Trephining in the Neolithic Period

Author(s): Victor Horsley

Source: *The Journal of the Anthropological Institute of Great Britain and Ireland*, Vol. 17 (1888), pp. 100-106

Published by: [Royal Anthropological Institute of Great Britain and Ireland](#)

Stable URL: <http://www.jstor.org/stable/2841590>

Accessed: 15/06/2014 07:27

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Royal Anthropological Institute of Great Britain and Ireland is collaborating with JSTOR to digitize, preserve and extend access to *The Journal of the Anthropological Institute of Great Britain and Ireland*.

<http://www.jstor.org>

- From the AUTHOR.—Prebasioccipitale o basiotico (Albrecht). By Prof. G. Sergi.
- Ricerche di Psicologia sperimentale. By Prof. G. Sergi.
- Interparietali e preinterparietali del cranio umano. By Prof. G. Sergi.
- Antropologia Fisica della Fuegia. By Prof. G. Sergi.
- From the UNITED STATES GEOLOGICAL SURVEY.—Mineral Resources of the United States. Calendar Year 1885.
- From the BERLIN GESELLSCHAFT FÜR ANTHROPOLOGIE, ETHNOLOGIE, UND URGESCHICHTE.—Zeitschrift für Ethnologie. 1886, Heft 6; 1887, Heft 1.
- From the ESSEX FIELD CLUB.—The Essex Naturalist. No. 4.
- From the SCOTTISH GEOGRAPHICAL SOCIETY.—The Scottish Geographical Magazine. Vol. III. No. 5.
- From the ARCHÆOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.—The Archæological Journal. No. 173.
- From the ASSOCIATION.—Journal of the East India Association. Vol. XIX. No. 3.
- From the SOCIETY.—Journal of the Society of Arts. Nos. 1797, 1798.
- Proceedings of the Royal Geographical Society. 1887, May.
- Journal of the Asiatic Society of Bengal. Nos. 272, 273.
- Proceedings of the Asiatic Society of Bengal. 1886, December; 1887, January.
- Mittheilungen der Anthropologischen Gesellschaft in Wien. Band XVI. Heft. 3, 4.
- From the EDITOR.—Nature. Nos. 913, 914.
- The Photographic Times. Nos. 292, 293.
- Journal of Hydrotherapeutics. No. 1.
- L'Homme. 1887. No. 5.

Prof. FLOWER read a letter from Emin Pasha, dated Wadelai, 8th November, 1886.

Prof. VICTOR HORSLEY, F.R.S., delivered a discourse on "Trephining in the Neolithic Period," illustrated by numerous photographic transparencies projected on the screen by the oxyhydrogen lantern.

TREPHINING *in the* NEOLITHIC PERIOD.

By VICTOR HORSLEY, B.S., F.R.S., &c.

(Abstract).

THE object the author had in view was to obtain the criticism of the Anthropological Institute upon certain views which he had formed from a surgical standpoint, of the operative procedure of trephining as practised by the people of the polished stone epoch, and the reasons which led to its performance.

After discussing the evidence which has now accumulated respecting the probable mode of operating, namely, whether it was done by boring, scraping, or sawing, he shewed reason for believing that in the majority of instances it was by means of sawing, and that in some cases this might have been supplemented by scraping. The evidence upon which these opinions were based was supplied by numerous photographs¹ of specimens in the Broca Museum and elsewhere.

The most usual seat of operation was next discussed, and in illustration of this part of the subject photographs were shewn of a skull upon which the author had marked in outlines, the margins of all the trephine openings of which he had been able to obtain specimens.

By means of this composite arrangement it was demonstrated beyond question, that in almost all the known instances of this practice the opening in the skull was made over that portion of the surface of the brain which is known to be more especially the seat of representation of movement. This region of the brain, moreover, is the seat of origin of that special form of convulsions which is known as Jacksonian epilepsy, and which so frequently follows injuries to the skull and brain. The anatomical grounds, therefore, for accepting the view that the operation was performed to relieve urgent symptoms of the kind mentioned would appear to be very strong.

But further facts of interest exist in this connection. This special form of epilepsy most usually commences with a peculiar sensation in one definite part of the body, whence it travels up the limb towards the head, this usually constituting the *aura* or warning of the onset of the fit. This factor is of special importance since it commonly happens that at the moment when the sensation appears to reach the head consciousness is lost. If, moreover, the mischief is occasioned by a depressed fracture there will be considerable tenderness at the injured place, and this becomes exaggerated at the period of convulsions. Putting these facts together with minor details of such cases too numerous to be mentioned here, the following mode in which the practice may have originated among so savage a people seems to be possible.

The tender cicatrix may have first been excised as the source of pain.

This probably would have produced a temporary benefit, sufficient to encourage the patient to undergo, in case of relapse, a further operation for the removal of bone.

¹ Prof. Horsley was very greatly indebted to the kindness of Prof. Duval and Prof. Topinard, who permitted him to take numerous photographs of the unique specimens under their care.

This would in most cases be followed by relief, not merely of the pain but of the fits also.

Consequently the operation would gain a certain reputation for the cure of convulsions generally, and as such might have been frequently practised among savages to whom pain is of slight consequence.

The author then alluded to the various theories which have been promulgated to explain this interesting problem, and shewed reasons for not accepting them.

DISCUSSION.

Sir JAMES PAGET, having been called upon by the President to open the discussion, said that he had studied the subject too little to speak on many of the points referred to by Mr. Horsley, but thought that he had shown the great probability that the opening of the skull was, in different instances, practised in all the three methods described by him. The sloping bevelled edges of some of the openings seemed sufficient evidence of the chiselling; the minute holes arranged in forms approaching circles indicated the drilling; the deep-cut narrow lines the sawing; and so far as he knew or had seen in the many dissected skulls in the Museum of the College of Surgeons and in other museums, there was none of them that made it probable that the changes illustrated by Mr. Horsley were results of disease. Openings in the skull, due to the growth of tumours within it, were not very rare, but in these the opening in the outer table was not larger, but often was smaller, than that in the inner, and there was no bevelling from the outer table to the margin of the inner. Necrosis of the skull due to disease might, when healed, nearly imitate some of the changes referred to the trephining; but such necrosis was rarely on only one spot on the skull. The specimens appeared to be excellent examples of recovery from operations which were, probably, far less dangerous to the rough uncivilised people on whom they were practised than they are now to the more cultivated races, even though these may have all the advantages of the skill and knowledge which are employed in modern surgery.

Sir WALTER BULLER, K.C.M.G., on being appealed to by the President, as to whether any form of epilepsy was common among the Maoris of New Zealand, said that such cases, if they did exist must be very rare indeed, for he could not remember having met with a single instance. He added that he had listened with much interest to Professor Horsley's excellent lecture, and that while looking at the limelight illustrations he was forcibly reminded of a Maori skull which had come under his own notice. The Maori to whom this skull belonged had evidently sustained a severe injury in the head, probably by a blow from a *tewha tewha*, or wooden *patu*, which had completely laid open his skull to the extent of several inches. It was evident that this had happened during life,

and that the subject had survived the injury, because the sides of the long opening had become rounded over in the process of healing, as so well explained and illustrated by Professor Horsley. He knew nothing of the man's history, but it was clear from the condition of the bone, that he had long survived this terrible wound, and it was likely enough that he had afterwards died in the odour of sanctity. At any rate this very interesting skull had been preserved, and was, he believed, now in one of the Colonial museums.

Dr. PRIESTLEY said he felt in some embarrassment in being called upon to speak, as the subject of the paper was entirely new to him.

Mr. Horsley's communication was extremely interesting, and from the point of view suggested by the President, would, of course, have had additional interest if any mention had been made of the practice of trephining infants as well as adults. He had some recollection of having heard or read of the practice of trephining young children in prehistoric times, probably for convulsions and other like ailments, but the operation was then most likely undertaken, not for purely surgical reasons, but in the superstitious belief that the demon which caused the malady would thus be liberated.

It was well known that convulsions in children were relatively more frequent than in adults, and consequently if in former times it were the practice to trephine the skull for fits or other cerebral ailments in grown-up people, it might be inferred that the proceeding would more frequently be carried out in younger people.

As to the influence of the operation on infantile mortality, to which the President had alluded, he feared he could say nothing, as he knew of no records on the subject.

Dr. RYLE remarked that it was interesting to compare with the results of anthropological investigation the writings of the early medical authors. Trephining is several times mentioned in the works of Hippocrates. In some of his writings, about the genuineness of which there is no question, the date of which would therefore be about 400 B.C., he describes cases of head injuries which he had treated by trephining, and it may be noticed that although he had observed the association of convulsive movements on one side of the body with injuries to the opposite side of the head, he does not endeavour to localise by means of these movements the site of the injury, or the spot at which the trephine should be applied.

A still more interesting notice of trephining is found in the writings of Aretæus, the Cappodocian, who probably flourished about the second century of our era. He actually advises the use of the trephine for the treatment of epilepsy.

He does not apparently make the distinction which we now

draw between traumatic and idiopathic epilepsy, but simply recommends trephining for severe cases.

His account of cranial operations is particularly noteworthy in connection with the description of the operations of the neolithic people which Mr. Horsley had given. For cases of simple pain in the head localised scraping of the bone down to the diploe was practised, but when epilepsy existed the trephine was employed. And it was employed in a peculiar manner. The operator was not to go deeper than the diploe, and was then to bring about the separation of the inner layer of the bone by the use of ointments and poultices. If we may allow ourselves to speculate upon the reasons which may have led to this practice, we may suppose that the two dangers which modern surgeons are familiar with in these operations, viz., direct injury of the brain or membranes by the trephine going too deeply, and hæmorrhage from blood vessels lying on the inner surface of the skull, were recognised by these early operators, and may have given rise to the method of operating which Aretæus describes. To remove this portion of the inner table of the skull after trephining by the slow process of necrosis and exfoliation of bone must have occupied a very considerable length of time. It would be interesting to know if there are any signs of this prolonged mode of operating in the skulls of the neolithic age.

Miss BUCKLAND said that having had the advantage of hearing Dr. Broca's description of the trephined skulls in his museum, she wished to point out that Mr. Horsley differed in several particulars from that distinguished anthropologist. Dr. Broca had dismissed the idea that these neolithic trephinations had been resorted to for the relief of traumatic epilepsy, because he found no sign of depressed fracture either in the region of the operation, or in any other part of the skull, whilst almost invariably there were signs of growth, proving that the operation had been performed in early life, the parietal bones rather than the vertex being the favourite part for the operation. As regards the mode of operation, Dr. Broca had demonstrated that precisely similar openings could be made by scraping with a flint implement or piece of glass, and as this is the method still in use in the South Sea Islands, Miss Buckland believed that Dr. Broca's idea that the neolithic trephinations were thus performed was more likely to be correct, than that these oval openings could have been made by drilling or sawing, although both the latter modes are in use among the Kabyles, who possess metal instruments; but the fact that where the saw is employed, a square is marked out as in Peru, would prove the practice to differ from that in use in France in neolithic times, no square lines being observable, so far as she knew, on the French trephined skulls. That these openings were made to facilitate the exit of evil spirits who had caused the epilepsy or infantile convulsions, seems probable from the fact that in all ages such seizures were regarded as the work of evil spirits, whilst the use of cranial amulets as

charms against such diseases, was not confined to neolithic times, but exists even at the present day, as witnessed by an article in the "English Illustrated Magazine," where it is related that a cranial amulet in Perugia is greatly venerated, as having belonged to a holy man who had been famed for the cure of epilepsy, and it is suggested that pieces had been cut from many skulls in the cemetery in that city for similar uses. Among the Kabyles the operation seems to be regarded as a religious rite, and there would appear to be so little danger apprehended from it that a case is recorded in which a man was trephined five times in as many years and yet survived.

Prof. E. TYRRELL LEITH remarked that he thought greater attention should have been directed to primitive psychology in seeking an explanation of the custom in question. He referred more especially to the doctrine of spirit possession, which had not, unfortunately, been hitherto treated as adequately as its great importance deserved. He ventured to suggest that considerable light would be thrown on the custom by comparing it with another, which had survived in India down to modern times. When a Sanyasi, or Brahman ascetic, felt himself at the point of death, he caused himself to be seated in an open grave, which was filled in with salt. At a given signal his skull was broken with a cocoanut or stone by a chosen disciple, and earth was then hastily heaped upon him. That rite, he believed, must have originated in the idea that as speedy an exit as possible ought to be provided for his soul, which, according to a dogma of Hindu philosophy, resided in the top of the head. In the stage of human progress known as Shamanism, all disease was attributed to demoniacal possession, and the Shaman, or medicine-man, was accordingly called in to effect a cure by expelling the evil spirit with the aid of incantations. No cases afforded the savage mind more striking proof of demoniacal influence or the efficacy of magical cure than epilepsy. It seemed, therefore, highly probable that the process of trephining had been employed by primitive man in order to expel the demon who possessed the patient, especially in cases of epilepsy. Such an explanation was not necessarily opposed to the theory propounded by Prof. Horsley regarding the empirical discovery of a cure for traumatic epilepsy by removing such portions of bone as pressed upon the brain in fracture of the skull. He submitted, however, that a higher degree of probability existed in favour of his own hypothesis, as it was more in accordance with the mental process observable in savages at the present day. It had been stated in the paper that in two of the specimens examined it was doubtful whether trephining had been performed during life. Even supposing it had not, that fact was quite compatible with his hypothesis, for it was a common belief among the lower races that the soul remained in the body for some time after death. As regarded the suggestion that the operation might have been employed for the purposes of embalming, he would merely remark

that he did not remember to have met with any description of its use in ancient Egypt. He had always understood that, in the case of Egyptian mummies, the brain was extracted by means of hooked instruments through the nostrils.

The PRESIDENT said that although the author of the paper and M. Broca had both ignored the possibility of an instrument like the modern trephine having ever been used to cut circular discs out of the skull, it might be well to bear in mind that such instruments were largely used by the ancient Egyptian stone masons for hollowing their sarcophagi. These were proved by Mr. Flinders Petrie to have been bronze tubes, set with teeth of very hard stones or jewels; the fact that they were bronze being evidenced by the marks they had left, and the hardness of the jewelled teeth by the depth of the successive cuts in the stone cores that were still to be seen in some of their unfinished works. In fact, the Egyptians were masters of the art of trephining. It would be interesting to know whether, as he believed he had somewhere read, trephining was one of their numerous surgical operations, and, if so, whether there was any evidence of the holes having had vertical edges. Of course, a trephine on the same principle, would easily be made by rude people with tubes of other material than bronze, and with flint teeth.

As regards the motives for trephining, he felt some difficulty in accepting the very ingenious hypothesis of the author, partly because it implied more intelligence than savages usually shewed. In their surgery and medicine they were apt to proceed in a very off hand, ruthless, and unintelligent manner, following their fancies and superstition rather than experience. Another difficulty that he felt was, that he had no recollection of travellers speaking of traumatic epilepsy among savages. Sir Walter Buller had told them that he had never heard of it in New Zealand, and he himself had never heard of it in South Africa, though heavy blows, not unfrequently murderous ones, and very often half murderous, were inflicted by their so-called "knob-kerries." Perhaps it was owing to that hardness of constitution, on which Sir James Paget had made such interesting remarks, that savages were more exempt from the risk of traumatic epilepsy than ourselves. It would be very important to know precisely what are the motives that prompt trephining the skull among those rude races where the practice still exists.

Prof. HORSLEY, in reply, desired to thank the Institute for the very kind manner in which it had received and discussed his views.

It was impossible to accept Miss Buckland's rendering of Prof. Broca's view, for square lines and distinct saw cuts are observable on the French trephined skulls.

Prof. Leith's view that possibly it was performed in cases of ascetics or medicine men at the time of death is one well meriting further investigation.