact in the crania of Itaourt and Khnoumit. In the cranium of Ita the ethmoid is broken, but as in the case of Noub Hotep there is no reason for believing that it is due to any procedure for embalming purposes.

Of the seven crania in this collection one, certainly belonging to the Graeco-Roman period, has had its ethmoid deliberately broken through for the purpose of removing the brain and filling the cranium with bitumen: of the other six, four have the ethmoid perfectly intact and in the other two it is broken. It is unlikely that the embalmers should have broken into the cranium in two cases and not attempted to do so in the other members of the same series.

In the cranium of King Hor the nasal septum and the sphenoid bone were broken (when the specimen came into my possession) leaving a free passage into the cranium. This, however, seems to have been done after M. Fouquet examined the cranium, because he describes the septum and does not refer to any opening in the sphenoid.

From the cranial cavity I obtained seven flakes (each about 1 cm. in diameter) of a shining mud-coloured material, which proved to be resin closely resembling that obtained from the Canopic Jars

of the Middle Empire (*vide supra*). This discovery seemed to be of such importance that I opened the cranium to examine the interior. A thin layer of brownish material lined the cranial walls but on examination it was proved to be non-resinous—in all probability it was the dried remains of the brain. There was no evidence to suggest that the flakes of resinous matter were put into the cranium during the process of embalming. The probable explanation is that resinous matter placed in or around the nasal fossa had fallen into the cranium when the sphenoid was accidentally broken. For it seems highly improbable that the resinous matter could have got into the cranial cavity unless it were placed on the mummy itself.

So far as it goes this evidence seems to point to the conclusion that the surface of the body and perhaps the nose and mouth were covered with a resinous paste but no attempt was made to open the cranium. In twelve crania of upper class people of the 11th or 12th dynasty obtained by Mr. John Garstang near Beni Hasan the ethmoid was invariably intact.

In his description of the remains of the Princess Ita M. de Morgan states that "les chairs sont comme une sorte de résine brunâtre."[1] He states further that the "momie de la princesse Khnoumit" was "recouverte d'un enduit de bitume" (p. 55)—probably not bitumen but resin.

The evidence as a whole seems to point distinctly to the practice of embalming as early as the 12th dynasty: but there is no valid reason for believing that any attempt was made to remove the brain in the Middle Empire.

In the work already quoted Dr. Reisner says that "the earliest indication of the use of jars for preserving the entrails of the mummy is the chest for Canopic Jars found by Maspero in the pyramid of *Mr-n-r'-Pepy* at Saqqarah in 1881" (*op. cit.*,p.1).

[1] J. DE MORGAN, *Fouilles à Dahchour en 1894-1895*, Vienna 1903, p. 50.

Dr. Reisner has recently told me that Canopic Jars have been obtained from tombs of the 5th and 6th dynastic periods, but they are always clean and empty. Although these vessels thus show no signs of ever having contained viscera the fact that Canopic Jars are never known to have been used for any other purpose renders it probable that these early jars were intended to receive the organs removed from the body. If the organs were taken out of the body the most likely reason for such a procedure would be the attempt to prevent corruption. Thus the slight balance of evidence—indefinite and wholly inconclusive though it be—is in favour of some attempt at mummification or artificial preservation of the body as early as the 5th dynasty.

The examination of mummies of the New Empire reveals the fact that during the processes of mummification as practised at that time the soft tissues of the body (excepting the skin which was exposed to the action of the preservative agent) became converted into a loose spongy material which was much too soft and too small in amount to keep the skin distended: as the result the limbs became reduced to little else than bones with an ill-fitting wrapping of deeply wrinkled skin. This happened not only in emaciated persons but to an even greater extent in individuals whose bodies were plump and muscular (Pl. VIII, figure 1).

In the 21st dynasty the embalmers endeavoured to remedy this defect by stuffing various materials—pieces of linen, sawdust, sand, earth and other substances—under the skin so as to distend it and mould the form of the body. The great prevalence of plundering and the frequent rewrappings of mummies of the preceding dynasties that are known to have taken place in the reign of the priest-kings may have brought home to the embalmers in a manner not so fully appreciated before the imperfection of the results (so far as the retention of the form of the body is concerned) obtained by their fellow craftsmen of the 18th, 19th

and 20th dynasties. On the other hand it may have been merely the result of a gradual evolution of technique: the appreciation of the improved appearance of the face in mummies (of the 19th and 20th dynasties) whose cheeks had been stuffed with linen may have naturally suggested the attempt to deal in an analogous manner with the rest of the body.

Or again it may have been an innovation deliberately introduced to combine in one object the corruptible body and the *Ka*-statue which both separately represented the deceased in earlier tombs.

In a memoir presented to the *Institut* ten years ago Dr. Fouquet for the first time called attention to the stuffing of mummies in the following words:—"Le cou, les bras, les jambes sont bourrés de la même composition (limon, tantôt sans mélange, tantôt mêlée à des débris de linge et à des poudres aromatiques) que le ventre, mais on n'y trouve jamais de débris végétaux[1]". Dr. Fouquet's investigations were made on the same material which I have made the subject of the present communication; but since his work was accomplished the mummies have been transferred by M. Maspero, Director General of the Service des Antiquités to the Anatomical Museum of the Cairo School of Medicine; and, as the result, I have had much greater freedom in examining the specimens than Dr. Fouquet could have enjoyed. Apart from the mere fact that the limbs were packed with foreign material there is little in the report of M. Fouquet (or the two experts—chemical and medico-legal— who advised him) with which I can agree.

I can find no evidence whatever to justify the statements that the muscles of the limbs and back were ever extracted as M. Fouquet describes (*op. cit.*, pp. 93 and 94); nor is there any "*ablation des yeux*" (p. 94). Nor is it correct to say that the packing of the

[1] Dr. Fouquet, "*Note pour servir à l'histoire de l'embaumement en Egypte,*" Bulletin de l'Institut Égyptien, Troisième Sèrie—N° 7 Année 1896, 1897, p. 93.

back is most often wanting (p. 94) seeing that I have found it in 40 cases out of 42 mummies examined. The statement on p.94 : "tout ce qui ne devait pas être apparent était systématiquement négligé par les embaumeurs" is altogether misleading, for the process of packing was in most cases most carefully performed in every region of the body, irrespective of its situation. M. Fouquet's further remarks concerning his inability to detect the openings for introducing the packing accords as ill with his statement :— "J'en ai toujours trouvé une à chaque bras et à chaque avant-bras, une pour chaque cuisse et pour chaque jambe" (p. 93), as both expressions of opinion fail to receive confirmation from the photographs illustrating the present contribution.

The statements attributed to Professor Lacassagne are even more misleading. "Quelques-uns de ces tissus et les linges qui les touchaient, ont pu fournir, au professeur Lacassagne à qui je les ai envoyés à Lyon, la réaction de l'hémoglobine caractéristique des tâches de sang" (*op. cit.*, p. 93). No one has a wider knowledge of all the most modern tests, chemical and biological, for blood stains nor a better acquaintance with these methods in medico-legal practice than my colleague, Professor W. A. Schmidt, of the Cairo School of Medicine. Dr. Schmidt has examined large numbers of pieces of stained cloth and pieces of highly vascular tissues from a large series of mummies: he tells me that he has been utterly unable to recognise the presence of haemoglobin, although the tests in use now are immeasurably more delicate and sure than those in use ten years ago. All the reddish stains on linen were found to be due to resin.

"Un fragment de peau d'une autre momie a permis à l'éminent médecin légiste d'affirmer que la mort du sujet avait été causée par l'immersion et que le cadavre avait dû séjourner plus de quinze jours dans l'eau" (*op. cit.*, p. 93).

How did M. Lacassagne recognise from a piece of skin the

cause of death in the case of a body which we know to have been put into a salt bath for embalming purposes soon after death and left there for several weeks ?

I do not think that we can be content to accept M. Fouquet's account as in any way final.

Three years ago M. Maspero unrolled four mummies of the 21st dynastic period in the Cairo Museum ; and entrusted the tasks of writing the archaeological and anatomical reports respectively to M. Daressy and myself [1].

In ignorance of M. Fouquet's work I described the packing of the legs and the breasts of two women with pebbly sand and linen respectively without being able to find any previous record of such a procedure.

In July, 1905, with the help of Mr. A. C. Mace (of the Hearst Egyptological Expedition of the University of California) I undertook the detailed study of the mode of wrapping and the treatment of the body in the case of the mummy of a Priestess of Ammon, named *Ta-usert-em-suten-pa*, which M. Maspero kindly placed at our disposal. In the course of this examination we discovered that the stuffing of the various parts of the body was much more extensive and the process of packing much more elaborate than either M. Fouquet or I had supposed. I therefore undertook a fuller investigation of forty four mummies of the 21st dynasty which M. Maspero had presented to me for the School of Medicine three years ago. It is the results of this examination that I propose to set forth in this memoir.

Practically all of the material came from the great find of Priests and Priestesses of Ammon made by M. Grébaut at Dêr el Bahari in 1891.

[1] M. Georges Daressy, *Ouverture des Momies provenant de la seconde trouvaille de Deir-el-Bahari.*

G. Elliot Smith, *Report on the Four Mummies,* Annales du Service des Antiquités de l'Egypte, 1903, p. 15.

In certain parts of this investigation I have received invaluable help from Dr. W. A. Schmidt, Professor of Chemistry in the School of Medicine and Mr. A. Lucas, the Director of the Chemical Laboratory of the Survey Department. Dr. Douglas E. Derry, my Colleague in the Anatomical Department at the Cairo School of Medicine, has constantly assisted me in the anatomical work.

The Treatment of the Brain and the Cranial Cavity.

Herodotus has given us an account of the different modes of embalming practised in Egypt, presumably in the fifth century before the Christian era. The Greek original and Laurent's translation into English have been given in full by Pettigrew,[1] from whose work I have derived all the references to the Greek classics in the following account. Herodotus states that "in the first place with a crooked piece of iron they pull out the brain by the nostrils; a part of it they extract in this manner, the rest by means of pouring in certain drugs" (*op. cit.*, p. 46). Pettigrew says that Greenhill, in his "Art of embalming," p. 249, speaks of the extraction of the brain through the nostrils as an amusing story of a thing "impracticable and amusing" (*op. cit.*, p. 52, 5th footnote). Pettigrew himself was "at first tempted to conceive that it was not possible to empty the skull of its contents by these means," but the examination of several specimens convinced him that it had certainly been accomplished. "It would appear that the crotchets (two of which, made of bronze, Pettigrew represents in his Plate IV) had been introduced up the nostrils, made to perforate the ethmoid bone at the upper part of the nostrils and then by a circular rotatory movement to break down the cribriform plate of that bone, × × × [through the opening thus made] the

[1] Thomas Joseph Pettigrew, A History of Egyptian Mummies, London, 1834, pp. 44, 45 and 46.

brain and its membranes could be extracted and any fluid injected into the skull that might be necessary to cleanse that cavity" (p.53). He then proceeds to give an accurate account of the materials found in the cranium, which may be quite empty in some cases, in other cases filled with cloth, resin, pitch, spices in a state of coarse powder or even the remains of the brain itself.

In one of the Rhind papyri which has been translated into German by Heinrich Brugsch we find an account of this packing of the cranium written by an Egyptian in Ptolemaic times:— "Anubis als Kolchyt füllt deinen Kopf mit syrischem Salze, Spezereien, Ur, Cedern, Pech und Fett von einer [ ] Gans." [1]

The examination of the large series of mummies in the School of Medicine clearly demonstrates the manner in which the head was treated. If a vertical mesial sagittal section be made through the head of a mummy of the 21st dynasty a resin-smeared track will be found (Pl. I, figures 1 and 3) leading up through the nostril to the roof of the nasal cavity, which is formed by the ethmoid bone. This will be found broken through so that there is a free opening into the brain cavity (through which a probe has been passed in figures 1 and 3, Pl. I). In figure 2 (Pl. I.) the front part of the floor of the cranium has been exposed by removing the roof of the skull: the ovoid opening of the nasal fossa is seen and a resin-smeared surface leading from it toward the back of the head.

In most cases no trace of the brain or its membranes is found (Pl. I, figure 1): in other instances the whole of the dura mater and part of the brain itself may still be present (Pl. I, figure 3). In most of the crania examined there was a small quantity of resin and strips of linen (figure 1) but in other cases the whole cranial cavity was completely filled with the resin and linen. In some cases

[1] *A. Henry Rhind's "Zwei Bilingue Papyri, hieratisch und demotisch"* uebersetzt und herausgegeben DR. HEINRICH BRUGSCH, Leipsig 1865, Pl. V, p. 4.

again there was no linen. I have found a like variabitity in the packing material of the crania of the royal mummies of the New Empire.

In mummies of the Graeco Roman period the cranium is often filled with pitch.

The Treatment of the Body Cavity.

Herodotus has told us that after the brain had been removed, an incision was made in the flank with a sharp Egyptian stone and through the opening the body cavity was emptied of its contents, then cleansed and rinsed with palm-wine, scoured out again with pounded aromatics, and the belly having been filled with pure myrrh, cinnamon and all other perfumes except frankincense, the opening was sewn up again. According to Herodotus it was customary "to steep the body in natrum, keeping it covered seventy days" *after* it was packed with the aromatic substances; but Pettigrew has clearly demonstrated the improbability of this order of procedure and shown that the body was soaked in the "natrum" first and packed afterward. Diodorus Siculus mentions that the embalming incision was made in the left flank and the examination of mummies in modern times has demonstrated the accuracy of his account in respect of this matter.

The embalming incision usually consists of a large vertical fusiform gaping wound in the left lumbar region extending from the iliac crest, about 2 or 3 cm. behind the anterior superior spine, to the costal margin. It may be further forward or extend further down in front of the iliac spine. In one case (Pl. XV, figure 1) I have seen it in the front of the body (in the umbilical region) and in two children it was placed obliquely above and parallel to Poupart's ligament.

As a rule no attempt has been made to close the wound, which

is then covered over by a plate, usually of wax but sometimes of bronze, bearing the conventional design of the eye or *Uta* (Pl. XIX, figure 3). In Plate X figure 1 the lower half of a wax plate is shown in situ. Great variety is shown in the quality of the wax and the care with which the pattern is wrought upon it. In some cases the gaping wound is not protected by a plate of any sort ; and in two cases the edges were brought together and kept in position by a running ligature (Pl. XV, figure 1).

When the incision was made the body cavity was opened and the intestines, liver, spleen, kidneys, stomach and pelvic viscera completely removed along with most of the vessels : the diaphragm was then opened and the lungs removed, the bronchi or in other cases the lower end of the trachea being cut through to free the lungs. *In all cases the heart is left in the thorax attached to the great blood vessels* (vide Pl. IV and Pl. XIV, figure 3). This striking confirmation of the statement of Diodorus, has not, so far as I am aware, been recognised hitherto : on the other hand I have never seen the kidneys left in position as the same writer has affirmed. In some cases the bladder has been left in the pelvis. In most cases only the arch and a small part of the rest of the aorta are left ; but in one case I have seen the whole aorta and iliac arteries persisting. The heart is never left exactly in its normal position. In most cases it has been pushed upward into the upper part of the right side of the thorax : in other cases it is left in the middle line in front of the vertebral column : and in other cases again it is found in the left side of the chest. When it is remembered that all the manipulations of the contents of the body were done through the wound in the left flank it is easy to understand these displacements.

When the viscera had been removed both the body itself and the organs taken from it must have been put into a saline bath, such as Herodotus has described. The various tissues of the body

contain saline material and the skin shows unmistakable signs of having been macerated until the cuticle (together with all the hair, except that of the head) had peeled off. Much speculation has been made as to the nature of the bath, which many writers assume to have been "natron" or soda. Professor W. A. Schmidt has examined the tissues taken from various mummies, not only of the 21st dynastic period but of various other epochs, and has found that both the skin and the other parts of the body give an acid reaction, which he has shown to be due to the presence of fatty acids derived from the disorganisation of the body-tissues. If any natron (carbonate of soda) whatever had been added to the animal tissues it would have more than neutralised this small quantity of organic acid. But if the preservative action had been exercised by means of common salt (chloride of sodium), which Dr. Schmidt finds in all the tissues, such neutralisation would not have occurred. In mummies of the early Christian Period from Akhmîm that are now in the Anatomical Museum of the School of Medicine, Dr. Schmidt has found large quantities of chloride of sodium and in the case of other specimens of the 5th century A.D. obtained at Naga ed dêr by the Hearst Egyptological Expedition Mr. Lucas has found that the preservative material is chloride of sodium. On the other hand Mr. Lucas has found that the separated epidermis obtained from some of the royal mummies of the 19th dynasty was packed with crude natron. There can, however, be no doubt that the body and the viscera were primarily treated (in all periods when mummification was practised) by being immersed for some weeks—whether 40 or 70 days it is not possible to say—in a bath of chloride of sodium. The Rhind Papyrus mentions 36 days for the "soda" bath and 70 days for the whole process of embalming (*vide infra*).

Before the body was put into this solution each nail of both the hands and feet was carefully secured by a piece of string

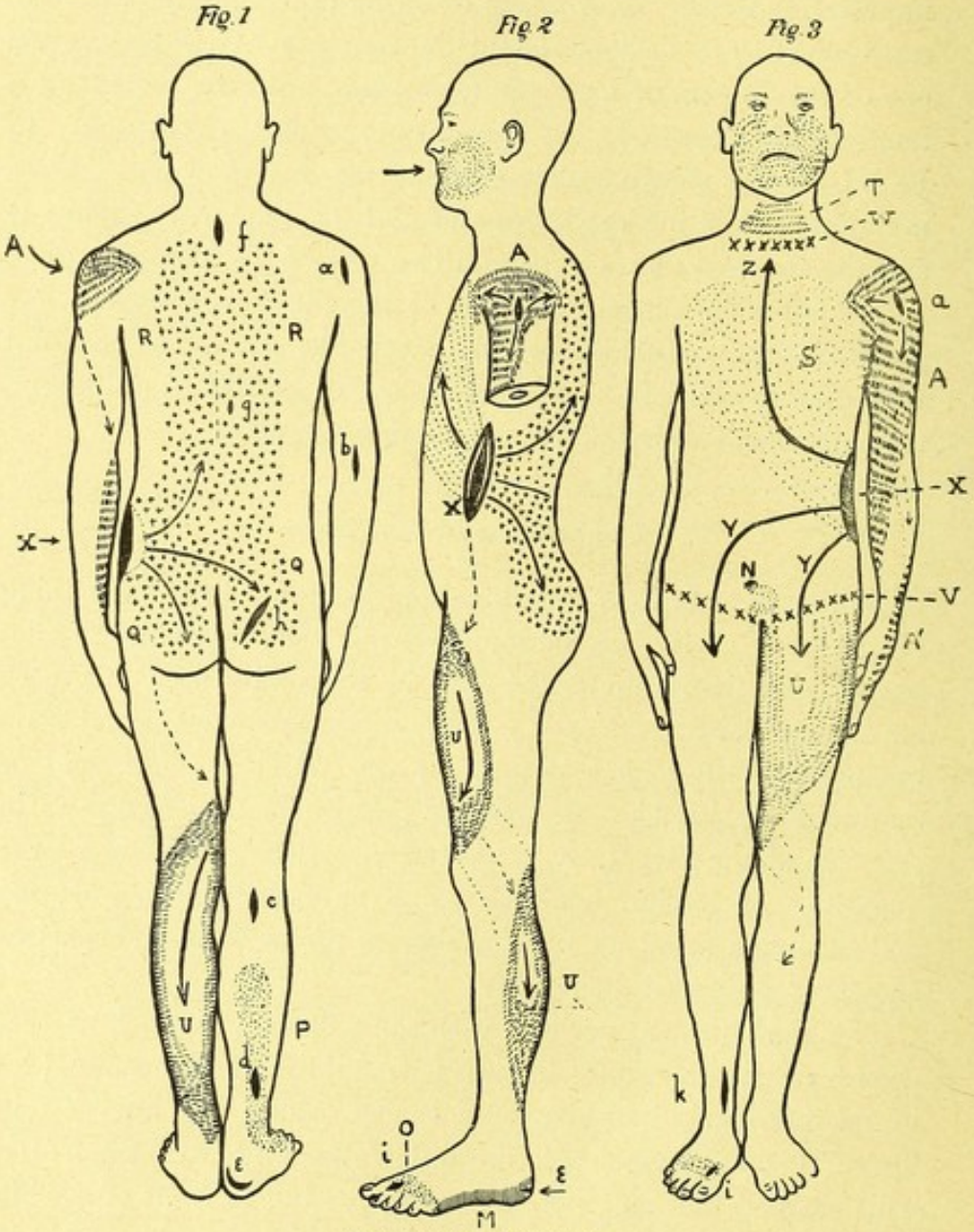
wound in a circular manner round the finger or toe, so that when the epidermis peels off it may not carry the nails with it. The impressions left by these pieces of string are visible in almost all cases, and it often happens that the string is left in position on one or two fingers or toes. In most cases, however, the string is removed after the body has been taken out of the salt-tank. In Pl. XI there is shown a photograph of the fingers of one of these mummies exhibiting the impressions left by the string (figure 4) and the string is shown in situ on two toes of the foot in figure 5. In the latter the sharply cut edge of the cuticle is visible on the great toe, the epidermis forming a thimble, which has been cut with a knife and left in position to avoid the risk of pulling off the nail when the rest of the epidermis peels off.

The packing of the limbs.

While the body is in the saline solution the skin and the lining of the body cavity become toughened by the action of the salt; but the soft tissues under the skin in the limbs, back and neck are not exposed to the action of the preservative agent and soon become reduced to a soft pulpy mass, which is of a fluid or semifluid consistency. It was the practice of the embalmers in the time of the 21st dynasty to stuff into this pulpy mass large quantities of foreign materials so as to restore to the collapsed and shrunken members some semblance of the form and consistency they possessed during life.

The hand (armed perhaps with some instrument such as that used for removing the brain) was passed through the opening (X) in the left flank into the body cavity (along the lines Y Y in figure 3) and a channel was forced downward into each thigh (U). This channel was an extensive cavity passing in front of the hip bone (os innominatum) and thigh bone (femur) and bounded in

front by the skin of the thigh (Pl.VIII, figure 2. Pl. IV, figure 3, B). In all cases the cavity so made extended as far as the



FIGURES 1, 2 AND 3.

DIAGRAMS TO ILLUSTRATE THE MANNER IN WHICH THE BODY WAS PACKED.

knee and as a rule much lower still: it wound round the inner side of the leg to the back of the knee (popliteal space) thence to the calf and not infrequently almost as far as the ankle. Both legs were tunnelled in this way by the operator working with his hand and arm passed into the leg through the body cavity from the left flank. A channel was also made in a similar manner in the neck as far up as the level of the chin, the arm being passed into the body through the flank wound X and up through the body along the line Z (figure 3); the cavity so formed was limited posteriorly by the cervical vertebrae and the muscles attached to it and in front by the skin of the neck (Pl. X, figures 3 and 4). The trachea, oesophagus and blood vessels were pushed aside—usually to the right, because the manipulations were conducted from the left—and in most cases the larynx was pushed right up behind the hyoid bone near the back of the mouth.

When this was done the body was probably turned upside down so that the head would be downward and mud in a semi-fluid state was introduced into the cervical cavity (Figure 3, T, also Pl. IV, figure 3) through the thorax. The thoracic inlet was then tightly packed with a mass of linen (Figure 3, W, also Pl. IV, figure 1, K and figure 2) so that when the body was placed again in the vertical position the mud-packing in the neck would be retained in its position. Mud is not the material always employed for the stuffing of the neck. In some cases the whole cavity was filled with linen bandages, in other cases with pebbly sand (Pl. X, figure 4) in others again with a mixture of mud and vegetable powder (sawdust) or a mixture of soda and butter (Pl. XIII, figures 1 and 2).

With the body placed head uppermost in the vertical position the legs were stuffed with mud or sand, and when the cavities formed in these limbs had been filled large linen plugs were inserted at the situations of Poupart's ligaments (Figure 3, V)

to retain the packing in position. I have never found any material other than mud or sand used for packing the thighs, although small quantities of sawdust may be mixed with the earthy packing. When the neck and legs had been packed in the manner just described the body cavity could then, in most cases, be packed. It occasionally happened, however, that the embalmer, his hand placed in the body cavity, separated (probably with a knife) the muscular tissue from the abdominal margin of the thoracic wall and through the opening thus made forced pieces of linen or pebbly sand between the skin and the chest wall. I have observed this only in the cases of two female mummies in which the breasts (mammae) were packed in this manner (Pl. VIII, figure 1). The stuffing was in other cases done in an entirely different manner to be presently described. The thighs were invariably packed by the route described above, that is, from the abdominal cavity ; and in most cases the calves of the leg were moulded by pushing material downward from the thighs (figures 1 and 2). But occasionally other means are adopted for the treatment of the lower part of the leg. In some cases an incision had been made behind the knee (figure 1, *C*, also Pl. V, figure 2 4 and Pl. VI, figure 2) and masses of linen (or, in other cases, mud) had been pushed downward toward the ankle and also upward toward the thigh. It sometimes happens that the packing material pushed up from the knee occupies a different muscular compartment to that packed from above and the two separate masses overlap. In other cases incisions are made lower down : sometimes on the posterior aspect either just above the ankle (figure 1, *d*) or midway between ankle and knee, at other times on the inner side of the ankle (figure 3, *k* and Pl. XI, figure 1). From these openings not only was the calf of the leg distended but also the dorsum of the foot, the instep (see figure 1, *P*), the region around the heel and even the sole of the foot. In two cases I have seen crescentic

incisions made around the heels at the junction of the plantar with the posterior surface (figure 1, *E* ; Pl. XI, figure 3) : in another case a small incision was made on the inner aspect of each heel alongside the tendo Achilles. In addition to these openings a deep cleft was almost invariably made between the great and second toes (figures 1 and 2, *i* and Pl. XI, figure 2) and from it the sole and in some cases the phalangeal region of the dorsum pedis were stuffed with linen or mud (figure 2, *O*).

The treatment of these various wounds varied considerably. As a rule they are merely smeared with a resinous paste either with or without the previous apposition of their edges ; in other cases the openings are closed by a running suture of hempen string (Pl. XI, figure 1 and Pl. VI, figure 2) ; and in some cases oblong strips of linen are placed over the wounds and fixed by means of a resinous paste. In one case a large ulcer on the dorsum of the foot had been stuffed with butter such as is often found in the mouth.

The Packing of the Arms.

The arms were almost invariably packed through an opening which was made in the neighbourhood of the shoulder. (figures 1, 2 and 3, *a*). It may be at the top, alongside the acromion process ; it may be lower down and as far back as the posterior border of the deltoid or as far forward as its anterior border, or even as far as the mid-point of the clavicle ; or it may be lower still near the insertion of the deltoid. Its size, shape and direction are as variable as its position : it may be gaping or closed, stitched, merely smeared with resinous paste, covered with a patch of linen or plugged with a linen pad (Pl. XII, Pl. IV Pl. XIII).

In most cases the arm and forearm (as far as the neighbourhood of the wrist), the pectoral region, the axilla and a small area of

the side of the chest and part of the back between the scapula and the upper dorsal spines are stuffed through this opening. The packing material may be linen (Pl. XIII, figure 1), mud, (Pl.IV) sand, sawdust or a mixture of any two or all of these substances.

In some cases—though this is very rare—a second incision was made either behind or to the inner side of the elbow and from this the forearm was packed (figure 1, *b* and Pl. V, figure 1, *3* and Pl. VI, figure 3).

It often happens that the forearms are not stuffed at all and in three cases in which all other parts of the body were packed no attempt had been made to treat the arms (Pl. VIII, figure 1). In only one case have I seen any packing in the hands (figure 3, *A*). In this instance sawdust had been packed from the shoulder-aperture not only into the flexor but also into the extensor aspect of the forearm beyond the wrist as far as the distal extremities of the metacarpal bones of the middle and ring fingers.

The Packing of the Back.

The stuffing of the back is almost as often practised as the packing of the thighs and more often than that of the arms. It may be accomplished in a variety of ways. The more usual method of performing this operation is as follows:—the skin is separated from the muscular wall of the abdomen in the posterior lip of the embalming wound in the left flank (Pl. X, figure 1, *B*.) and a broad channel is then made upward toward the space between the shoulders and downward into each buttock (figures 1 and 2, *R Q* and Pl. VII, figure 2 and Pl. IX figure 4); into this space mud is then stuffed, in most cases in very large quantities (Pl. X, figure 2). Sometimes this packing is restricted to the loins and buttocks, but at other times it extends as high as the shoulders. Sometimes the buttocks are stuffed in other ways:

in three cases I have seen a pair of vertical or oblique incisions—one in each buttock (Pl. V, figure 1, *2*) through which the packing was done ; in most cases, even when the material is introduced partly from the lumbar and gluteal incisions just referred to, part of the mud or linen was introduced from the perineal wound that was made when the pelvic viscera were removed from the body cavity. Other channels are in some cases made directly from the pelvis through the great sciatic notches.

In one case the upper part of the back was packed through a vertical mesial incision (figure 1, *f*) over the second and third dorsal spines (Pl. V, figure 1 and Pl. VI, figure 1). In another case this region was packed with linen introduced at the arm-incision in front of the shoulder and pushed backward between the scapula and the chest wall (Pl. IX, figure 3). In yet another case a small puncture had been made on each side below the angle of the scapula (figure 1, *g*). In another two extensive vertical incisions had been made alongside the lumbar spines. In the case of an extremely emaciated old woman called *Nesi-Tet-Neb-Taui* a curious state of affairs was revealed. Large open ante-mortem wounds—possibly bedsores—were found on the back between the shoulders and on each buttock. These had been made use of for the purpose of packing the back and then two square sheets of fine leather (? Gazelle-skin) had been applied to cover the upper wound and the whole buttock respectively (Pl. IX, figure 1 and 2). These sheets had been sewn to the healthy skin beyond the sores and the edges hidden by strips of linen which were smeared with a resinous paste. A large opening—possibly an abscess or sinus—extended transversely from the left pudendal labium outward into the buttock ; this had been sewn up with string.

A long ulcer on the back of the leg had been covered up by a sheet of linen soaked in a solution of resin.

The Packing of the Anterior Abdominal Wall.

In many, or perhaps most, cases no attempt was made to stuff the anterior wall of the body, excepting in the small area adjoining the shoulder. But in several cases I have found that a track had been made between the skin and the muscle passing upward from the wound in the left flank to the front of the chest and mud, mixed with chaff in one case, had been introduced so as to mould the form of the bust (figure 3, *S* and Pl. VII, figure 1). In women with long flattened pendulous breasts no attempt was made to introduce any packing material into the mamma itself. In the case of the woman represented in Pl. VII the breasts were small and infantile and were rendered slightly prominent by means of mud packing. In another case of a somewhat corpulent woman whose mammae must during life have been full and rounded without being pendulous the organs had been packed with pebbly sand (Pl. VIII, figure 1) introduced under the skin from the abdomen. In another case the right breast (but not the left) had been packed with linen introduced in a similar manner.

The anterior abdominal wall itself was not packed if we exclude the tract made for packing the bosom.

In other cases the packing material introduced through the shoulder incision was pushed inward as far as the sternum and the whole of the pectoralis major fulness was moulded from it.

In the mummy of an old woman the mons Veneris was packed with linen. This had been done from the abdominal cavity by separating the skin from the symphysis pubis and forcing the linen above the left pubic spine and then transversely inward in front of the body of the pubes (figure 3, *N* and Pl. VIII, figure 2). I have seen similar linen-packing in the pubic region in a man and in several cases the mud employed in packing the thighs

extended as far as the pubic region. In one case the scrotum was a large hollow sac (? perhaps the result of hernia) and the mud packing blocked the orifice of the scrotal lumen.

On the Manipulations in and around the Face.

The mouth and the naso-pharynx were sometimes packed with linen (Pl. XIII, figure 2), with or without resin, sometimes with mud or sawdust, but usually with a white material. This latter substance has a greasy feel when rubbed between the fingers and emits a strong odour like cream cheese. Dr. Schmidt has been able to identify carbonate of soda, valerianic acid, butyric acid and fatty material and states that they are probably the decomposition products of a mixture of butter and soda.

The same material is often found stuffed into the cheeks also (Pl. XIV, figure 1). In other cases linen (Pl. XIII, figure 2), sawdust (Pl. IV, figure 2) or mud occupies this place. I have not been able to find any definite evidence of incisions in the mouth cavity beyond a slight elongation of the opening of the mouth in some cases. On the other hand it is often possible to identify not only the tongue, soft palate, epiglottis and larynx, but also the floor of the mouth in a perfectly complete and undamaged state.

I can find no evidence whatever in support of Dr. Fouquet's statement that incisions were made in the floor of the mouth for the purpose of packing the neck. Not only is the floor of the mouth intact but the neck is packed *from below*, i. e., from the body cavity.

The nose sometimes contains the same sort of packing material as the mouth and nasopharynx but as a rule it is only partly filled with resin and linen which have fallen into the nasal fossae during the packing of the cranium (Pl. I). The nostrils are

always packed with resin. In one case I found in the resin plugging the right nostril part of the phosphatic crust of a (? vesical) calculus (Pl. XIII, figure 2).

During the preliminary stages of embalming the eyes collapsed and fell back into the orbits. Artificial eyes were then introduced in front of the remains of the real eyes and the eyelids pulled down into a semiclosed position. The artificial eye usually consists (Pl. IV.) of a piece of linen rolled up roughly: a pupil is represented by a spot of black paint: in two cases the eye was represented by a piece of white stone with a black spot on it. In the mummy of Ramses IV (which I unrolled last summer in the Cairo Museum) small onions were put in front of the collapsed eyes.

The eyes, nostrils, ears and mouth were then thickly sprinkled with red or yellow resin or a resin-paste was applied: and then, in the better kind of mummy, plates of wax were placed, one on each eye, nostril, ear and mouth. On top of this a thick coating of resin was spread over the whole face.

Before doing so, however, the eyebrows were painted with some material which is now black but sometimes has a dull reddish tinge: a similar band was usually painted across the forehead.

The Heart.

The heart, left in the body cavity, is always well preserved. In many cases the valves are quite intact and it is often possible to recognise the musculi papillares and the chordae tendineae.

As a rule the organ is found in a considerably damaged state as the result, no doubt, of unintentional hacking, which was inflicted on it by the operator when he was cutting through the roots of the lungs and the oesophagus. This operation was of course done under very difficult conditions, the arm being passed right

up through the body from the opening in the left flank. The commonest injury to the heart is, as we should have expected, a complete opening up of the left auricle or often of both auricles: but in many cases great gashes are found in one or both ventricles.

I was considerably surprised to find that the cavities of the heart were in many cases *tightly* stuffed with mud or a mixture of mud and sawdust. In several cases it was not altogether clear how this packing material could have been introduced, especially when we take into consideration the fact that the manipulation was all done through the left flank. It seems probable that the wounds accidentally made in the heart were employed for introducing this material, but there is no means of proving this. There is, however, another possibility. The heart is usually stuffed with mud like that employed for the neck—material that is never employed for filling the body cavity. If the body were placed in the reversed position for stuffing the neck (as I suggested earlier in this memoir) the heart, being at that time presumably soft and flabby, would have dropped into the neck cavity and become stuffed at the same time as the neck. The heart might have become filled in this manner and then have been replaced in the thorax when the plug of linen was being put in the thoracic inlet.

The Treatment of the Pudenda.

All the men without exception had been circumcised; but in the case of the women it was not possible to express any certain opinion in regard to the possibility of circumcision having been performed for the reason that, in the operation of excising the pelvic viscera, the labia majora were the only parts of the vulva left.

In the men the penis and scrotum were painted red like the rest of the body and as a rule were wrapped separately from the

limbs. In some cases the genital organs were pushed against one or other thigh and wrapped with the limb, i.e., not separately. In one case the penis was flattened out against the perinaeum so that at a casual glance the organs seemed to be missing. In several cases the pubic region was packed in both men and women —sometimes with cloth, sometimes with mud. In one instance the scrotum was a large hollow bag—possibly the result of hernia —the orifice, but not the cavity,of which was plugged with mud derived from the packing-material of the thigh.

In only two or three cases amongst the women were the remains of the pudenda—the labia majora—allowed to remain in their natural position. In most cases the skin, while still soft and flexible, was pushed backward toward the anus so as to form an apron covering the rima pudendi. This curious procedure gives the body a strange appearance : at first sight I thought that the operation of infibulation (such as is practised in the Sudan at the present day) had been employed, but in this I was mistaken. This attempt to hide the pudendal cleft was also found in the mummy of a girl, eight years of age.

Vegetable substances found in or on the mummies.

In addition to the garlands of leaves and flowers placed outside the wrappings of mummies, flowers and other vegetable substances are often found amongst the wrappings, on the surface of the body or inside the mummy.

In the case of the mummy of a priest flowers were found wrapped around every finger and toe in contact with the skin and a complete flower on a long stalk was placed alongside each arm near the elbow. Some of the flowers from the toes were examined by Mr. Percy E. Newberry, who identified then as the petals of *Nymphaea stellata*, Savigny.

It frequently happens that onions are found inside the body cavity.

The commonest situation in which the onion is found is the pelvis (Pl. XV, figure 2)—seven cases—and next in order of frequency the upper part of the thorax—five cases. Twice I have seen onions in the epigastric region. Often there are two onions; in other cases only one. They are found in both men and women. In one case a small onion was flattened against each external ear (Pl. XIV, figure 2).

The onion was always held in great respect in Egypt as an article of food, as an offering in tombs and also for medicinal and magical purposes, as the harbinger of prosperity and health. It is commonly used at the present day as an antiseptic. It is not unlikely that its powerful odour may have led to its use as a deodorant.

Treatment of the Body Cavity.

Both Herodotus and Diodorus describe the cleansing of the body with palm wine. We have no means of checking the accuracy of this statement; but it is quite a rational procedure which might have been resorted to for its astringent action after the body was removed from the salt bath.

When the viscera were taken from the body the pelvic organs were removed as completely as possible; in other words, they were cut through quite close to the perinaeum; so that in the male the anus and in the female the whole rima pudendi in addition were left as gaping openings. These wounds were usually plugged (from inside the pelvis) with fragments of linen but in some cases the rima pudendi was sewn up with string.

When the viscera were removed from the salt bath they were thickly sprinkled with the powder (coarse sawdust) of various aromatic woods and, while they were still flexible, they were

moulded into shape and wrapped in linen. That the viscera had not been dried and were still flexible when the wrapping was done is obvious from the fact that one end of the linen bandage is almost always intertwined with—and so fixed to—some part of the organ wrapped.

The small intestines are usually bent upon themselves a large number of times so as to form an elongated parcel of parallel bands. Amongst these bands there was often placed (while the viscus was still flexible) a wax image of one of the four genii—usually the hawk-headed *Khebsenuf*. Then the mass was thickly sprinkled with sawdust and wrapped in a linen bandage. As a rule a bandage about 5 cm. broad was employed : one end was intertwined with a coil of intestine and the bandage was then wound spirally around the cylindrical mass of intestines, then after two or three longitudinal turns, the whole mass was invested by a series of spirals. The end of the bandage remained free ; and one end of the parcel was then in many cases slightly bent so that the end of the bandage become caught in the kink (Pls. XVI, XVII and XVIII).

The liver is usually flexed around its transverse axis so as to form a hollow tube open on one side (Pl. XIII, figure 3, Pl. XVIII figure 4, and Pl. XVII, figure 1). Either the upper or the lower surface may form the surface of the tubular cylinder. Inside the latter a wax statuette—usually the human-headed *Amset*—is found in most cases. It was, in other respects, treated like the intestines. Although either of these parcels may be found in any part of the body-cavity, yet more often than not they are found in definite situations—the parcel of intestines vertically in the abdomen against the right wall extending from the iliac fossa to the right costal margin (Pl. III, figure 1, *A*) and the liver transversely in the lower part of the thorax (Pl. III, figure 1, *B*).

When the various parcels of viscera had been returned to the

body packed tightly in sawdust or coarser fragments of wood a large part of the abdomen and the pelvis still remained without any organs. This region was then tightly stuffed with sawdust and the opening in the left flank was then closed. This was done in two of my series of cases by bringing the edges of skin together and sewing up the opening with a continuous running thread: in all of the rest the wound was allowed to gape and no attempt was made to bring its edges together. In most cases the flank incision was covered over by a plate—sometimes wax, sometimes metal—bearing the conventional eye-design. This plate was often carved with great care (Pl. XIX, figure 3) but in other cases the wax was merely scratched in a very rough manner. In none of the mummies of the earlier period (i.e. those of the new Empire) have I seen plates bearing the eye-design used for this purpose—in some of the royal mummies, as also in that of *Yuaa* there was a leaf-shaped plate of gold covering the flank-incision.

In most of the mummies of the 21st dynasty the whole surface of the body was painted—in the case of the women yellow, in the case of the men sometimes red but at other times yellow. Dr. Schmidt analysed some of the yellow paint and found it to be a mixture of chrome yellow and gum.

In several cases in which the mummies of men were not painted red a sheet of red linen was wrapped around the body external to the innermost layer of circular bandages.

Most of the mummies in which this curious packing and moulding of the form have been found belong to the period of the 21st dynasty. In the brief sketch of the finding of these mummies given by M. Maspero in his "Guide au visiteur" *(op. cit. supra)* it is stated that the style of the coffins indicates the time as being that of the 21st and 22nd dynasties (p. 142). In the mummy of a Chanteuse d'Ammon named *Tentamout* unrolled at

the Gizeh Museum four years ago by M. Maspero in the presence of Sir Frederick Treves we have an example of the same kind of packing of the legs, back, arms and neck with earth or mud, which is interesting because this girl is described as being "a contemporary of the last Ramses of the 20th dynasty." This indicates that the peculiar practice commenced in the 20th dynasty; but as none of the royal mummies of this time were stuffed in this way it must have been quite late in the dynasty when it was begun. The fact that I have not been able to find any such packing in mummies of the later dynasties (i. e. after the 22nd) does not exclude the possibility that the practise was still in vogue, because most of these later mummies were completely disintegrated, nothing but bones and an abundant quantity of brown powder being found inside the wrappings; in the later Ptolemaic and Roman mummies the molten pitch has destroyed and permeated all the wrappings, flesh and bones, in such a manner that it is difficult to obtain any evidence as to the exact manner in which the embalmers practised the details of their art.

In several mummies of the 30th dynasty and of the Graeco-Roman period that I have examined there had certainly been no packing.

In his memoir to which I have already referred M. Fouquet says that the practice of *bourrage* was not in vogue in the 23rd dynasty, as the mummies of the family *Sen Notems* exhumed by M. Maspero in 1885 show. Nor was there any question of it being employed in the 26th dynasty (*op. cit. supra*, p. 95); yet M. Fouquet, without noticing the discrepancy, quotes an account of such practices from the Rhind papyrus in reference to mummification in the time of Ptolemy Philopator (p. 91), three hundred years after the 26th dynasty.

The Rhind papyrus which seems to refer to this practice has been translated by several philologists: but I need refer to only

two of these renderings, Birch's English version and the later, more accurate, translation by Heinrich Brugsch, both of which are contained in the latter's memoir alongside the Hieratic and Demotic texts[1].

In the translation of Pl. XXVI (Brugsch's German on p. 25) we read:—"all your limbs are embalmed by Anubis in the hall of [ ] × × × He restored your flesh, he made your skin whole again, he preserved your bones and made your limbs youthful."

Brugsch's translation (p. 4) of Pl. V I shall reproduce in his own words:—"Du verlässt befriedigt die Schlachtbank, wo dir die acht Oeffnungen an deinen 36 Tagen gemacht worden. Ich erfüllte an dir das Vorgeschriebene in dem grossen See des Chonsu, welcher verbunden ist mit dem Saale der Unterwelt, deinem Lande. Man machte dir die acht Oeffnungen, um die siebenzehn Oeffnungen zu vollständigen, bis zum 70 Tage hin, welche den siebenzehn Gliedem dies Gottes entsprechen, wovon die einzelnen sind: die sieben Oeffnungen des Kopfes, die vier Horuskinder, die zwei Schenkel, die zwei Arme, der Bauch, der Rücken, in Summa siebenzehn. × × × × × Anubis als Kolchyt füllt deinen Kopf mit syrischem Salze, Sperereien, Ur, Cedern, Pech und Fett von einer [ ] Gans."

I shall return to the discussion of these quotations in the concluding paragraphs.

On the Association of the Funerary Genii with the Viscera.

Before the time of the 21st dynasty it was customary to put the viscera when they were taken out of the body into four Canopic Jars, each of which was dedicated to one of the four

[1] A. Henry Rhind's *"Zwei Bilingue Papyri, hieratisch nnd demotisch,"* uebersetzt und herausgegeben Dr. Heinrich Brugsch, Leipsig, 1865.

children of *Horus*—the human-headed *Amset*, the Baboon-headed *Hapi*, the Jackal-headed *Tuamâutef* (or *Duametef*) and the Hawk-headed *Kebhsenuf*. The body cavity was then packed with linen bandages or with a mass of resin and linen. In the 21st dynasty it became the custom to return the viscera to the abdominal cavity after the body itself and the organs had been treated with preservative materials and it was usual to place along with some of the organs when they were replaced certain wax or pottery models of the children of *Horus*.

In most modern books dealing with the customs of the ancient Egyptians it is asserted that each of the four Genii is associated with some particular viscus or rather that certain organs are dedicated to each of the four. Although I have been unable to find any reference to this matter in Pettigrew's writings Wilkinson has published the following statement to explain the association of the funerary Genii which has been so often quoted since :—

"To Amset were dedicated the stomach and large intestines ; to Hapi the small intestines : to Smautf [Tuamâutef] the lungs and heart ; and to Kebhnsnof the liver and gall bladder. × × × × To Mr. Pettigrew we are indebted for this interesting fact."[1]

When, three years ago, I began the study of this problem such a wide range of variation was found in the associations of the four Genii and the various organs that I was driven to the conclusion that if the viscera were theoretically dedicated to particular Genii, in practice there was no constant association in the case of mummies of the 21st dynasty.

The examination of a still larger series of mummies of this period has convinced me that, in spite of frequent irregularities, a definite association was intended—but the guardianship of the

[1] Sir J. Gardner Wilkinson, "*A Second Series of the Manners and Customs of the Ancient Egyptians*," Vol. II. London 1841, p.71.

various Genii is by no means identical with that suggested by Pettigrew. Thus the human *Amset* is usually found wrapped up in the *liver* instead of the stomach and large intestines, the Ape-headed *Hapi* is usually associated with the *left lung* rather than the small intestines, the Jackal *Tuamâutef* with the *stomach* and not with the heart and lungs and the Hawk-headed *Kebhsenuf* is usually enclosed in the parcel of *intestines* instead of the liver. Even if we admit the possibility that the organs were put back carelessly and that as pure chance or as the result of the routine practice of a particular school of workmen the Genii became associated with a definite set of organs different to that originally intended, this cannot be the whole explanation. For there could have been no mistake in the case of the heart. It was deliberately left in the thorax in every case : it was never wrapped in a parcel like the other viscera and it was never associated with any of the Genii, not even with *Tuamâutef*, as Pettigrew's list requires.

In about 50 % of the mummies examined no funerary figures were found. In many cases this was no doubt due to the damage inflicted on the mummies and the disturbance of the body's contents before they came into my possession ; but in a considerable number of instances no Genii had been put in the body. This was the case in the mummies of two children—one newly born and the other a girl of 8 years—as well as in many adults of both sexes. In many others either the wax figures were so distorted or the viscera so ill-preserved, or both, that it was not possible to identify them and determine the association of Genii and viscera. In several other examples I have not opened the body cavity in order to avoid destroying certain forms of packing of the more superficial parts. It thus happens that from a series of nearly fifty mummies of this period I am able to make a statement of the relationship of the Genii and the viscera in only fifteen cases.

These results are tabulated in the following list :—

	Amset	Hapi	Taumâutef	Kebhsenuf
1	liver	? lung or stomach	? piece of intestine	intestines
2	liver	? stomach	intestines	lungs
3	liver	lung	? stomach	intestines
4	liver	intestines	? stomach	? lung
5	liver	lung	stomach	intestines
6	liver	lung	? stomach or lung	intestines
7	liver	lung	? stomach or lung	intestines
8	liver	two lungs	intestines	small piece of intestine
9	intestines	? small piece of intestine	liver	lungs
10	?	lung	intestines	? liver
11	liver	?	?	?
12	? liver	lung	intestines	?
13	liver	lung	stomach	intestines
14	?	liver	?	?
15	liver	stomach	lung	intestines

The large number of question-marks in this list is due to the great difficulty in distinguishing dried and in many cases badly preserved specimens of such organs as lungs and stomach the one from the other, and excluding the possibility that they may not be spleen, cœcum, bladder or even kidney. The liver, intestines and kidneys and in most cases the lungs also are quite unmistakable (Pl. XVII, XVIII and XIX) ; but the determination of the nature of the viscus associated with *Taumâutef* (Pl. XVIII, figure 2) is much more difficult.

It will be seen that in the fifteen cases *Amset* was associated with the liver eleven (possibly twelve) times out of the thirteen in which the viscus was recognisable ; and it is worthy of note that in the *only case* (No. 9) in which it can be stated with certainty that the liver was not the accompanying organ the parcel of intestines associated with *Amset* was placed in the

position (transversely across the epigastrium) where the liver was usually put and the liver was found in the region (vertically in the right side) of the abdomen usually occupied by the intestines.

There can be absolutely no doubt that the persons who embalmed these bodies, deliberately and of set purpose put *Amset* with the liver and not *Kabhsenuf*, as Pettigrew stated. It is worthy of note in this connection that when Mr. Quibell and I unrolled the contents of a Canopic Jar of *Thua* (mother of *Amenhotep* III's wife) we found the liver in the *Kabhsenuf* Jar. Whether this is sufficient to justify us in supporting Pettigrew's statement so far as the new Empire is concerned must remain an open question for the present: but it seems most improbable that, if this be so, they should have suddenly changed the association of the Genii and the viscera.

Hapi was associated with the lung (? left) or lungs in eight (or possibly nine) out of fourteen cases, with the stomach in one (or possibly three), with intestine in two cases and the liver in one. If we could be more sure of the identity of the lung in every case the proportion of cases associated with Hapi would almost certainly rise, because it is precisely the best preserved examples which have provided us with the eight cases.

Taumâutef was certainly associated with the stomach in two cases and almost certainly in four others; in five cases with pieces of intestine which might possibly be stomach or have been mistaken for stomach; with the liver in one case and a lung in one (or possibly three) cases. It is worthy of note that it was precisely in those two cases in which the organs were best preserved that the stomach was recognised, which suggests that the great difficulty in identifying this viscus is the real cause of the seeming irregularity in its association.

Kabhsenuf was associated with intestines in eight cases, with

lungs in three and possibly with the liver in one case out of twelve. In the other three cases, although it is not possible to identify the viscus associated with *Kabhsenuf*, the liver is accounted for elsewhere : hence among the fifteen cases there is only one, and even that a doubtful, instance of the association of *Kabhsenuf* with the liver, which Pettigrew has advanced.

The figures vary considerably in size and material. One set was made of pottery but the others were made either partly or wholly of wax. Sometimes they were made of mud with a thin veneer of wax : in other cases of pure wax : in others again of wax mixed with other substances, probably resin and mud.

In Pl. XVII, figure 3, the smallest set found is represented. The figures are about 6 cm. long. They are usually almost twice as large and in one case were as long as 15 cm., and proportionally thick. In one case the busts only of the four Genii were represented and in yet another the figures were cut out of a wax plate in a squatting form (Pl. III, also Pl. XIX).

In Plate XIX the range of variation in size and shape of the figures of *Hapi* (figure 1) and *Taumâutef* (figure 2) respectively are shown (on different scales). Four different sizes of mummy-shaped and one squatting Ape (*Hapi*) are shown, two other Baboons wrapped in lungs and a bust also in part of a lung. Four different sizes of mummy-shaped and one squatting figure of the Jackal (*Taumâutef*) are shown, one other in a stomach and one in a liver and a bust in a piece of intestine (? stomach).

In Pl. XVII, figure 1, a typical set is shown : *Amset* (human) wrapped in liver, *Hapi* (Baboon) wrapped in lung, *Taumâutef* (Jackal) in the stomach and *Kabhsenuf* (Hawk) with the intestines : the latter are shown on a much larger scale in figure 2.

In Pl. XVIII another typical set is represented: *Hapi* with the left lung (figure 1), *Taumâutef* with the stomach (figure 2), *Kabhsenuf* in the midst of the intestines (figure 3) and *Amset*

inside the roll of liver (figure 4). (Figures 3 and 4 are reproduced on a scale half that of figures 1 and 2.)

Conclusion.

The outstanding feature of all these manipulations practised during the 21st dynasty is the obvious intention of the embalmers to restore to the body the form it had during life, to make the skin complete and also to give to the whole mummy not only the form but the appearance of the person as he was in life. "Alle (deine) Glieder sind embalsamirt in der Halle des [ ] von dem *Hirsescht Anubis* als ein embalsamirer, dem Herrn der Tiefe von Toser. Er machte wohl dein Fleisch, er [ ] deine Haut, er conserviste (deine) Gebeine, er liess alle deine Glieder verjüngen in Westen" (Brugsch's translation of the Rhind Papyri, *op. cit. supra*, p. 25).

These operations were performed quite regardless of sex or age. I have found the limbs stuffed in men and women, in boys and girls, and even in a new-born babe.

In most cases the intention is clearly shown of making as few openings as possible on the surface of the body. Thus the legs were stuffed from the abdominal cavity, the back from the flank wound, the neck from the body cavity ; and so in respect of most of the packing operations, the embalmer was willing to attempt manipulations of very great technical difficulty rather than make extra skin wounds for the purpose of stuffing the body directly. But at times this general rule was departed from ; as, for example, in the case of the mummy represented in Pl. V, where incisions were made in such unusual places as the back of the shoulders, the buttocks, the elbows and knees. In the case of the new born baby it was apparently difficult or impossible to pack the right leg from the opening made in the body cavity (in the left iliac region) so a second opening was made on the right side and through it linen was passed into the leg as far as the calf.

But quite apart from these exceptional cases there is no great uniformity in the treatment of this series of bodies, nor is there any evidence that any attempt was made to conform to the "statutory" number of seventeen openings or incisions referred to in the Rhind papyrus :—seven for the head, four for the thorax, two for the legs, two for the arms and one each for the abdomen and back.

The one incision for each arm is fairly constant: it is very rare to find a second arm incision and I have never seen the arm packed in any other manner than through the shoulder incision. In three cases the arms were not packed, although the rest of the body was stuffed.

In most cases there is only one skin incision for the lower limbs —that between the great and second toes, but if the statement in the Rhind papyrus has any real meaning, is it not more likely a reference to the openings from the body cavity into the legs? The thighs were always packed from the abdominal cavity and I have seen only one mummy of this series that had no leg-packing whatever. I have already cited several exceptions to the rule of only one skin incision. In his attempt to bring his statements into harmony with those of the Rhind papyri M. Fouquet makes the strange assertion: "J'en ai toujours trouvé une à chaque bras et à chaque avant-bras, une pour chaque cuisse et pour chaque jambe, total pour les membres, huit à la partie latéro-interne" *(op. cit.*, p. 93, 94). This quotation is neither a true record of the facts as I have seen them, nor does it conform to the account in the Rhind papyrus. The ancient Egyptian writer speaks of two incisions for the legs and two for the arms—*four in all* and not two for each limb, i. e.,a total of eight, as M. Fouquet pretends. In respect of this matter the Rhind papyrus contains a much more accurate account of the openings found in these mummies of the 21st dynasty than M. Fouquet's memoir presents.

The mention of the openings for the body cavity and for the back is quite in conformity with my findings. M. Fouquet's difficulty in explaining the reference to an opening for the back in the Rhind papyrus has been disposed of in the preceding pages.

The reference to the "seven openings of the head" in the Rhind papyrus can only mean the ears, eyes, nostrils and mouth. Dr. Fouquet's attempt to explain this quotation by enumerating the "ablation" of the eyes, incisions in the floor of the mouth for stuffing the neck, slits at the angles of the mouth and perforation of the ethmoid is quite futile, because the eyes were not removed nor incised in any way, nor was the mucous membrane of the month cut, for the packing was introduced into the neck through the body cavity and not from the mouth.

Revillout's translation of the Rhind papyrus contains a reference to "quatre [ouvertures] à la poitrine" where in Brugsch's rendering we find "die vier Horuskinder." The meaning of this is not altogether clear. No special openings or incisions were made for the four Genii who were the "children of Horus": and, on the other hand, many openings are found in different mummies in or around the chest. There are (1) the opening from the thorax into the neck; (2) the two openings sometimes made to pack the breasts from the abdominal cavity or from the flank wound; (3) the tunnels made from the shoulder-incisions for packing the pectoral regions and (4) the stuffing of the back. Perhaps the opening of the thorax (by cutting through the diaphragm) is included. If so, this would explain the reference to the models of the children of Horus, which were put in the thorax.

In the Rhind Papyrus it is stated that eight incisions were made "in the thirty six days" and afterwards nine more were made to complete the prescribed seventeen. It is impossible, even if we were to admit that this Ptolemaic account had any reference

whatever to the mode of procedure in the 21st dynasty, to offer any satisfactory interpretation of this passage, unless the word "opening" be used for apertures other than those artificially made.

When the body was placed in the salt bath it would have only the opening in the left flank and the "seven doors of the head," i. e., the statutory eight. When it came out of the bath an incision would be made for stuffing the back, one in each shoulder for the arms, each leg would be tunnelled from the abdomen — in all five new incisions. These, together with the four "à la poitrine" —whatever these may be, perhaps neck, the two breasts and some other of the varied openings known to have been made—would make up the nine secondary apertures completing the statutory seventeen. Now that philologists have a more accurate and intimate acquaintance with the ancient Egyptian scripts than Brugsch could have had forty years ago, it is possible that a new translation might clear up some of the obscurity in these renderings. So far as we are aware no evidence of any such manipulations as this papyrus hints at were practised at the time (about 200 years B. C.) when it was written. But at present it is impossible to say whether the statements contained in the Rhind papyrus are merely the traditional report of a practise long extinct or on the other hand whether they might not be an account of operations sometimes employed in Ptolemaic times, which may or may not be identical with those resorted to by embalmers in the time of the 21st dynasty.

The ancient Egyptians were always regarded by visitors of foreign nationality as a people of strange customs; but none of their practices could have been considered so extraordinarily bizarre as that which forms the subject of the foregoing account.

That a people strongly imbued with the belief in a future life or even those who, not having such a belief, had an intense

veneration for their dead should desire to preserve the body itself from corruption is quite intelligible to all men; but it is not so easy to understand how it came to pass that these Egyptians, who are said to have held the body in such great respect as to have regarded it almost as sacred, should have resorted to such disgusting manipulations as packing the limbs with mud, involving as it did the destruction of a large part of the body and resulting, at best, in little better than a caricature of the deceased.

It is quite beyond my province to attempt to explain this apparent paradox—to reconcile these wanton mutilations and the making of these sham restorations with the belief in the sincerity of the Egyptians sacred respect for the dead body. I am, however, persuaded to give an explanation suggested to me by Dr. George A. Reisner (in charge of the Hearst Egyptological Expedition of the University of California); not because I can pretend to express any opinion on its merits, but because I have been able to obtain information regarding certain practices unknown to Dr. Reisner when he suggested that I should look for them in support of his hypothesis.

At certain periods of their history the ancient Egyptians were accustomed to place in the tomb of their dead a statue representing the deceased, so that when the perishable body should have lost all likeness to the person in life the statue would remain as a dwelling for the *Ka* or "double." These statues were painted red in the case of men, and yellow in women.

Dr. Reisner made the suggestion that all the elaborate measures taken to restore the integrity of the skin and to preserve the form of the body might be explained on the supposition that the embalmers of the 21st dynasty aimed at making the body itself take the place of the statue: in other words the corpse was preserved and fashioned so as to retain some resemblance to the deceased and be the home of the *Ka*. It was perhaps for the

same reason, i. e., in order to make the body complete, not only in form but also in substance, that the viscera, which, in other times, were placed in Canopic Jars apart from the body, were replaced in the body of the mummy in the 21st dynasty.

In support of the hypothesis that the body was intended to take the place of the statue, there is the interesting fact that at this time—and, so far as I can ascertain, at no other period—the body was painted like the statues of the earlier dynasties.

The female bodies were painted with a mixture identified by Dr. Schmidt as chrome yellow and gum, i. e., with the same materials which M. Maspero has mentioned as having been used for painting female statues.[1]

The bodies of the men were painted either red, rose-colour or more usually a dull reddish or yellowish brown. In many cases the brown paint when moistened and rubbed off on cotton wool becomes light yellow, indistinguishable from that used on the women's bodies. This fact, at first very puzzling, is interesting in view of M. Maspero's statement that "at Sakkarah under the 5th Dynasty, and at Abû Simbel, under the 19th Dynasty we find men with skins as yellow as those of the women; while in the tombs of Thebes and Abydos, about the time of Thothmes IV and Horemheb, there occur figures with flesh-tints of rose-colour" (*op. cit.*, pp. 204, 205).

[1] G. MASPERO, *Manual of Egyptian Archaeology*, translated by Amelia B. Edwards, London 1895, p. 203.

DESCRIPTION OF THE PLATES

PLATE I.

Figure 1.—The right half of the head of a mummy of the 21st dynasty, which was divided into two by a mesial sagittal section.

A probe has been placed in the artificially made passage from the nose into the cranium. An accumulation of resin is seen in the back of the cranial cavity.

Figure 2.—The front part of the floor of the cranial cavity of another mummy to show the ovoid opening made in the roof of the nasal fossae and the resin-smeared track leading back from it.

Figure 3.—The head of a mummy split in the mesial plane, and the right half turned up. A probe is placed in the passage made by the embalmer. The cranial cavity is filled with a large quantity of resin and linen bandages packed among the membranes of the brain and even the remains of the brain itself.

PLATE II.

Figure 1.—The mummy of a Priest of Ammon (21st dynasty) after the removal of all the wrappings.

Figure 2.—The same mummy, after the anterior abdominal wall had been removed to show the sawdust packing of the body cavity.

Figure 3.—The same mummy. The sawdust has been removed from the abdominal cavity, but left in the thoracic cavity, which has been opened by removing the anterior wall of the chest.

Three parcels of viscera (wrapped in linen) are exposed—one (*A*) in the abdomen, aud two (*B* and *C*) in the thorax. At *D* is seen packing material pushed between the skin and the thoracic wall from the shoulder incision.

The embalming wound in the left flank can be seen now.

PLATE III.

Figure 1.—The mummy shown in Pl. II.

The sawdust packing has been cleared away from the thorax revealing another parcel of viscera (*E*).

Figure 2.—The same mummy.

The parcel *A* has been removed from tbe abdomen and, after the linen wrappings were removed, has been placed on the mummy near the right hand. It consists of the small intestine with a sitting figure of a Jackal cut out of a plate of wax. The parcel *B* (unrolled and placed on the right elbow) contains the liver and a human figure.

Another parcel (*F*) is now exposed in the thorax.

Figure 3.—The same mummy.

All the parcels except *G* have now been removed. It consists of a piece of intestine wrapped round a wax figure of a Hawk.

The heart and aorta (*H*) are now exposed.

PLATE IV.

Figure 1.—The mummy shown in Plates II and III.

The skin of the neck has been removed showing mud-packing and the linen plug *K* in the thoracic inlet.

Part of the skin has been removed from the left arm to show the packing and on the right shoulder a piece of linen packing has been pulled out of the incision *J* to make the latter more obvious.

Figure 2 was intended to show the details of the neck and arm-packing: but in the process of reproduction of the photograph almost all the detail has been lost. The skin of the left side of the face has been removed to show the face-packing.

Figure 3.—The packing has been removed from the neck and left thigh to demonstrate the cavities *A* and *B* into which the mud had been pushed.

PLATE V.

Figure 1.—The back of the mummy of a priest covered with glistening red paint.

There can be faintly seen a small vertical incision (marked 1 in white paint) just below the neck, between the shoulders; and two oblique incisions (marked 2 in white paint), one on each buttock.

Figure 2.—The back of the legs of the same mummy.

The buttock-incisions (2) are much more distinct than they are in figure 1. An incision (4) may be seen on the back of each knee joint; and another (5) on the back of each heel.

All these incisions are sewn up with a running thread.

PLATE VI.

Figure 1.—The incision between the shoulders (Pl. V, figure 1) is shown on a larger scale. The white arrows point to the ends of the incision and the number 1 is opposite its middle.

The incision is very difficult to see even on the actual mummy, and was very difficult to photograph by reason of the polished red surface.

Figures 2 and 3 are larger photographs of the incisions on the backs of the knee (4) and the elbow (3) respectively of the mummy shown in Pl. V.

PLATE VII.

Figure 1.—The front of the mummy of a woman.

The skin has been removed from the front of the chest and abdomen almost as far down as the umbilicus, so as to expose the layer of mud covering the front of the thorax and leading down to the opening in the left flank.

This photograph shows the characteristic position of the hands in front of the pudenda.

Note the annular depressions on all the fingers—due to the presence of string wound around the fingers during the first stage of embalming.

Figure 2.—The back of a female mummy. The right arm has been detached. The back—from the loins to the shoulders—has been stuffed with a large quantity of mud. The buttocks, however, have been stuffed with linen (removed on the right side).

PLATE VIII.

Figure 1.—The front of the chest and the right arm of the mummy of a corpulent woman.

The arm has not been stuffed, and the loose wrinkled skin forms a case enclosing the bone.

On the left side the skin of the breast has been in part removed to show the packing material. On the right side the packing in the mamma has been removed with the skin so as to demonstrate the path by which the pebbly sand was introduced under the skin of the breast from the abdominal cavity.

Figure 2.—The perinaeum and thighs of the mummy of an old woman.

The skin of the thighs has been removed so as to reveal the large cavities traversed by the two femora and tightly packed with mud.

The skin has been removed from the most prominent part of the mons Veneris so as to demonstrate the linen packing to which its fulness is due.

The rima pudendi is occupied by linen pushed into the cleft from the pelvic side.

PLATE IX.

Figure 1.—The back of the head and shoulders of the mummy of an old woman.

A sore (? bedsore) has been covered over by a square piece of leather.

Figure 2.—The buttocks of the same mummy. A large sheet of leather hides two large ulcers (? bedsores).

Figure 3.—The back of the shoulders of a mummy from which the skin has been partly removed to show a pad of linen pushed underneath the skin from an incision near the acromion.

Figure 4.—The rest of the back of the same mummy. Two large streams of mud can be seen proceeding from the wound in the left flank, one into each buttock. The skin has been removed from the surface of the mud.

PLATE X.

Figure 1.—An oblique view of the left flank of the mummy shown in Pl. VII, fig. 1, after removing the left arm. Part of the wax plate covering the embalming wound has been left in situ, but its upper part has been removed to show the wound and the places from which the packing was introduced (*A*) in front of the chest (see Pl. VII, figure 1) and (*B*) into the back (Pl. IX, figure 4).

Figure 2.—A transverse section across the thorax to show the mud packed between the vertebral column and the skin of the back.

Figure 3 and 4.—Sections through the neck to show mud and pebbly sand respectively packed in front of the vertebral column so as to distend the skin of the neck.

Figure 5.—A section through the knee joint exposing the upper end of the tibia and the semilunar cartilages. A large quantity of mud is seen packed under the skin behind the knee.

PLATE XI.

Figure 1.—A long incision has been made on the inner side of the leg for the purpose of stuffing the front and the back of the leg with linen. The wound has been carelessly sewn up with a running thread.

Figure 2.—The soles of the feet showing incisions between the great and second toes.

Figure 3.—The sole of the foot showing a crescentic incision around the heel.

Figure 4.—A hand exhibiting annular depressions around the fingers. These are caused by string wound around the fingers to keep the epidermis and nails in position.

Figure 5 was intended to show the string in position on the toes, but unfortunately all the detail has been lost in the process of reproduction.

PLATE XII.

This photograph is intended to demonstrate the appearance of a gaping shoulder incision, through which linen has been pushed inward (note the bulging in the axilla) and downward into the arm. The surface of the linen exposed in the opening is thickly smeared with a resinous paste.

The neck is tightly stuffed with the white material supposed to be a mixture of "butter" and soda. The breaking away of some of the brittle skin has exposed this white substance.

PLATE XIII.

Figure 1.—In this mummy the linen packing is seen around the left shoulder and in the right arm beyond the elbow.

The neck is packed with "butter" and soda.

Figure 2.—The right half of the lower jaw has been removed and is seen to the left of the head with the linen-packing of the mouth attached to

it. The wall of the right nostril has been removed to expose a calculus (? vesical) lying in it.

The butter-packing has run down into the thorax from the neck.

Figure 3.—The liver of the mummy of a priestess, showing the gall-bladder distended with more than 30 gall-stones.

PLATE XIV.

Figure 1.—The cheek removed to show the mouth filled with "butter" and soda.

Figure 2 shows an onion placed over the ear.

Figure 3.—The heart and aorta are exposed. Very coarse wooden chips are used for packing the body-cavity.

PLATE XV.

Figure 1.—This photograph shows the embalming wound (sewn up with thread) placed unusually far forward in front of the body.

The body cavity of this mummy was opened since this memoir has been printed. It differed from all the rest of the series in as much âs the body contained nothing but sawdust, *even the heart having been removed.*

Figure 2.—An oblique view of the pelvic cavity of a mummy containing a large onion, seen from above. (The vertebral column is seen leading to the left upper corner of the photograph).

PLATE XVI.

Figure 1.—In this mummy the greater part of the right arm and the whole of the front of the body wall has been removed. The parcels of viscera (wrapped in linen) are shown in their undisturbed condition, the sawdust packing having been removed by means of a bellows.

H is the heart amulet *Ab*, made of wax. This is the only mummy in which I have seen such an object.

Figure 2.—A complete set of five parcels of viscera from the body of a woman. A coil of intestine is hanging out of the largest parcel.

PLATE XVII.

Figure 1.—A set of the four funerary Genii, made of wax, each wrapped in a viscus: at the upper left corner is the liver, part of it being broken

off to expose the human head of *Amset*; below this is a parcel of intestines with the Hawk-headed figure; on the upper right side is the Baboon wrapped in a lung and below it the Jackal wrapped in the stomach.

The scale is in centimetres.

Figure 2.—The Hawk and the small intestines from figure 1 on a larger scale.

Figure 3 represents the smallest set of Genii found in this series of mummies. Centimetre scale.

PLATE XVIII.

Figure 1.—A wax figure of a Baboon wrapped in a lung.

Figure 2.—A wax figure of a Jackal wrapped in the stomach.

Figure 3. — A wax figure of the human-head *Amset* wrapped in the liver (reproduced half the size of figures 1 and 2).

Figure 4.—A parcel of small intestines from which the head of a Hawk can be seen emerging near the middle. Same scale as figure 3.

Centimetre scales alongside the figures.

PLATE XIX.

Figure 1.—A series of wax figures of Baboons to demonstrate the variations of form and size. Centimetre scale.

Two full-length figures wrapped in lungs.

A bust wrapped in lung.

A squatting figure.

Four full-length figures of different sizes, photographed in different positions.

Figure 2.—A similar series of Jackals on a smaller scale.

Figure 3.—A wax plate (with the sacred-eye design) used for covering the embalming incision in the left flank.

PLATE I.

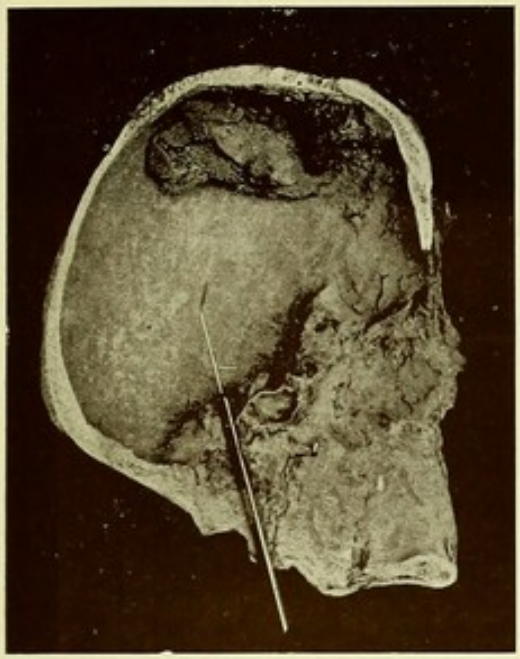


FIG. 1.

FIG. 2.

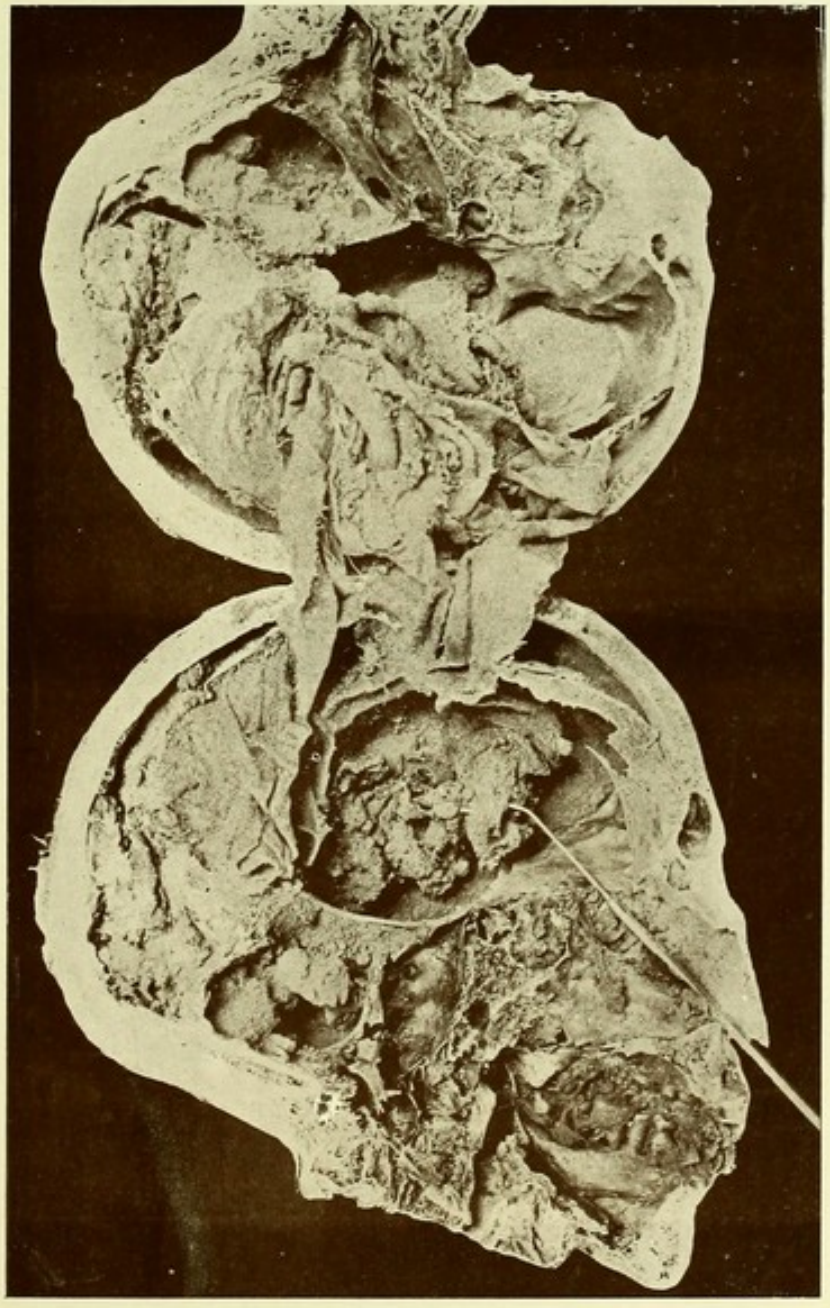


FIG. 3.


ROYAL COLLEGE OF SURGEONS
25

ROYAL COLLEGE OF SURGEONS OF ENGLAND

Plate II.

Fig. 3.

Fig. 2.

Fig. 1.

PLATE III.

FIG. 3.

FIG. 2.

FIG. 1.

PLATE IV.

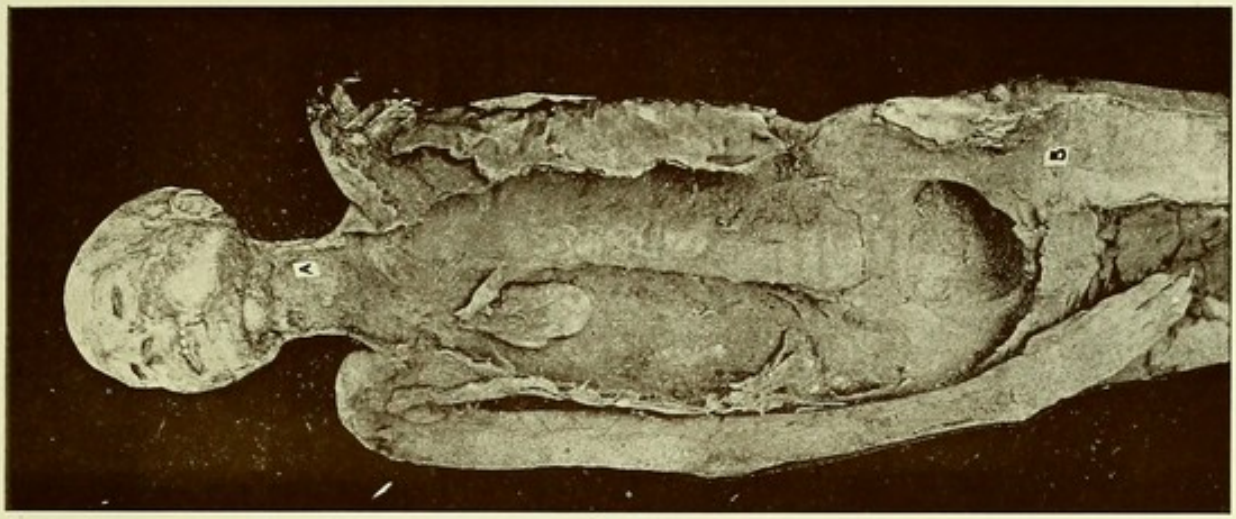


FIG. 3.

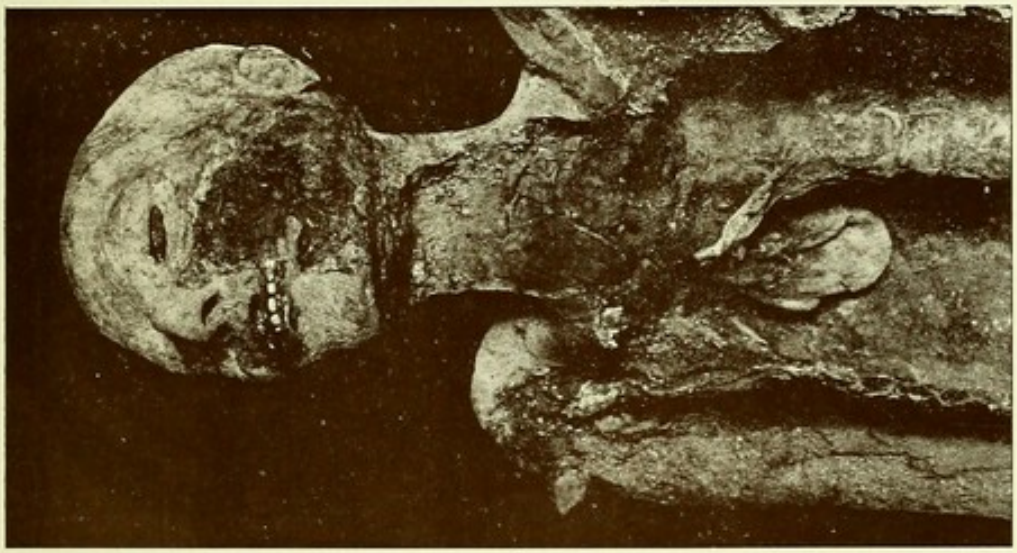


FIG. 2.

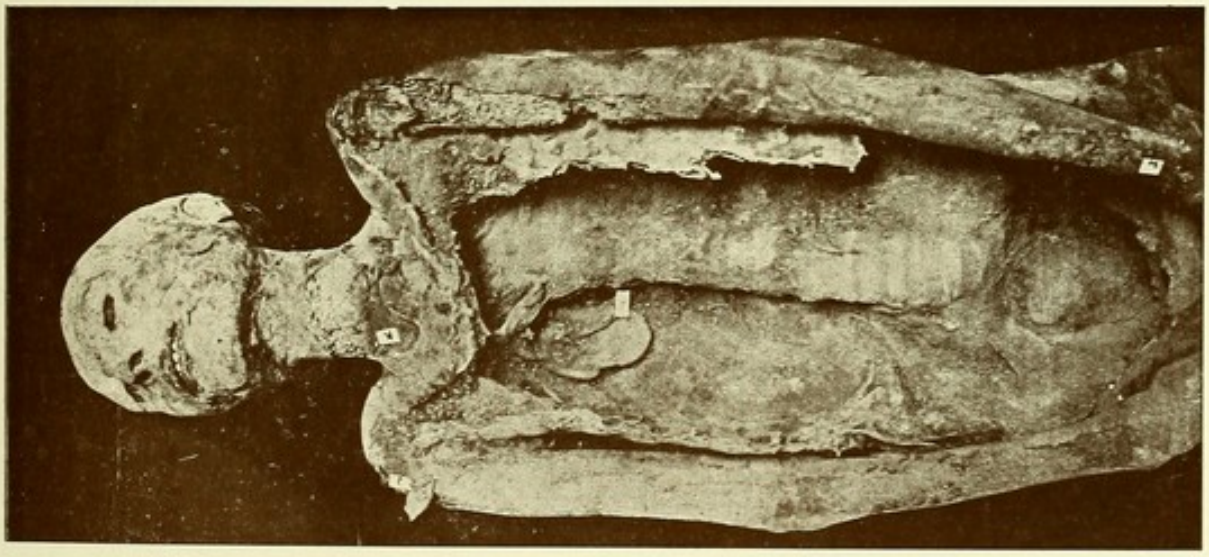


FIG. 1.

PLATE V.

FIG. 1.

FIG. 2.

PLATE VI.

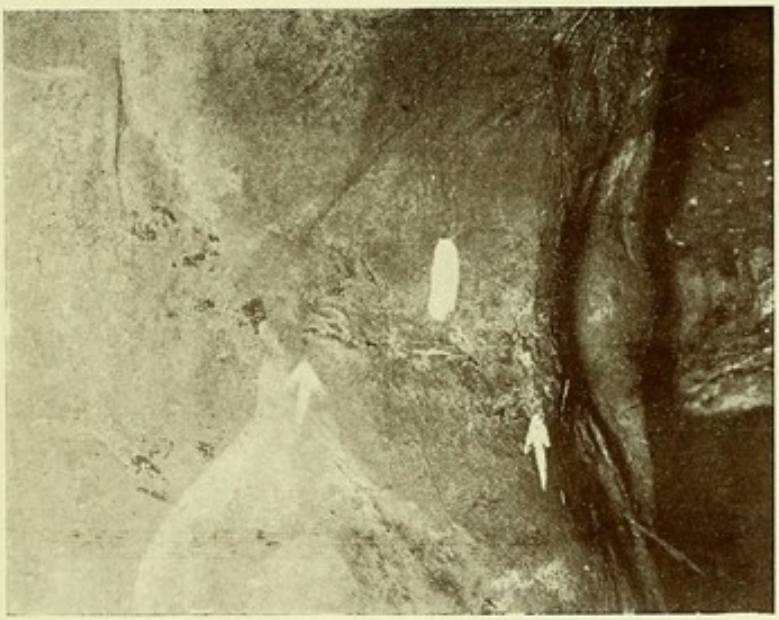


FIG. 1.

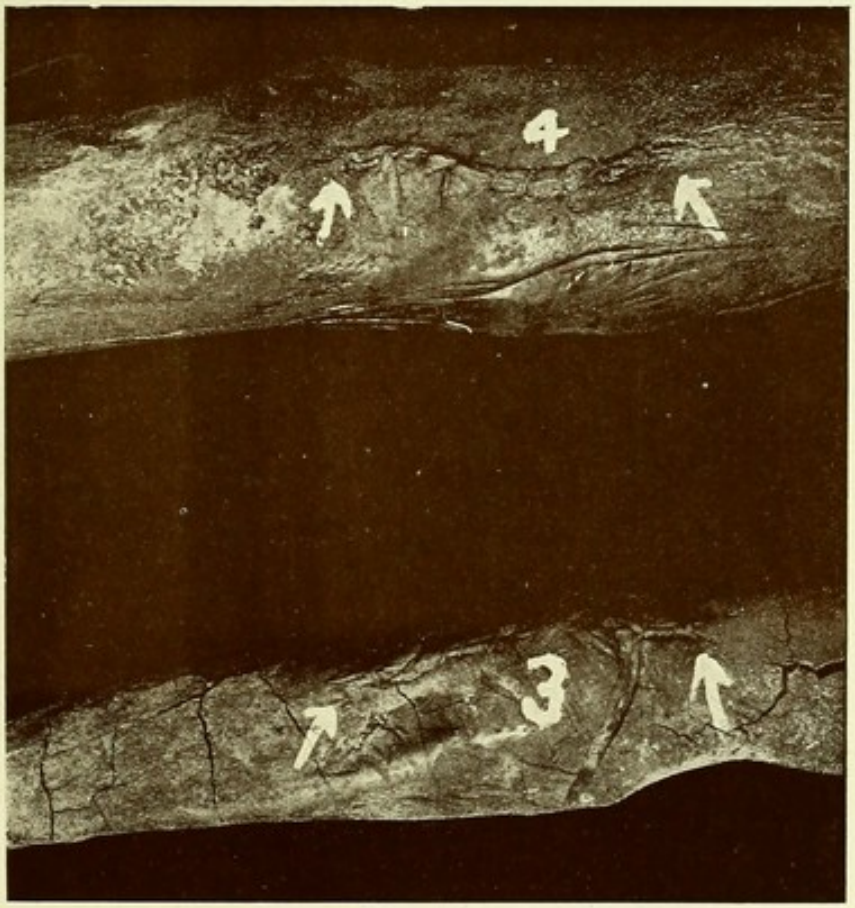


FIG. 2.

FIG. 3.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
-5 FEB 25
LIBRARY

PLATE VII.

FIG. 1.

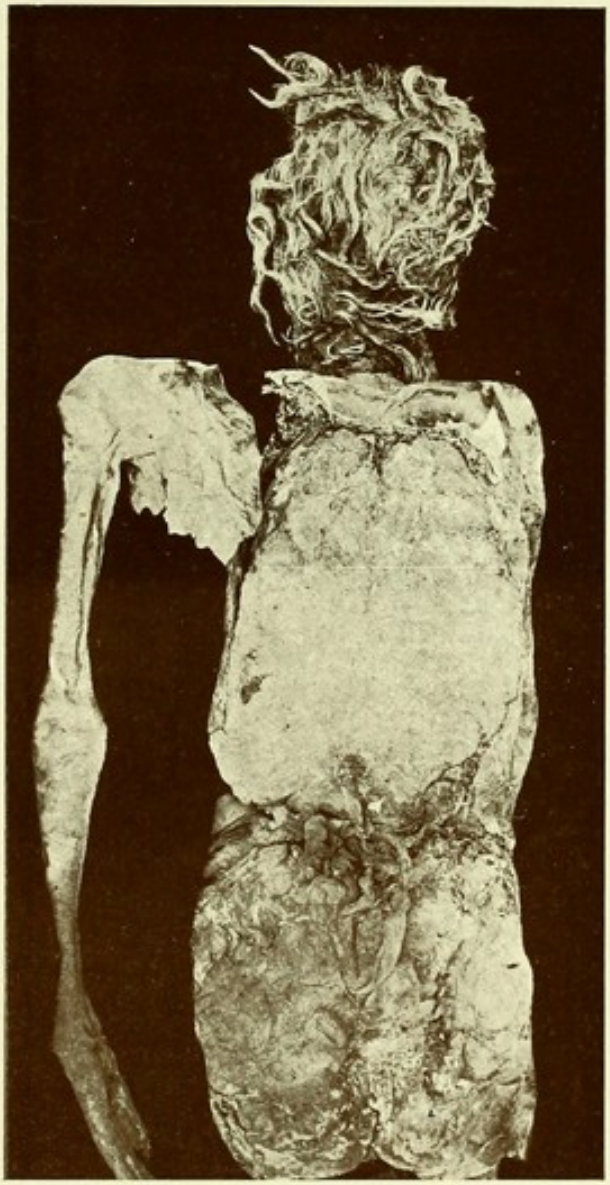


FIG. 2.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
LIBRARY

PLATE VIII.

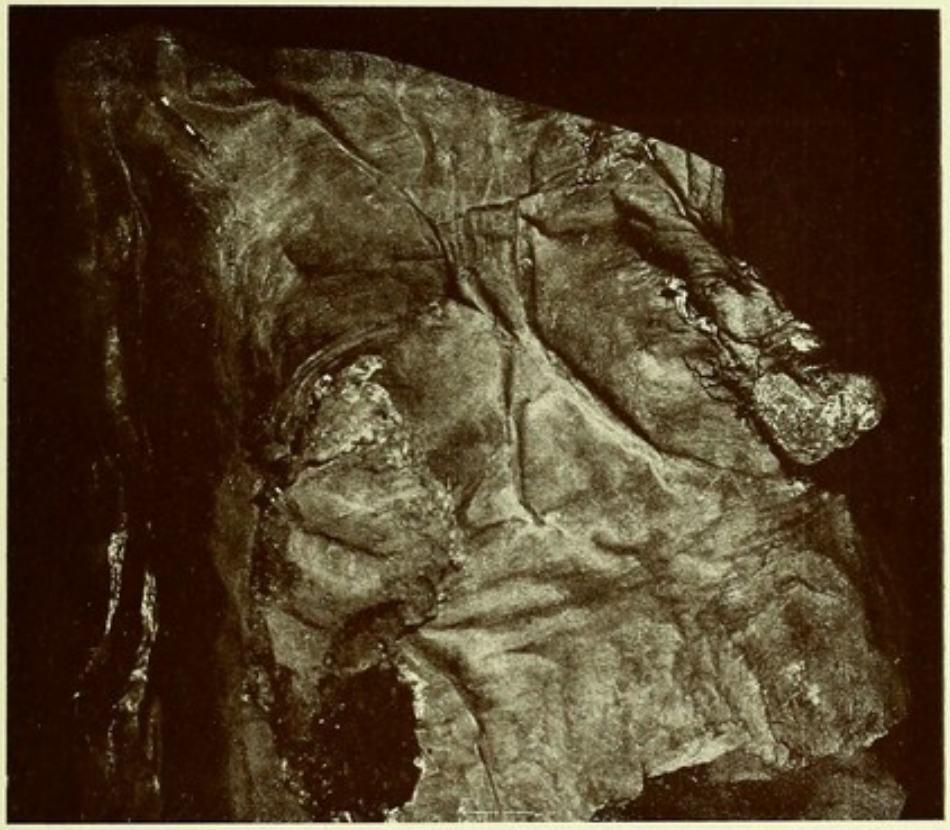


FIG. 1.

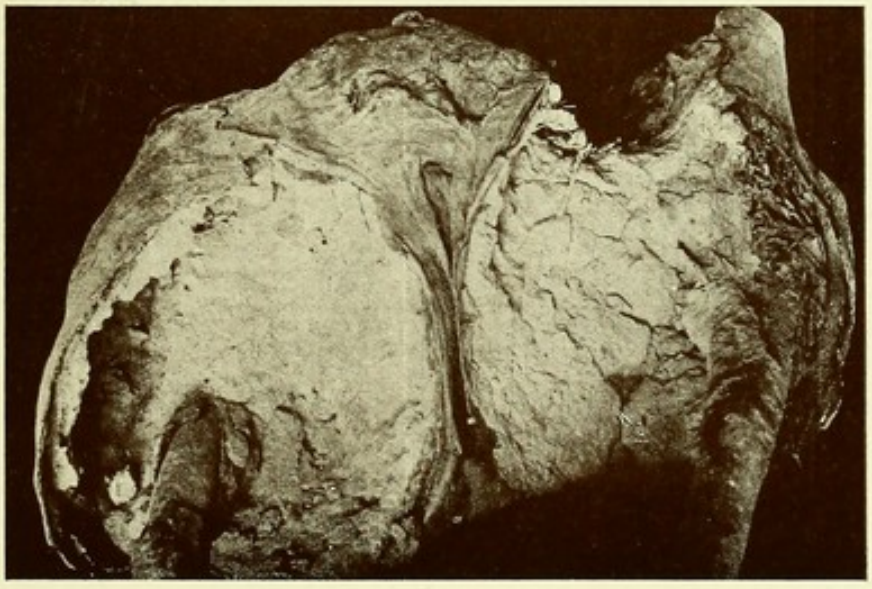
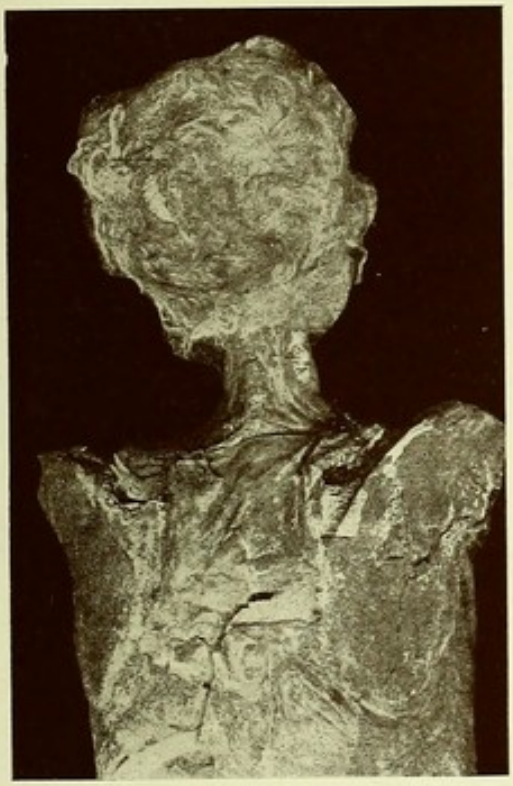


FIG. 2.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
3 FEB 25
LIBRARY

PLATE IX.



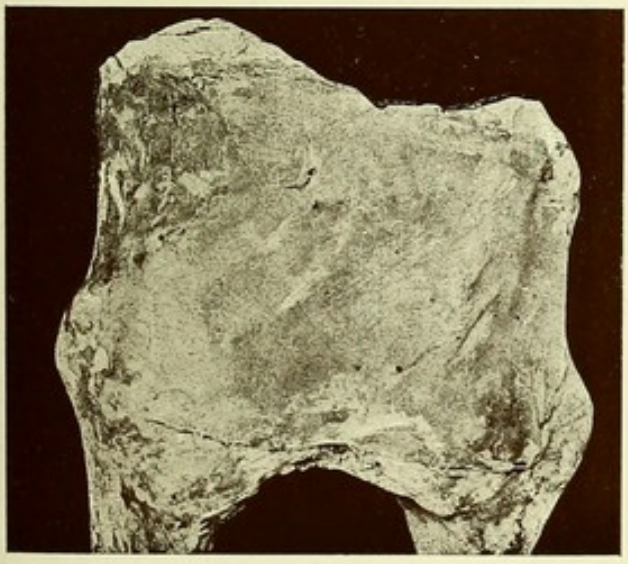


Fig. 2.

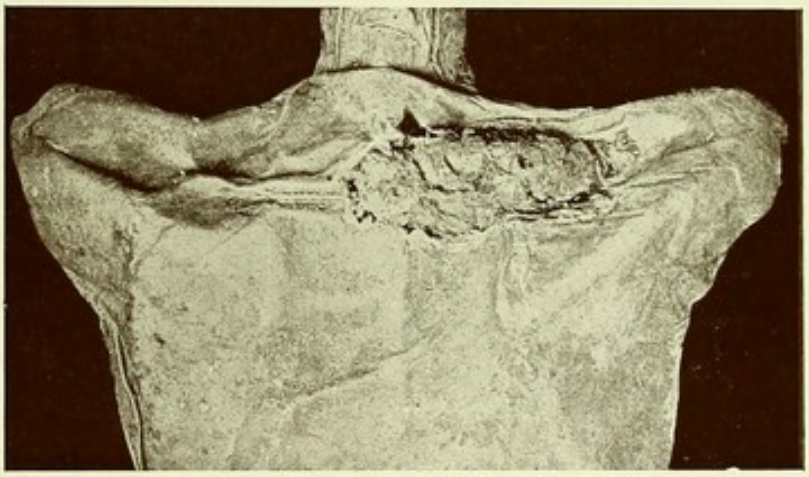


FIG. 3.

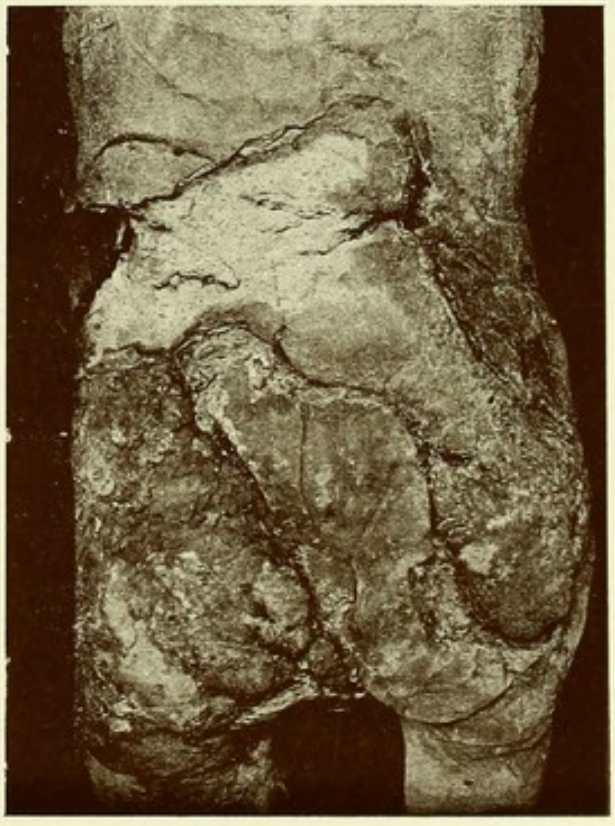


FIG. 4.


-7 FEB 25

PLATE X.

FIG. 3.

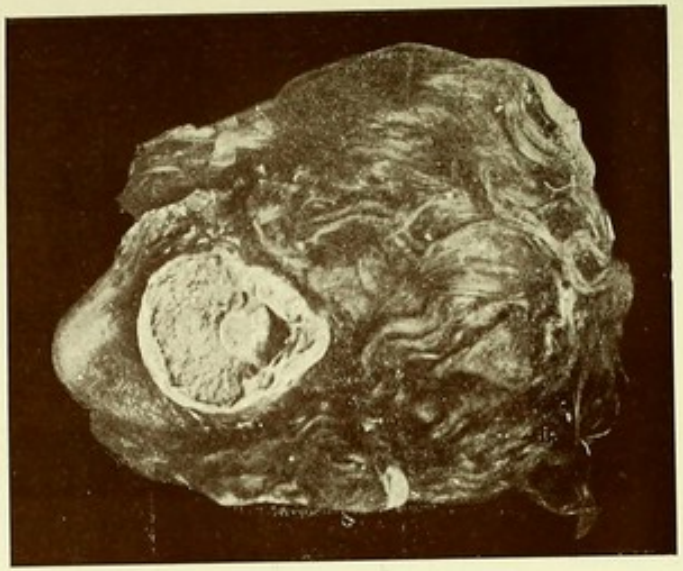


FIG. 1.

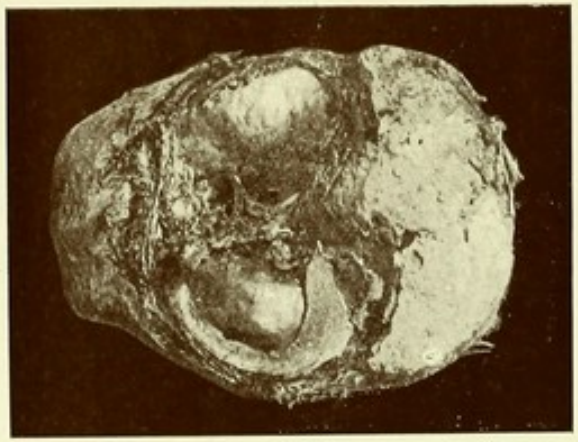


FIG. 5.

FIG. 4.

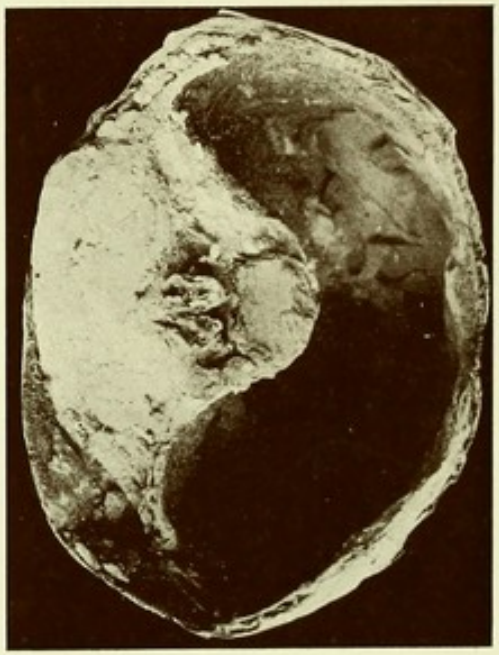


FIG. 2.


-3 FEB 25

PLATE XI.

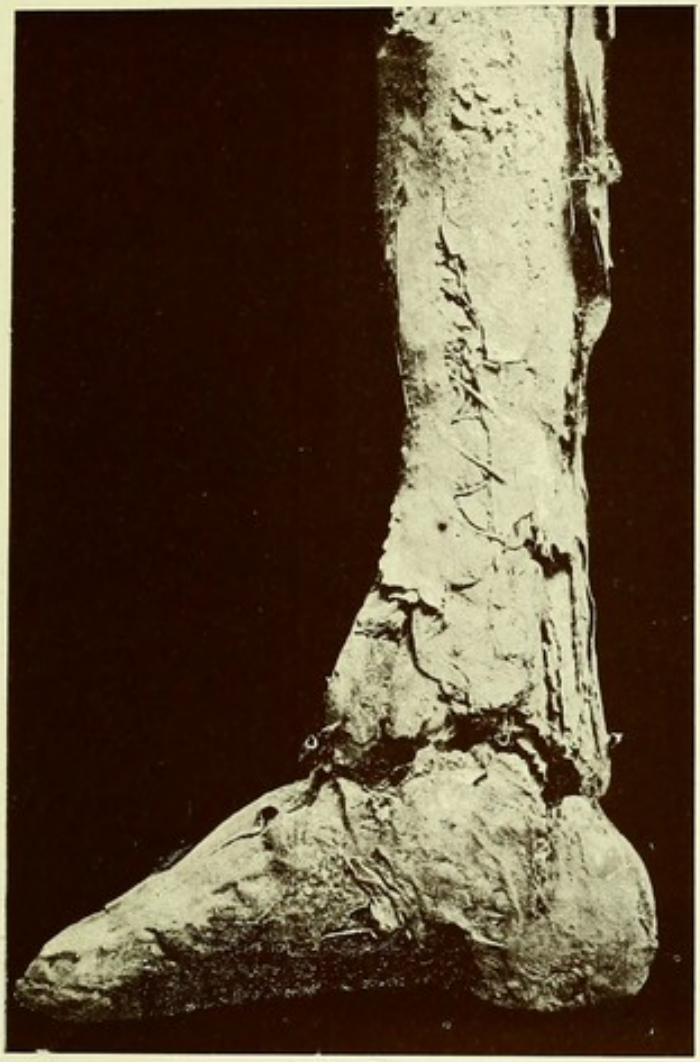


FIG. 3.

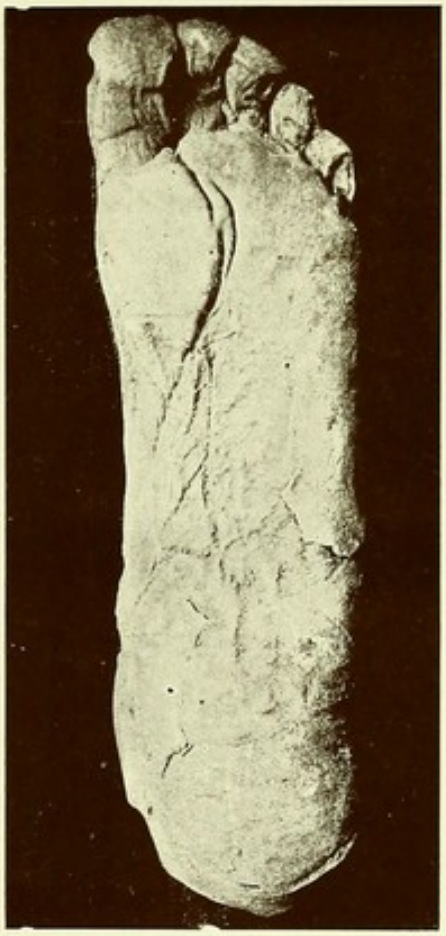


FIG. 4.

FIG. 5.

PLATE XII.

PLATE XIII.

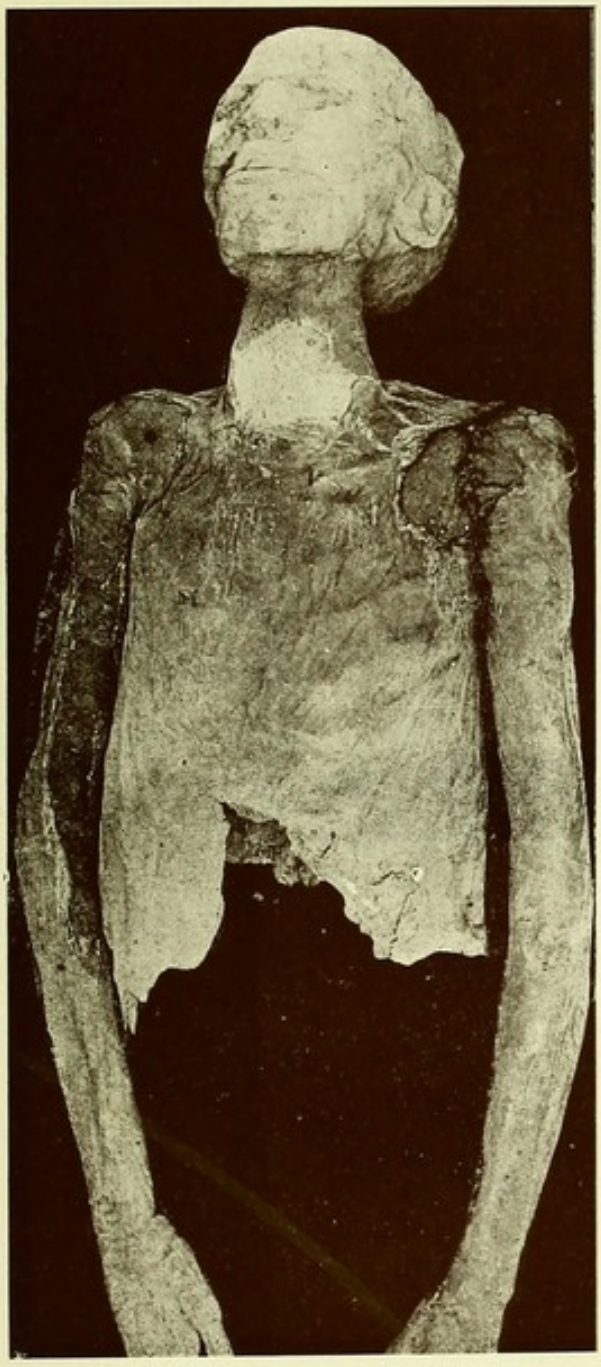


FIG. 1.

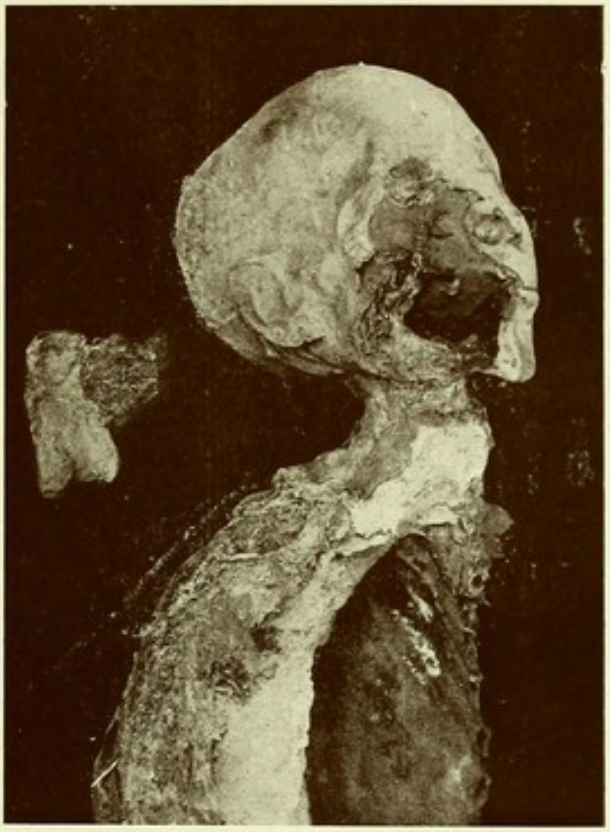


FIG. 2.

FIG. 3.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
3 FEB 25
LIBRARY

PLATE XIV.

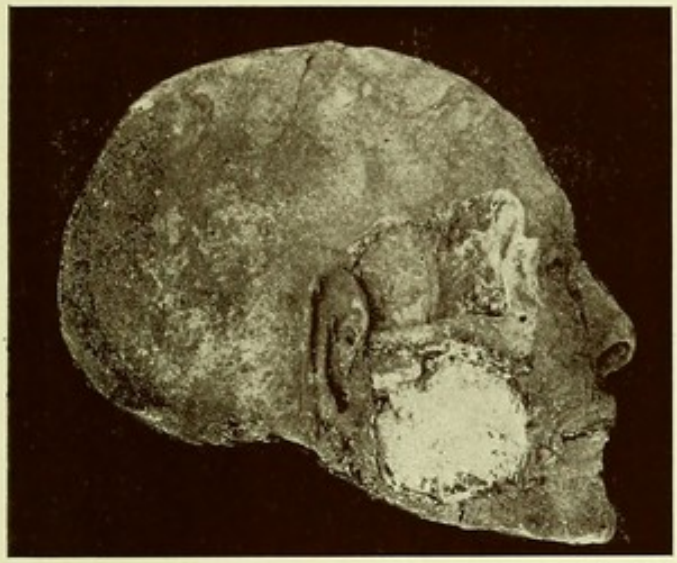


FIG. 2.

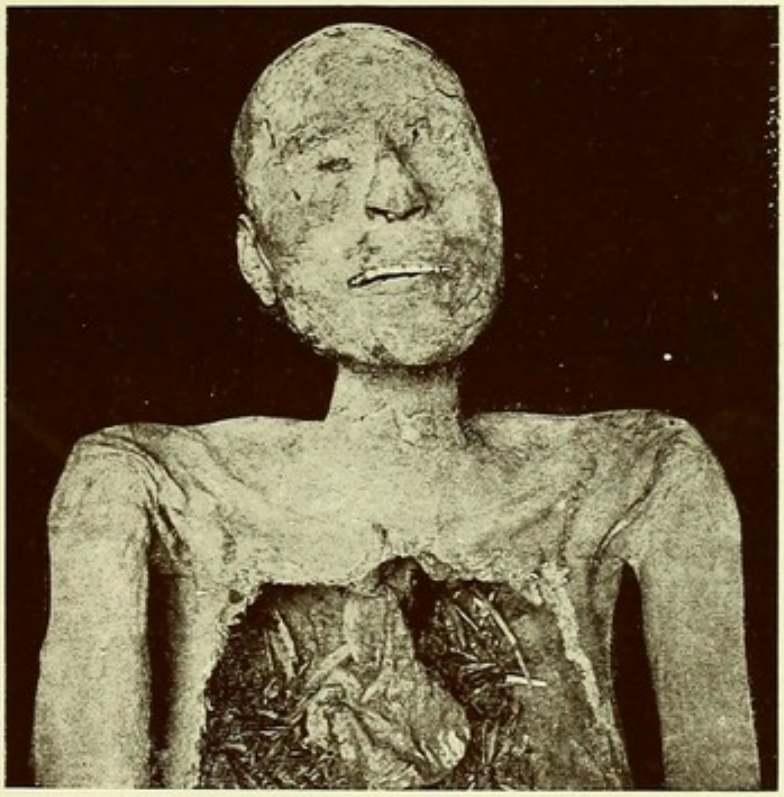


FIG. 3.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
-3 FEB 25
LIBRARY

PLATE XV.

FIG. 1.

FIG. 2.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
-3 FEB 25
LIBRARY

PLATE XVI.

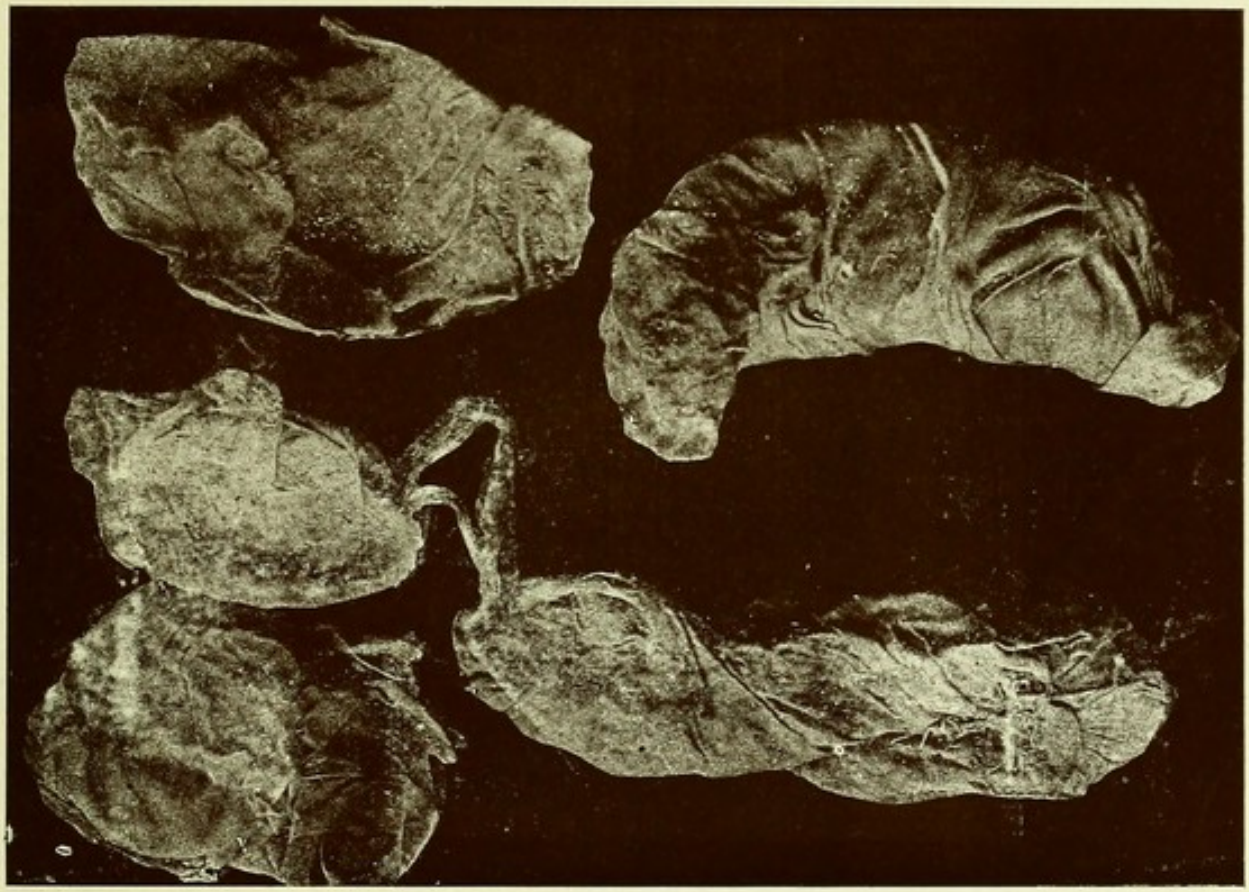


FIG. 2.

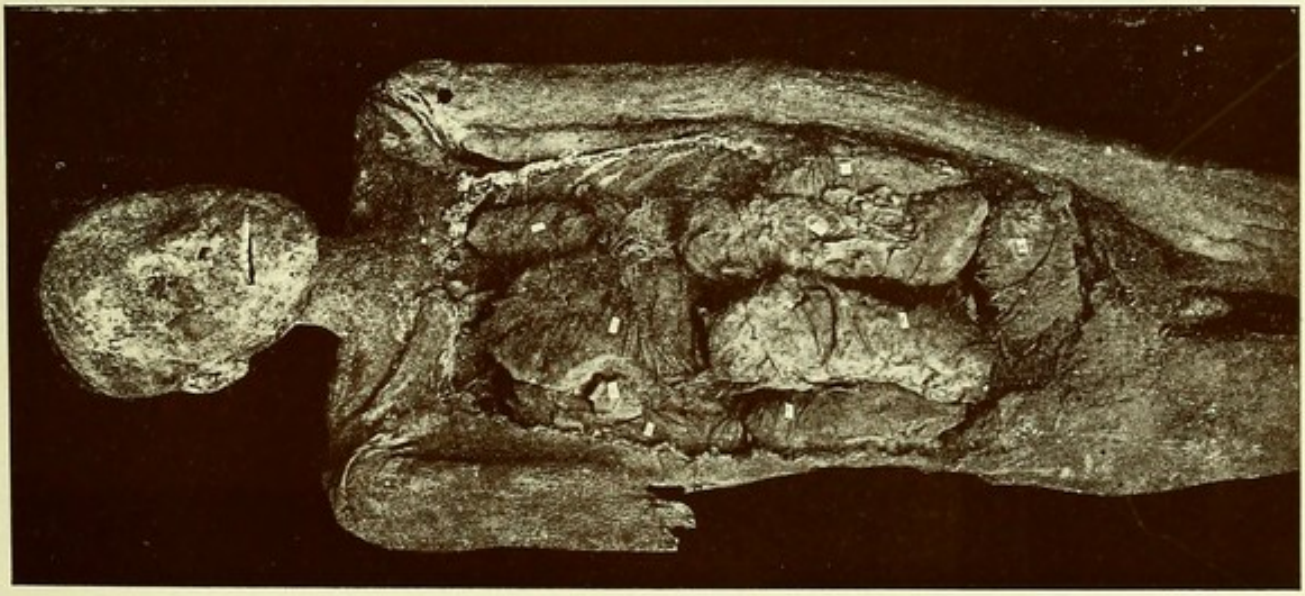


FIG. 1.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
3 FEB 25
LIBRARY

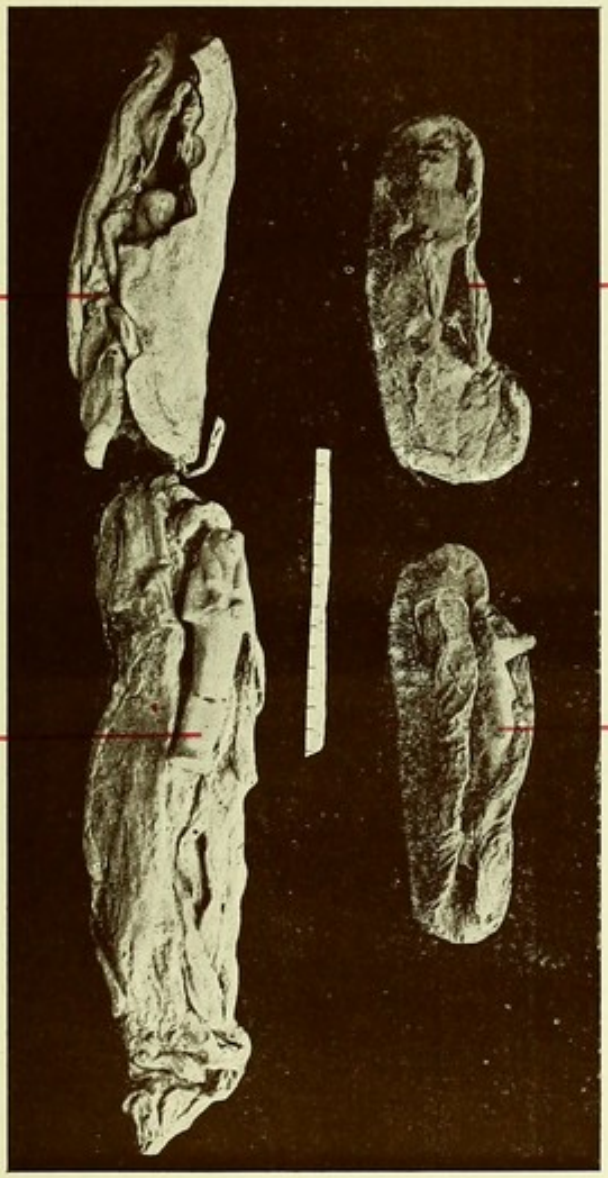


FIG. 1.

FIG. 2.

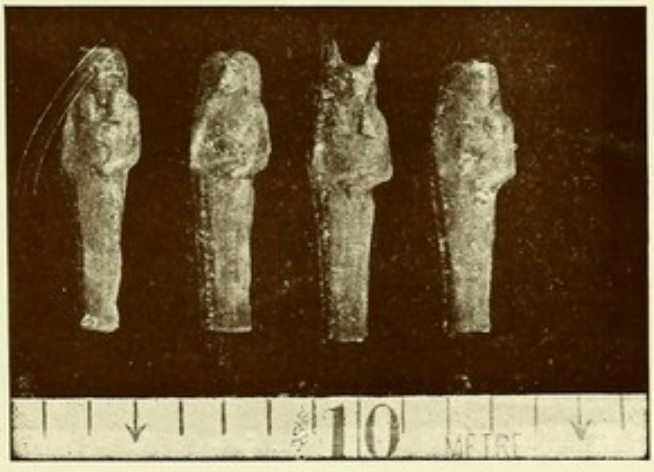


FIG. 3.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
3 FEB 25
LIBRARY

Fig. 1.

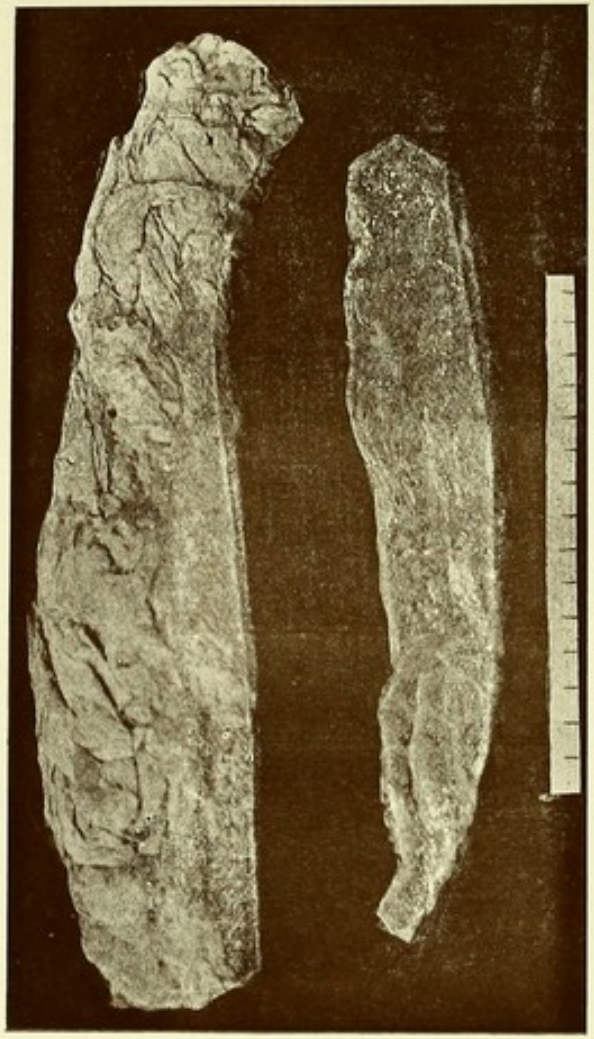


Fig. 2.

Fig. 3.

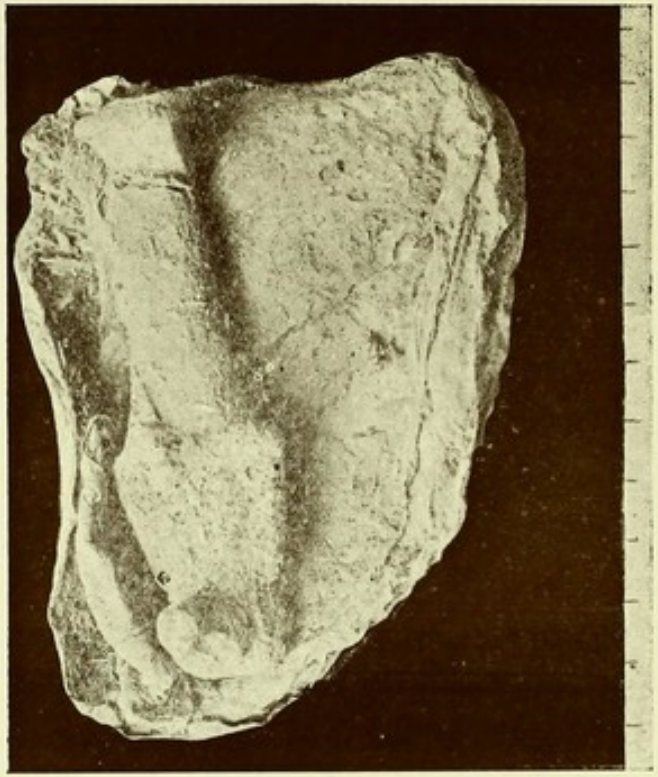


Fig. 4.

Plate XVIII.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
3 FEB 25

PLATE XIX.

FIG. 1.

FIG. 2.

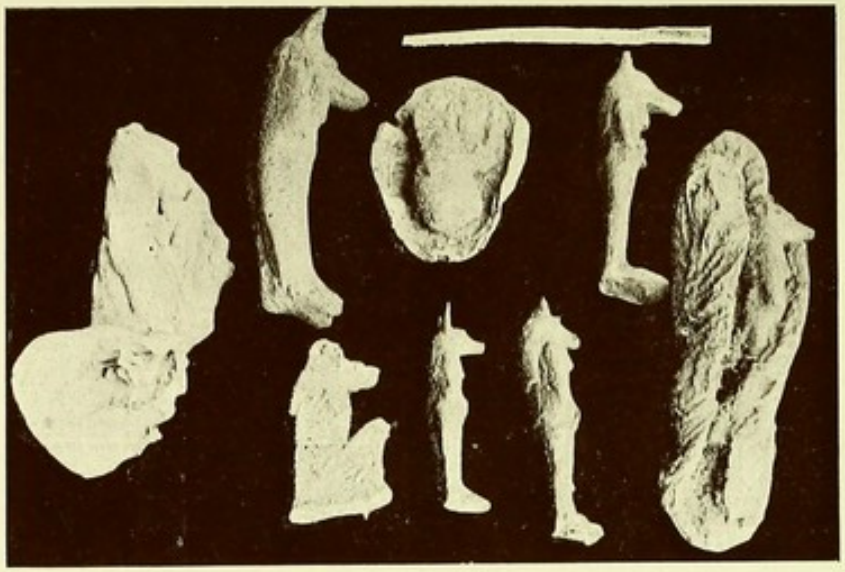


FIG. 3.

ROYAL COLLEGE OF SURGEONS OF ENGLAND
-3 FEB 25
LIBRARY