
PHILOSOPHICAL
TRANSACTIONS.

- I. *An Account of a Mummy, inspected at London 1763. In a Letter to William Heberden, M. D. F. R. S. from John Hadley, M. D. F. R. S.*

Dear Sir ;

Read Jan. 12, 1764. **O**N the 16th of December 1763, Dr. Wollaston, Dr. Blanhard, Dr. Hunter, Dr. Petit, the Rev. Mr. Egerton Leigh, and Mr. Hunter, met at my house; that we might together inspect a Mummy, which I had received from the Museum of the Royal Society.

Our intention was; to examine the manner, in which this piece of antiquity had been put together; to compare it with the accounts given of these preparations by ancient authors; and to see, whether there were any traces left of the softer parts; and, if so, by what means they had been preserved. A greater

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number of authors have written on this subject, than I was aware of; so that, in all probability, we have not made any new discoveries. I enclose to you the result of our enquiry; and the few obvious reflexions which occurred. If they appear to contain any thing worthy notice, you will please to communicate them to the Royal Society. I am,

Dear Sir,

Your most obedient and

Charter-House,
Jan. 10th, 1764.

Obliged humble Servant,

John Hadley.

THE Mummy, which is the subject of the following pages, is the first article in Dr. Grew's Catalogue of the rarities of the Royal Society. He informs us, that it was a present from Henry Duke of Norfolk; and was an entire one, taken out of the Royal Pyramids. He then proceeds to describe the manner, in which the several parts were wrapped up; but this he has not done exactly: as most of these very parts had evidently never been opened, till we examined them: and were then found in a very different state from that in which they are represented by him.

This Mummy had been greatly injured, before it came into our hands; the head had been taken off from the body; and the wrappers, with which they had been united, having been destroyed, the cavity of the thorax was found open towards the neck: and part of the upper crust, with the clavicles, having been also broken away, the heads of the *ossa humeri* presented themselves covered with a thin coat of pitch.

The feet also had been broken off from the legs; and were fixed, by wires, to the end of the wooden case in which the Mummy lay.

The outward painted covering, which reached from the upper part of the chest nearly to the bottom of the legs; had been removed and fastened on again by a great number of ordinary nails, driven up to the head into the substance of the Mummy. This had most probably been done by those, who had orders some years since to repair it; and by this, and by the manner in which they had fastened on the feet, they seem to have done their work in a most clumsy manner.

This whole external covering of the fore part of the Mummy consisted of several folds of broad pieces of linnen cloth ; made to adhere together by some viscous matter, which had not yet lost its property : and the whole had received an additional degree of strength and substance from the coat of paint laid on. The figures, which were not entirely defaced, were so much of the same kind with those which the writers on this subject have described, as to make any account of them here needless : and, indeed, they were all so much injured, as to render a particular description of them very difficult, if not impossible.

There were not the least remains of hair or integuments, on any part of the head ; some parts of the skull were quite bare ; particularly about the temporal bones : which had the natural polish, and appeared in every respect like the bones of an ordinary skull. To other parts of the skull adhered several folds of pitched linnen ; which together were near half an inch in thickness : on removing them, they were found to have been in actual contact with the bone ; so that the integuments must have been taken away, before the wrappers were at first applied.

The under jaw was lost : and the superior maxillary, sphenoidal and ethmoidal bones were broken away ; the *foramen occipitale* was stopped up with pitch, with which also the inner part of the skull was lined ; this seemed to have been poured in at the *foramen*, and made to apply to the several parts of the inside of the skull, by turning the head in different directions ; the wave of the melted pitch from such motion appearing very plain. The inside of the skull was in many places covered very thinly ; and, in some few, which
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the fluid pitch had missed, it was quite bare. The pitch, which stopped up the *foramen occipitale*, had on it the impresson of one of the *vertebræ* of the neck; and externally about the *foramen* adhered a considerable quantity of pitch.

The outward painted covering being removed, nothing but linnen fillets were to be seen: which enclosed the whole Mummy.

These fillets were of different breadths; the greater part about an inch and a half, those about the feet much broader: they were torn longitudinally; those few that had a selvage having it on one side only; the uppermost fillets were of a degree of fineness nearly equal to what is now sold in the shops for 2s. 4d. per yard, under the name of long lawn; and were woven something after the manner of Russia-sheeting: the fillets were of a brown colour, and in some measure rotten. These outward fillets seemed to owe their colour to having been steeped in some gummy solution; as the inner ones were in pitch.

The fillets immediately under the painted covering lay in a transverse direction; under these, which were many double, they lay oblique, diagonally from the shoulders to the *ilia*. Under these the fillets were broader, some nearly three inches; and lay longitudinally from the neck to the feet, and also from the shoulders down the sides; on which there was a remarkable thickness of these longitudinal fillets: under these they were again transverse, and under these again oblique.

The fillets in general externally did not adhere to each other; but, though pieces of a considerable length could be taken off intire, yet (from the great age)

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so tender was the texture of the cloth, that it was impossible regularly to unroll them.

As the outward fillets were removed, those that next presented themselves had been evidently steeped in pitch, and were in general coarser, in folds, and more irregularly laid on; as they were more distant from the surface. The inner filleting of all was so impregnated with pitch, as to form with it one hard black brittle mass; and had been burned nearly to a coal. On breaking this, it appeared in many places as if filled with a white efflorescence: like that observable on the outside of *pyrites*, which have been exposed to the air. This efflorescence however had nothing saline to the taste; and did not dissolve in water: but instantly disappeared, on bringing it near enough to the fire to be slightly heated; and was soluble in spirit of wine.

In the cavity of the *abdomen* we found several small pieces of bone, which had the appearance of dry oak, mixed with crumbled pitch; under this was found more solid pitch, which adhered to the spine.

After cutting away the mass of cloth and pitch which covered the *thorax*; we found, the arms had been laid straight down by the sides of the chest, and the ulna and radius bent upwards, and laid with the hands across upon the breast, the right hand being uppermost.

The bones of the fingers were lost; but the metacarpal bones were found, broken off, and fallen into the thorax.

The filleting, which went round the upper part of the body, included the arms also; but they had evidently

dently been first wrapped separately, then laid up in the position in which we found them, and the hollows which they formed filled up with pieces of pitched cloth.

In the cavity of the thorax there was also a considerable quantity of crumbled pitch and splinters of dry bone; and, as in the progress of this examination we continually found, that some of the bones did, as we laid them bare, separate into such splinters; it is very probable, that this appearance was owing to the Mummy's having been handled in a rough manner, and much shaken by the persons who had driven it full of nails, when they were employed to repair the outside of it.

On our first opening a way into the *thorax*, we imagined the ribs were destroyed; but, upon a more accurate examination, they were found entire; but so bedded in the pitch, and so black, and burned into the mass, as to make it difficult to distinguish these very different substances from each other.

The bones of the spine and of the *pelvis* were in the same state with the ribs; only rather more burned.

There was a considerable thickness of hard solid pitch lining the cavity of the *thorax*; this had been evidently liquified, and poured in; and retained that glossy appearance on its surface, which is observable on pitch that is suffered to cool without being disturbed.

On breaking through this hard crust of pitch, to examine the *vertebræ* and the ribs, the pitch, which was under this crust and nearest to the bones, was crumbly and soft; and, on being exposed to the air, grew perfectly moist, in a very short time.

The lower extremities were wrapped separately in fillets to nearly their natural size, and then bound together; the interstices being rammed full of pitched rags.

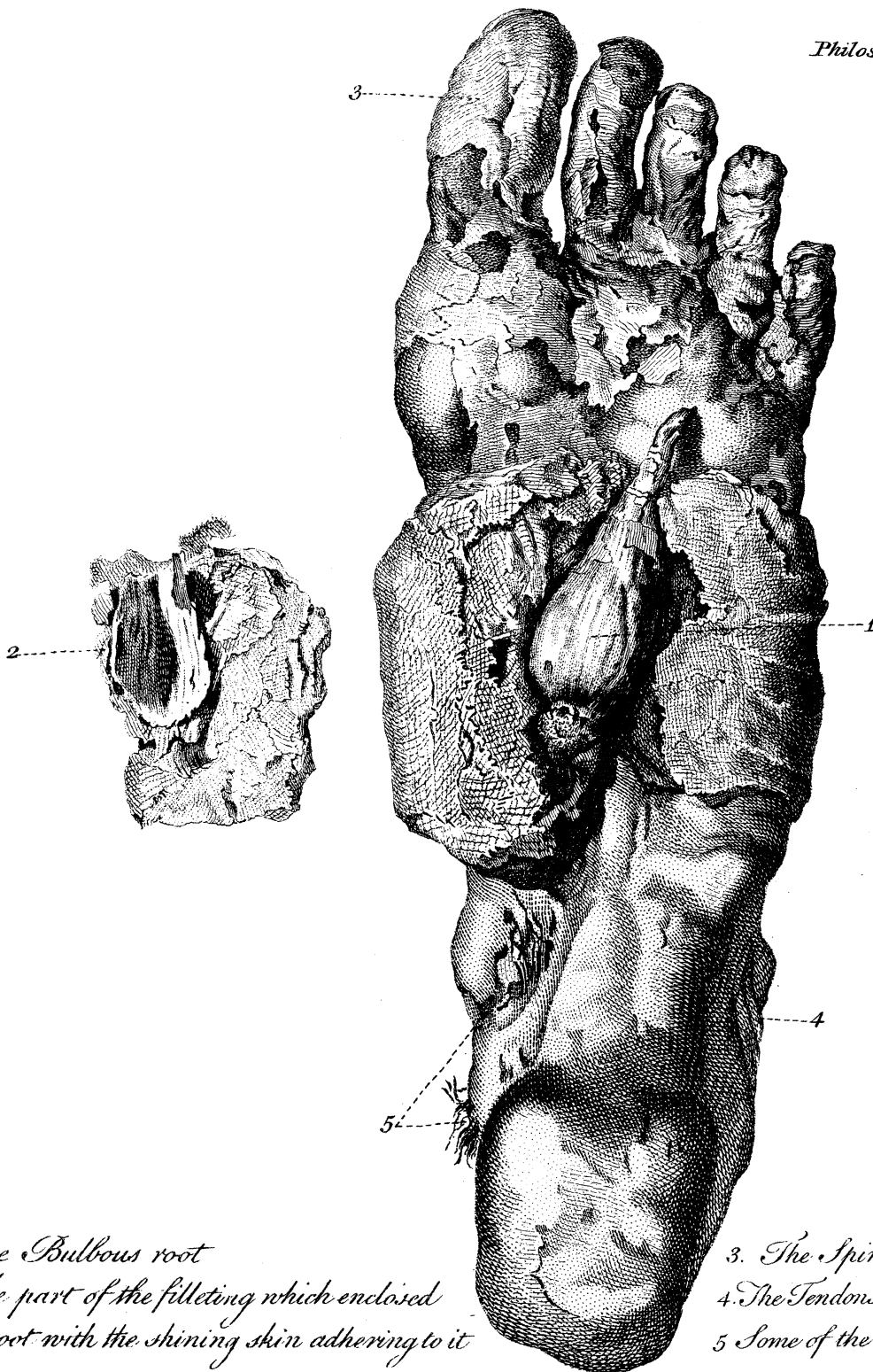
On cutting through the fillets on the thighs, the bones were found invested with a thin coat of pitch; and the filleting was bound immediately on this.

The *tibia* and *fibula* of each leg were found also wrapped in the same manner; and the bones in actual contact with the pitch: excepting in one or two places, where the pitch was so very thin, that the cloth appeared to adhere to the bone itself.

The feet were filleted in the same manner; being first bound separately, and then wrapped together. The filleting had been by some accident rubbed off the toes of the right foot; and the nail of the great toe was found perfect: the last joints of the bones of the lesser toes had been broken away; by which it appeared, that these bones had been penetrated and their cavities quite filled with pitch. The filleting about the heel had also been broken away, and the bones of the *tarsus*, and some of the metatarsal bones had fallen out and were lost; leaving the remaining filleting like a kind of case.

The fillets on the left foot were perfect; except on the heel, and where they had been divided from those of the leg; a small portion of the *tendo Achillis* adhered to the *os calcis*; and some of the ligaments to the *astragalus*.

On cutting into the fillets on the sole of this foot, they were found to enclose a bulbous root. The appearance of this was very fresh; and part of the thin
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1. The Bulbous root

2. The part of the filleting which enclosed the root with the shining skin adhering to it

3. The Spiral lines of the skin

4. The Tendons of $\frac{1}{2}$ Peroneus Anticus & others

5. Some of the Ligaments of the Tarsus

shining skin came off with a flake of the dry brittle filleting, with which it had been bound down; it seemed to have been in contact with the flesh: the base of the root lay towards the heel. [Vide T.A.B. I.]

This discovery immediately brought to mind a passage in *Prosper Alpinus* *, and gave some appearance of probability to a relation, which, as he himself insinuates, might give great reason to doubt his veracity. Speaking of the stone image of a *scarabæus*, which was found in the breast of a Mummy he adds: “ *Incredibile dictu, rami rorisma-*
“ *rini qui una cum idolo inventi fuerunt, folia usque*
“ *adeo viridia et recentia visa fuerunt, ut eâ die a*
“ *plantâ decerpti et positi apparuerint.*”

The fillets were removed from this foot with great care; they were much impregnated with pitch, excepting about the toes; where the several folds united into one mass, being cut through, yielded to the knife like a very tough wax. The toes being carefully laid bare, the nails were found perfect upon them all; some of them retaining a reddish hue, as if they had been painted: the skin also, and even the fine spiral lines on it, were still very visible on the under part of the great toe, and of the three next adjoining toes. Where the skin of the toes was destroyed, there appeared a pitchy mass, resembling in form the fleshy substance; though somewhat shrunk from its original bulk. The natural form of the flesh was preserved also on the under part of the foot; near the bases of the toes. On the

* Prosper Alpinus rerum Ægyptiarum, &c; cum notis Vesslingii, 1735. pag. 36.

back of the toes appeared several of the *extensor* tendons.

The root just mentioned was bound to the foot by the filleting that invested the metatarsal bones; no more of this filleting was cut away, than was just sufficient to shew, without removing from its place, a substance which had been preserved in so extraordinary a manner.

On cutting away the fillets which covered the *tarsus*, the bones adhered strongly together; and were covered with hard pitch: with which they seemed thoroughly impregnated.

On cutting away this outward pitch, there appeared very distinctly the tendons of the *peroneus anticus* and *posticus*, the tendons of the *extensor digitorum longus*, and the tendon of the *tibialis anticus*; and besides these a considerable portion of the ligaments of the *tarsus*.

On examining the case formed by the pitch and fillets, which had covered the right foot, and out of which the bones had been taken; there was a very plain mould left, in which there had been enclosed another root similar to that we discovered in the left foot; and in which some of the external shining skin of the root still remained.

During this whole examination, if we except what was discovered in the feet, there were not found the least remains of any of the soft parts.

All the bones of the trunk were bedded in a mass of pitch; and those of the limbs were covered with a thin coat of it, and then swathed in the fillets: which (as has been mentioned) in some places where the pitch was very thin, seemed to adhere to the bone itself.

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The cavities of many of the bones, on being broken, were found quite full of this substance: the metacarpal bones were so; as were the *radii*, and many others: the ribs, as was before mentioned, were impregnated with it; and so burned, as to be with difficulty distinguished from it: in which state also, were the *vertebræ* and the bones of the *pelvis*.

The pitch had also penetrated into the cellular part of the head of the thigh bone; the small bones of the toes were quite full: but it had not entered into all the metatarsal bones.

From experiment it has been found; that, bones and flesh being boiled in common pitch, it will pervade the substance and fill the cavities of the former: and the latter will be so impregnated with it, as to be reduced to an uniform black brittle mass; not in the least resembling flesh.

This treatment however will not account for the state, in which this Mummy was found; for, if the flesh had not been previously removed, though its appearance would have been entirely changed, yet the filleting could never have been found in contact with the bones.

From this last circumstance it is most likely that the body, excepting the feet, had been reduced to a skeleton, before it was laid up; it is also pretty certain, that it must have been kept some time in boiling pitch; both before and after some of the layers of the innermost filleting were laid on.

The feet seem to have been swathed, at least in part, before they were committed to the hot pitch: and this seems to have pervaded the bandages, the flesh and the bones.

It has been imagined, that the principal matter used by the Ægyptians for embalming was the *asphaltus*; but what we found was certainly a vegetable production. The smell in burning was very unlike that of *asphaltus*; nor did it resemble that of the common pitch of the fir-tree: being rather aromatic.

It was compared with a variety of resins and gum-resins; but seemed not to resemble any of them, excepting myrrh; and that but very slightly.

In all probability, it was not a simple substance; but might be a mixture of the resinous productions of the country, with the pitch of that tree which they had in greatest plenty.

The *Αλειφαρ τῶν Κεδρῶν* of *Herodotus**, and the *Κεδεμα* of *Didorus Siculus*†, was most probably the tar of the cedar; it is the substance said by these authors to be used for embalming; *Galen*‡ mentions its power of preserving bodies; and § *Dioscorides* calls it *Νεπερῶς ζῶν*. *Pliny*, speaking of the cedar, says; that the tar was forced out of it by fire, and that in *Syria* it was called *cedrium*: *cujus tanta vis est, ut in Ægypto || corpora hominum defunctorum eo perfusa servantur.*

Some branches of the cedar were procured from the physic garden at *Chelsea*; and, being treated in the manner described by *Pliny*, yielded tar and

* Herodot. Euterpe, pag. 119. ed. Gronov.

† Diodor. Sicul. lib. i. p. 82. ed. Rhodomanni.

‡ Galen. de simpl. Med. Facult. lib. vii. cap. 16.

§ Dioscorides de mat. medic. lib. i. cap. 105. pag. 56. Francof. 1598.

|| Plinii Histor. lib. xvi. cap. 11. pag. 382. ed. Dalecamp.

pitch, which had no aromatic smell, and seemed in many respects similar to the produce of the fir-tree. There must undoubtedly therefore have been some other resinous matter mixed with the *cedrium*.

The pitch of this Mummy was carefully distilled; but gave no other produce, than what might be expected from a resinous body; the *caput mortuum*, when burned and elixated, yielded a fixed alkali; to this may be attributed the moisture, which the pitch, that was in contact with the spine and those other parts which were most burned, contracted on being broken and exposed to the air; for this pitch had an alkaline taste, and had been more than melted; having been burned to a *caput mortuum*.

A great variety of experiments were made on this pitchy matter; the result of them all tended to prove, that it had not the least resemblance to *asphaltus*; but was certainly a vegetable resinous substance.

Monf. *Rouelle*, in the Memoirs of the Royal Academy of Sciences for 1750, has given us a very elaborate and ingenious treatise on embalming: wherein he has chemically analysed the pitch of six different Mummies.

From his observations; from what *Pietro della Valle**, and *Joannes Nardius* † at the end of his edition of *Lucretius*, have written on this head; from

* *Viaggi di Pietro della Valle*, Tom. 4.

† *Lucretius Joannis Nardii de Funeribus Ægyptiorum Animadversio* 50. p. 627. These accounts of *della Valle* and *Nardius* are also to be met with in the 3d vol. of *Athanas. Kircher's Oedipus Ægypt.*

what Dr. *Middleton* † observed in the Mummy which was opened at *Cambridge*; from the *Memoires* of Count *Caylus*, in the 23d vol. of *Acad. des Inscript. et Belles Lettres*; and from this present examination; it appears, that various methods of embalming were practised among the *Ægyptians*; and that they used different materials for this purpose: and though *Herodotus* and *Diodorus Siculus* have given us reason to expect to find the bodies in a much more perfect state, than we ever do meet with them, yet, on the other hand, it is evident; from the foot of this Mummy which we examined, and from the account *Monf. Rouelle* and Count *Caylus* have given us in the above mentioned *Memoires*; that all the fleshy parts were not always previously destroyed.

† *Middleton's* works, vol. 4. *Germana quædam Antiquitatis monumenta.*