Trepanations from the Stone Age to the Medieval Age in Scandinavian perspective

Jennbert, Kristina

Published in:
Regions and Reflecions. In honour of Märta Strömberg.

1991

Trepanation from Stone Age to Medieval Period from a Scandinavian Perspective

Kristina Jennbert

"A couple of thralls leapt forwards and pulled off their caps. On their exposed heads they had a small cover secured over a round hole which had been drilled into the bone at the crown. Such a hole was regarded with great reverence and was conferred only on the most distinguished members of society. The evil vapours could escape through this hole, and the sunlight could enter, once they were dead, and draw up their spirit. They loosened the covers, letting the evil vapours escape, and at once regained their composure"

(Verner von Heidenstam, 1909)

Abstract

Trepanations have been performed in many parts of the world from the Late Stone Age up to the present time. The "essence" of trepanations is discussed from a Scandinavian viewpoint. Source-critical aspects, methodological questions and problems of representativeness are dealt with. The Swedish material exhibits strong male dominance during the Stone Age, Bronze Age and Iron Age, whereas the Medieval material is characterized by a more uniform distribution between the sexes. Different operating techniques are represented on the crania, and the trepanations indicate a high degree of survival. Trepanations are described as being universal phenomena, but also as intimately associated with specific cultures in their purpose and procedure. I believe that it is excessively rational to explain trepanations simply in terms of medical reasons, a view which is strongly associated with the modern, secularized world. Medicine, magic, society and religion, notions of death and the perception of illness are all interlinked. A study of the history of religion with the help of palaeopathology, medical anthropology and detailed archaeological source material would enable the debate concerning trepanations to be broadened in order to provide a more helpful appreciation of its ritual activities and of people in the society of ancient times.

Trepanations arouse both wonderment and curiosity about the knowledge and skills of other cultures and past times. In order to be able to appreciate trepanations, it is fundamentally necessary to regard man as a cultural being capable of thought and action, and of using symbols and expressions within a social reality. One dilemma with which we are faced, however, is to imagine ourselves in the reality and the cultural world of another period, and not to impose our own conceptual world view indiscriminately. Trepanations are discussed below from a Scandinavian perspective, both regionally and globally, in an attempt to define the "essence" of the trepanations.

Archaeological finds, written sources and ethnographical accounts indicate that trepanations were performed in different parts of the world from the Late Stone Age up to the present time. This long-time perspective is engrossing, and we actually come "close" to modern man. Trepanations are still performed to

this day in order to relieve acute pressure on the brain due to haemorrhage or a blow to the head. It is hoped that, by concentrating on the trepanations performed on people in different cultural contexts, our understanding of people in other cultures and in former times can be increased and, not least, the ethnocentric view which characterizes so many opinions about "prehistoric man" can be changed.

A number of questions must be asked, on both an individual and a collective plane, in respect of causes, execution and survival in the cultural environments of the various periods. What are of interest on an individual plane are the relief of pain, the symptoms, and whether the person who was trepanned occupied a special position within society. The question which arises on the collective plane is why trepanations were performed. Are the trepanations universal or culture-specific; i.e. are they linked locally or regionally to certain areas during different so-called archaeological periods? Were the trepanations performed for medical or ritual reasons? The source material may provide details which bring us closer to the problem, although a wider variety of source material is essential if we are to arrive at a more reliable appreciation. The very extensive and detailed literature which has been published in the fields of archaeology, physical anthropology, medicine and ethnography provides the basis for a discussion of the various questions.

Trepanations can be discussed from a local, regional or global standpoint. In this respect primarily the Swedish trepanned material will be described, discussed and compared with Danish finds (Bennike 1985) and one Norwegian find (Scheiner 1946). The Scandinavian material has already been included to a certain extent in the international discussion of cultural influences and distinctive features in Europe (Piggot 1940; Károlyi 1963; Ullrich & Weickmann 1965; Ullrich 1967).

A global perspective, archaeology, physical anthropology, medicine and ethnography

In Continental Europe, the trepanned skulls have been dated mainly to the Neolithic. They occur more sporadically during the Bronze Age, but their frequency increase again during the Iron Age and the Medieval Period (Piggott 1940; Károlyi 1964; Ullrich 1965; Lisowski 1967).We have some information (Wyszomirski 1979; McGrew 1985; Hæger 1988) to the effect that trepanations occurred before the Neolithic. The largest number of trepanned skulls has been found in Peru and Bolivia and has been dated to the period between 500 B.C. to 500 A.D. (Bandelier 1904; Stewart 1958). Numbers of trepanned skulls have been found from Mexico (Wilkinson 1975) to Alaska (Stewart 1958). The custom continues to the present time in Africa (Margetts 1967). Trepanned skulls dating from ancient times have been found in Egypt, North Africa, Kenya and the Canary Islands (Lisowski 1967). Instances have been recorded in Asia in *inter alia* Iran (Mallin & Rathburn 1976), Palestine (Parry 1936), India, Pakistan and Afghanistan (Lisowski 1967). In China and Japan, trepanations were performed during the centuries after the birth of Christ (Lisowski 1967). Examples are known from Melanesia, but not Oceania (Heyerdahl 1952; Steinbock 1976).

The discussion relating to trepanations has continued since the mid-nineteenth century in the fields of archaeology, physical anthropology, medicine and ethnography. From the point of view of the history of science, the discussion of trepanation is closely linked to all these disciplines. Opinions have differed, especially with regard to the reasons for performing the trepanations, not least as our knowledge of the operation has grown, our medical skills have increased, and our view of man and culture has changed with time. Our assessments based on cultural history and the methodical problems associated with the definition of trepanations have played their part in the extensive literature, being characterized by reflection, reexamination and differently framed questions.

The first trepanned skulls were described in the mid-nineteenth century. The French brain surgeon Paul Broca gained widespread acceptance for his theories on prehistoric trepanation

at the Anthropological/Archaeological Congress in Budapest in 1876. He drew a distinction between two types of trepanation. An *intra vitam* trepanation was a surgical intervention performed for a variety of reasons, whereas a *post mortem* trepanation was a magical/ritual ceremony (Károlyi 1963). These two expressions have survived in the subsequent discussions, and Bartucz *et al.* added the so-called symbolic trepanation, which does not penetrate the skull but forms a shallow depression (Jordanov *et al.* 1988). Major summaries of the available sources, discussions of reasons, and arguments from the point of view of cultural history can be found in a number of works from different subject areas (including Wölfel 1925; Guiard 1930; Piggot 1940; Stewart 1958; Károlyi 1964; Ullrich & Weickmann 1965; Lisowski 1967; Margetts 1967).

The Swedish point of view was represented by Oscar Montelius, in conjunction with Brocas' paper delivered at Budapest, who informed the meeting that a human skull containing a circular hole, which had not been made accidentally, had been found the same year in a Swedish cist (Hildebrand 1876). A couple of finds had already been made, although they were recorded only much later by Carl Fürst. The earliest find came from an investigation of an Iron Age grave in Södermanland in 1844. A second was discovered in 1863 in the course of the excavation of a passage-grave in Västergötland. However, it was not until an Iron Age grave field in Östergötland was investigated in 1900 by Oscar Almgren that the attention of Gustaf Retzius was drawn seriously to the evidence of trepanation in the Swedish material (Retzius 1900). Quite a large number of skulls were subsequently described and discussed by Retzius (1901) and by Carl Fürst (1913, 1917, 1924). More trepanned skulls were found later, some of which were described from an osteological and archaeological point of view (Rydbeck 1931, 1933; Forsström 1973; Gejvall 1974; Janzon 1974; Persson 1977, 1979; Wyszomirski 1979; Swanström 1983).

Medical history texts contain various approaches to the understanding and interpretation of trepanation surgery. Hippocrates, in his medical writings in about 460 B.C., refers not only to contemporary medical skills, but also to the medical skills of an earlier period. From time immemorial, under the influence of Egypt and the Orient, priests had been trained in association with temples at many places in Greece. Not only did they take care of the cult, but they also gave instruction in medicine and practised medical science. There were also medical schools in the south of Italy (Löwegren 1909: I f.). We know that trepanations were being performed in Greece long before Hippocrates' time, from his comments referring to trepanation as a familiar technique. The instruments which he used were a trepan drill and a trepan with a crown (Löwegren 1909: 671). Hippocrates describes different types of fracture and damage by crushing to skulls on which trepanning, a medical procedure, was being performed (Hippocrates, in the translation by Löwegren 1909: 145 ff.). 400 years later the Roman doctor, Celsus, wrote a detailed description of the trepanation technique (Odenius 1906).

Hippocrates' thoughts continue to influence surgery for the following millenia. In a bulky summary of the history of trepanation surgery, Robert Mynors lists and describes the work of a good 60 authors, from Hippocrates' time, including Celsus, writing in about 40 A.D., Heliodorus and Galeni from the third century, and up to the end of the eighteenth century (Mynors 1785). A more detailed description of the trepanation procedure during later centuries and the development of neurosurgery provides an additional medical perspective on an old operation method (Wölfel 1936; Walker 1959).

The knowledge that trepanations have been performed over a long period is further reinforced by the fact that so-called primitive trepanation also occurred during the nineteenth century and up to our own time. Ethnographic accounts provide more or less detailed descriptions of different cultural environments and operation techniques. William Ellis described successful trepanations in Polynesia (Ellis 1838). In Bolivia at the turn of the century, Indian

medicine men were performing trepanations with the help of some kind of cutting instrument which was available to them. If the operation was successful, the opening was covered by a piece of calabash (Bandelier 1904: 441). Trepanations observed at first hand are reported from the South Pacific (Crump 1901). Winifred Brooke gives another example of a so-called primitive trepanation during a stay in Bolivia in 1950. Another "modern" case is described by Roger Akester from Tibesti in the Sahara Desert (Oakley *et al.* 1959). M. W. Hilton Simpson also gives a detailed description of his meeting with doctors, their instruments and operation techniques during a journey in Algeria in 1913 (Hilton-Simpson 1913). So-called primitive trepanation is also known in modern times from *inter alia* Cornwall, Serbia, Montenegro, Dagestan in the Caucasus, western Iran, the Hindu Kush in northeast Afghanistan, Dardistan and eastern Central Africa (Margetts 1967). Ethnographic descriptions provide up to-date accounts of trepanations, which perhaps take place in a similar fashion to that which was common during prehistory.

A regional perspective. Trepanations and details of finds in Sweden

A total of 47 trepanned skeletons has been reported until now from the Scandinavian peninsula, of which 28 in Sweden, 18 in Denmark (Bennike 1985) and one in Norway (Schreiner 1946). They have been dated to the Late Stone Age, the Bronze Age, the Iron Age and the Medieval Period. Details of the Swedish trepanned skeletons are given below; the prehistoric examples are supported by information taken mainly from the literature and archive material, and the Scanian Medieval skeletons by oral information supplied by the osteologist Caroline Arcini of the Riksantikvarieämbete (National Board of Antiquities) in Lund.

A series of source-critical aspects, which influence the representativeness of the source material, can be discussed. The custom of inhumation or cremation of the dead has an effect on the methodological opportunities for identifying trepanations. The number of trepanations is also dependent on the types of archaeological remains and the conditions of preservation, which differ from one part of the country to another. The pattern of finds is influenced not least by the intensity of excavation and the funds set aside for the osteological analysis of the skeletal remains. We have a large amount of skeletal remains which could now be analyzed from a clearer palaeopathological starting point. Peat-cutting in Sweden has not taken place to the same extent as in Denmark, where a number of trepanned skeletons have been exposed.

In Sweden, all the skeletons with trepanation holes were found in graves which can be dated roughly to the Late Stone Age, the Bronze Age, the Iron Age and the Medieval Period (Tab. I). The graves are situated mainly in southern and central Sweden, in the counties of Scania, Halland, Småland, Öland, Gotland, Västergötland, Östergötland, Södermanland and Västmanland (Fig. 1).

Trepanations can be subdivided into the following categories: 1. trepanation performed on a living person in which the cranium is perforated; 2. trepanation performed on a deceased person for the purpose of making so-called amulets; 3. trepanation performed on a living person in which the cranium is not perforated, i.e. a so-called symbolic trepanation (*inter alia* Ullrich & Weickmann 1965; Jordanov *et al.* 1988).

All types are represented in the Swedish material. Trepanations of the first category are known from the Prehistoric Period and from the Medieval Period. The so-called symbolic trepanations belong to the Medieval Period. One instance of Category 2 is reported from Sjöholmen in Scania. A smoothed circular human parietal bone was found in an occupation layer in 1930 in the course of an excavation. A human frontal bone bearing marks of wear was also found at the same site. The layer at this site was dated to the Neolithic (Rydbeck 1931: 84 f.).

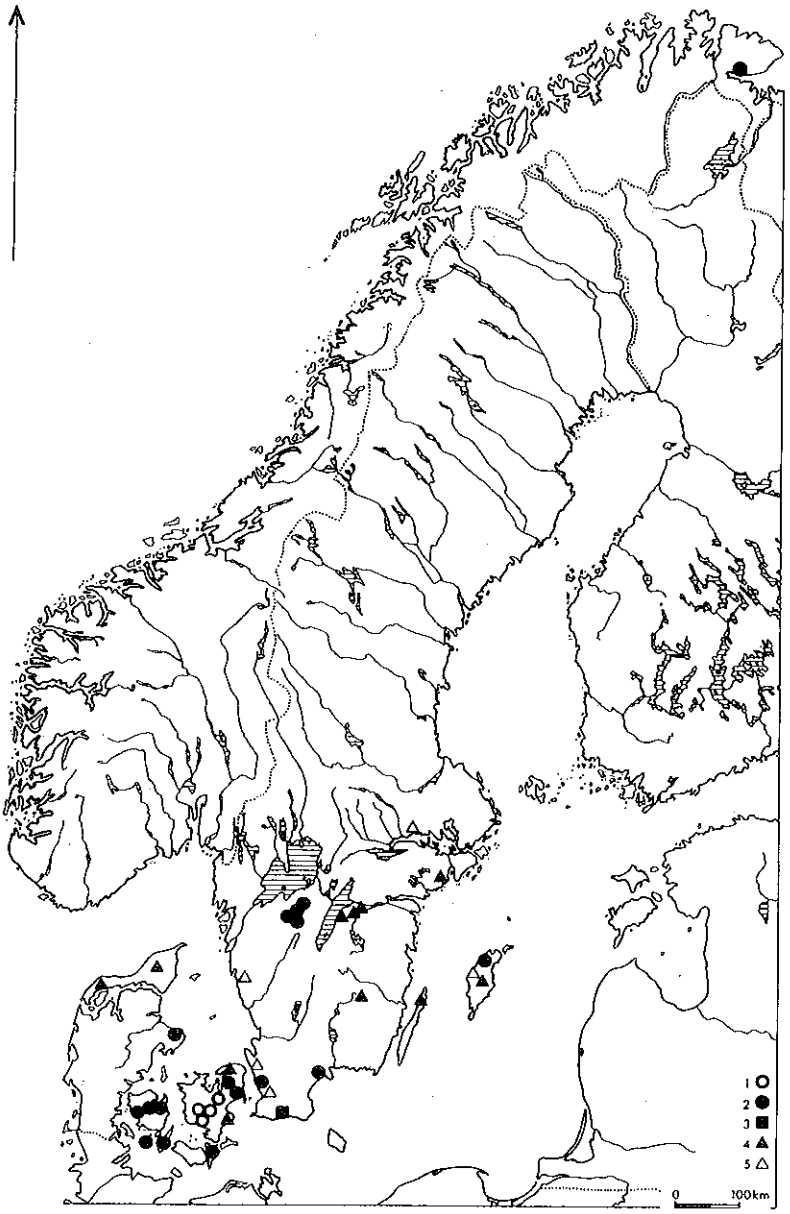

Fig. 1. Geographical distribution of trepanations in the Scandinavian peninsula 1. Early Neolithic 2. Middle and Late Neolithic 3. Bronze Age 4. Iron Age 5. Medieval Period.

Neolithic

GILLHÖG, BARSEBÄCK PARISH, SCANIA. LUHM 28200. This passage grave was investigated in 1931 by O. Rydbeck, and the skull with the trepanned hole was discovered in the following year when the skeletal remains were being examined. The skeleton was discovered between the outermost and the immediately adjacent wall stones on the southern side of the passage (Rydbeck 1933). Found next to the skeleton were 1 flint spear point, 2 transverse arrowheads, 2 bone rings and 2 amber beads. Finds from the Funnel Beaker Culture, the Battle Axe Culture and the Late Neolithic were made inside the chamber and the passage. "The treated area is subelliptical, approximately 11 cm long and approxi-

Fig. 2. Trepanation of the cranium from Gillhög, Scania. Photo Inger Kristensson, LUHM.

mately 5 cm wide. The longitudinal axis of the ellipse coincides more or less with the median line of the parietal region. The anterior margin of the area is on the os frontale, approximately 2 cm from the bregma (this point is difficult to establish, since the sutures of the scraped area are completely obliterated). The posterior limit is located on the ossa parietalia, approximately 2 cm in front of lambda. The skullcup has been gradually tapered off towards the centre, and this procedure resulted in a 44 mm long and 16 mm wide opening in the centre itself" (Persson 1977). The male, who was aged between 40 and 50, had survived the operation, since the edges of the bone exhibit a vital reaction (Persson 1977). Neolithic.

NYMÖLLA, GUALÖV PARISH, SCANIA. LUHM. A double grave was investigated in 1977 by B. Wyszomirski. The grave may have been bounded by a stone setting, and lay in the lower part of an occupation layer (Wyszomirski 1979). One of the individuals was a female aged 30-40 years. The other individual, who had an apparent trepanation, was a male aged 17-18 years. Lying close to the latter were a distal phalanx of grey seal and two microblades. The skull is severely abraded, and this is interpreted by Ove Persson as a probable trepanation hole. The opening is rounded, ca. 35 mm across, and is situated on the right side, on the right parietal bone, the upper part of which is located ca. 15 mm from the sutura sagittalis. Such an uncertain trepanation excludes speculation in respect of survival or technique (Persson 1979). TNC/MNI? Neolithic.

IRE, HANGVAR PARISH, GOTLAND. SHM, Grave 6b. This grave was investigated in 1957 by G. Arvidsson and is situated on a grave field with 10 graves. The grave contained three skeletons. The oldest male individual, lying to the south, had been buried first in an extended position lying on his left side, followed by the boy with the trepanned skull (6b), lying on his left side with his knees drawn up to his chest and with his head to the right of the man's thigh bone. The last individual to be buried was a young female, who had been laid extended on her back in the opposite direction, with her feet over the boy's lower legs. An abundance of finds was lying next to the boy with the trepanned hole, including worked bone of wild pig, 60 bone pipes made from birds' legs, 2 pig bridle objects, 1 beaver tooth, 3 bone fishing hooks, 1 tanged horn tip made from the horn of a red deer, 3 bone points and 3 wild pig hooves (Janzon 1974: 273). An oval trepanation hole, measuring 10 x 13 mm, is present on the right side, on the squama temporalis. A tooth-like impression was found in the occipital area, presumably caused by a bite from a wild pig (Gejvall 1974: 145). Pitted Ware Culture. Neolithic.

KNAGGÅRDEN, LUTTRA PARISH, VÄSTERGÖTLAND. SHM 3165. This passage grave was investigated in 1863 by B. E. Hildebrand, G. van Düben, G. Retzius and P. A. Säve. A cranium was discovered inside the chamber, which was described by Hildebrand as having an oval hole, 1.4 inches long and 0.5 inch wide at the middle, the edges of which are assumed to have been left either by a blow or by some disease in the bowl-shaped bone. The chamber contained an abundance of finds, including spear points, arrowheads, flint scrapers, flint chippings, bone rings, bone needles, bone points, amber beads, 2 pig bridles and the teeth of bear, badger, pig, dog and wolf (Hildebrand 1864; SHM tillväxten;

Sahlström 1915: 42 f.). This skull is not one of the seven crania described by Retzius in Crania Suecica Antiqua. Fürst refers to the find and claims that this is probably a genuine trepanation with bone edges which exhibit a vital reaction (Fürst 1924). Neolithic.

KÄLLEGÅRDEN, N. LUNDBY PARISH, VÄSTERGÖTLAND. SHM 21851. This cist was partially investigated in 1937 by K. E. Sahlström. The trepanned skull was found (the only find recovered) in the upper part of an abundant and compact layer of bones in a limestone cist beneath a cairn. Fragments of amber beads were found (Sahlström 1915: 71; 1939: 24-25, 178). The skull has a round trepanation hole above the left coronal suture, with the larger part on the parietal bone and the smaller part on the frontal bone. The hole measures about 40 mm at the tabula externa and about 25 mm at the tabula interna. The trepanation, which has no identifiable saw-marks, may have been bored, and exhibits a vital reaction (information provided orally by Mia Vretemark, Skaraborg County Museum, Skara). Late Neolithic.

BACKA, VARNHEM PARISH, VÄSTERGÖTLAND. SHM 5386:f, 17709. This cist was investigated in 1874 by O. Montelius and G. Retzius. The grave was built of limestone, with an ante-chamber and a circular hole in the end wall, and was covered by a cairn. A large number of skeletons was found. A flint dagger with a four-sided shaft, one bone needle and a clay vessel are recorded (SHM tillväxten; Montelius 1905a: 193; Sahlström 1915: 76; 1939: 21, 197; Rydbeck 1933). The skull was incomplete and damaged to the extent that Retzius does not even illustrate it or describe it in Crania Suecica Antiqua. Fürst returns to the skullcap and describes a trepanation hole situated ca. 15 mm behind the bregma above the sutura sagittalis. The hole is round, with sloping edges, and measures ca. 34 x 43 mm. The original trepanation hole probably measured ca. 20-22 mm. The operation was performed by scraping, and the individual had survived the operation (Fürst 1924: 82 f.). Late Neolithic.

Bronze Age

ABBEKÅS, SKIVARP PARISH, SCANIA. LUHM 20797:15, Mound 1, Grave 15. Four Bronze Age mounds were investigated in 1921 by F. Hansen. The trepanned skeleton was found on the eastern edge of mound 1, which contained 15 graves dating from the Late Neolithic to Period II of the Bronze Age. A bronze dagger lay on the chest, and a firestone at the waist (Hansen 1924). The man was aged 40-50 years and has an irregularly oval trepanation hole, measuring 63 x 50 mm, situated on the left parietal bone. The hole was made by scraping, and it exhibits vital reaction. The operation has been interpreted as having been performed for curative purposes as a result of a hacking blow (Fürst 1924: 85 f.), or as having been caused by a tumour in the cerebellum (Rydbeck 1931). Bronze Age II.

Iron Age

ÅSEDA, ÅSEDA PARISH, SMÅLAND. SHM?. Four skeletons were found in conjunction with trenching operations in 1921. An iron clasp of almost square form was found together with the skeleton with the trepanned hole. A young male had a circular trepanation hole, 10 mm in diameter, on the left parietal bone and the tuber parietale (Fürst 1922, Småland Museum Archives). Early Iron Age?

VANNBORGA, KÖPING PARISH, ÖLAND. SHM 12097. This grave was investigated in 1904 by T. J. Arne. The skeleton was lying in a disarranged position in a limestone cist beneath a cairn. The male, who was aged ca. 30 years, had been buried with his weapons: a spear point made of iron, an iron knife, a fragmentary conical shield boss made of iron, and a piece of resin sealing material (ATA, Stenberger 1933: 51; Schulze 1987: 71 f.). A hole which, for the most part, extends into the parietal bone is present on the right side approximately at the middle of the sutura coronalis. All the cuts made into the bone must have been made shortly before death, as signs of healing are absent (Fürst 1913). The grave can be dated to the Early Roman Iron Age, Period V:1 (Schulze 1987).

BROA, HALLA PARISH, GOTLAND. SHM 15601:6, Grave VI. This grave was investigated in 1915 by H. Hansson. The grave was situated in the middle of a large grave field known as the Högbro grave field. The grave field lies on a gravel ridge and contains more than 2000 inhumation and cremation graves dating from the Roman

Fig. 3. Trepanned skull from Abbekås, Scania. Photo Inger Kristensson, LUHM.

Iron Age to the Late Viking Period. The grave field has been investigated on a number of occasions from 1875 to 1981 in conjunction with sand and gravel extraction (Salin 1922; Nylén 1967; Orrling 1970; Östmark 1970; Pettersson 1982; Lindquist 1988). The skeleton with the trepanned skull was lying beneath a shallow earth mound with an internal cairn. Three petroglyph fragments were found inside the cairn. A penannular brooch was found in the grave (Carlsson 1988), together with a bronze pin for the brooch, a fragmentary bronze buckle-loop with animal masks, a double folded bronze buckle plate, a bronze strap-end, a bronze buckle, a bronze strap-distributor, a fragmentary bone comb, a glass bead and a single edged iron knife (ATA; Östmark 1970). The male was aged 40-50 years. The healed trepanation hole was of an irregular oval shape, measuring 23 x 17 mm, and was on the right parietal bone (Fürst 1917). Viking Period.

LEDSGÅRDEN, GÖKHEMS PARISH, VÄSTERGÖTLAND. SHM 19515. A damaged inhumation grave beneath a damaged cairn mixed with soil was investigated

in 1930 by headmaster H. Svensson. An apparently quite old individual lying on his back had a healed hole measuring ca. 10 mm on the left parietal bone. Animal bones and a flint scraper were lying next to the skeleton. A sewing needle made of iron was found in adjacent carbon layers (ATA). Iron Age?

ALVASTRA, V. TOLLSTAD PARISH, ÖSTERGÖTLAND. SHM 11180, 11746, Graves 1, 3, 17 and 109. The grave field known as Smörkullen was investigated between 1900 and 1922 and is one of the country's largest Iron Age grave fields (Almgren 1900, 1901; Arne 1903, 1904; Montelius 1905b; Oxenstjerna 1948, 1958; Borgström 1973). Gravel was extracted between the investigations, and much of the find material from the grave field was lost in this way. A total of 280 investigated and inhumation and cremation graves are recorded, although it is estimated that there must have been slightly fewer than 700 graves. The four graves with trepanned skulls were situated in the central part of the grave field and were separated from one another by about 30 m. Were the operations performed by one and the same person? (Borgström 1973). SHM 11180:1. The grave, Grave 1, was found in 1900 by O. Almgren in an area where trenches had been sunk. No finds were made in conjunction with this damaged and inexpertly excavated grave. A circular trepanation hole, some 19 mm across, is present on the left side above the sutura coronalis and cuts into both the frontal bone and the parietal bone. The hole had healed, and the female shows no other signs of illness. Retzius No. 93 (Retzius 1901; Fürst 1913). SHM 11180:3. This grave, Grave 3, which was found in 1900 by O. Almgren, had no visible markings, and no finds were made in the grave. A healed, oval trepanation hole measuring 38 x 25 mm was present on the left side in the sutura coronalis above the frontal bone and the parietal bone. The male showed no signs of other illness. Retzius No. 94 (Retzius 1901; Fürst 1913). Almgren writes that the left ulna exhibited a badly healed fracture (Almgren 1900: 99). SHM 11180:17. This grave, Grave 17, was investigated in 1900 by O. Almgren. The female, aged between 40 and 50 years, had been laid on her back within a stone border and had been covered with stone packing. A bronze fibula, an curved iron knife, resin sealing material for a wooden box and oak charcoal were lying next to the skeleton. The skeleton of a child was found lying close by (Almgren 1900). A rectangular hole with rounded corners, measuring 25 x 23 mm, was present on the left side on the sutura coronalis above the frontal bone and the occipital bone. The hole had healed, and the female showed no signs of other illness. Retzius No. 92 (Retzius 1901; Fürst 1913). SHM 11746:109. The grave, Grave 109, was investigated in 1902 by T. J. Arne. The male, aged about 40 years, was lying on his back in a grave with a stone border. A resin ring was lying next to the skeleton (ATA). An oval, long and narrow trepanation hole measuring 34 x 14 mm was present on the left parietal bone. The hole had healed, and had been cut for the purpose of treating an injury in the form of an external cut (Fürst 1917). Early Roman Iron Age.

SUNDBY, VETA PARISH, ÖSTERGÖTLAND. SHM 11748. In 1902 T. J. Arne investigated 21 graves (4 inhumation graves and 17 cremation graves) on a gravel ridge. The grave containing the trepanned skull and a number of other graves had already been disturbed by gravel extraction before the investigation began, and no finds could be linked to the skeleton. A kidney-shaped trepanation hole was present 2.5 cm from the sutura coronalis, and its left side encroached on the sutura sagittalis. The rear part of the hole is missing. The diameter is at least 21 mm, and its largest frontal width is 16 mm at the inner opening. The outer opening measures 26 mm. It is assumed that the operation was performed using a scraping technique, and the bone shows a vital reaction (Fürst 1913). Judging from the circumstances of the finds on the grave field, the skeleton can be dated probably to the Roman Iron Age (Arne 1903; Montelius 1905a). Roman Iron Age.

LILLA BERGA, KLOCKRIKE PARISH, ÖSTERGÖTLAND. SHM 14850:3. A grave field consisting of 15 cremation graves and 1 inhumation grave was investigated in 1913 and 1916 by E. Sörling in conjunction with gravel extraction operations. The inhumation grave, Grave 3, contained no finds and was covered by stone packing. The cremation graves contained clay vessels and resin sealing materials (ATA). The male, aged about 50 years, had an oval trepanation hole measuring 29 x 25 mm on the right half of the frontal bone. Its shape points to the possible use of a trepan, and the bone exhibits a vital reaction (Fürst 1917). Early Iron Age?

FREDRIKSDAL, VAGNHÄRAD PARISH, SÖDER-

MANLAND. SHM. The skeleton with a trepanation was found in 1844 in a grave in the form of a closed stone setting together with two other skeletons. A number of inhumation graves and cremation graves were found close by. The grave was found to contain a long copper sheet with rivets along two sides, presumably the edging for a wooden shield mounted with bone, horn and copper nails, and a quite large stone wedge (A. Retzius 1845). The trepanned skull was only discovered some considerable time later. The individual had a rounded hole, with pointed extensions running upwards and downwards on the right parietal bone, measuring ca. 23 mm, and exhibited no sign of vital reaction (Fürst 1917). Iron Age.

Medieval Period

St. CLEMENS, HELSINGBORG, SCANIA. LUHM, Graves 128, 150, 204, 332 and 432. 616 graves in the churchyard were investigated between 1958 and 1962 by M. Weidhagen-Hallerdt (Weidhagen-Hallerdt 1972, 1986). B. Jacobsson and A. Löfgren investigated 402 graves in 1987. The five graves containing trepanned skulls were discovered in 1987, to the north of the church. The graves did not contain any finds. Grave 332 contained one stone positioned to the right of the head and one to the left of the left thigh bone. All the graves have been dated to the period between ca. 1100 and 1300 (Löfgren 1988, information provided orally by Anders Löfgren of the National Board of Antiquities, Lund). The male, aged 25-30 years, buried in grave 128 had an oval trepanation hole measuring 10 x 15 mm on the left parietal bone, with signs of vital reaction. There was a second so-called symbolic trepanation, a shallow depression measuring 10 x 15 mm, further back on the skull above the sagittal suture. Grave 150 contained a female aged 35-45 years with a so-called symbolic trepanation, a shallow depression measuring 17 x 18 mm, above the bregma. In grave 204 a male aged 30-35 years had a shallow, porous depression measuring ca. 15 x 15 mm, a so-called symbolic trepanation, on the left parietal bone. The female aged 45-50 years in grave 332 had a symbolic trepanation, a shallow depression measuring ca. 22 x 24 mm, over the rear part of the sagittal suture. In grave 432 the female aged 35-45 years had a so-called symbolic trepanation, a shallow depression above the bregma (information provided orally by Caroline Arcini, of the National Board of Antiquities, Lund). Medieval Period.

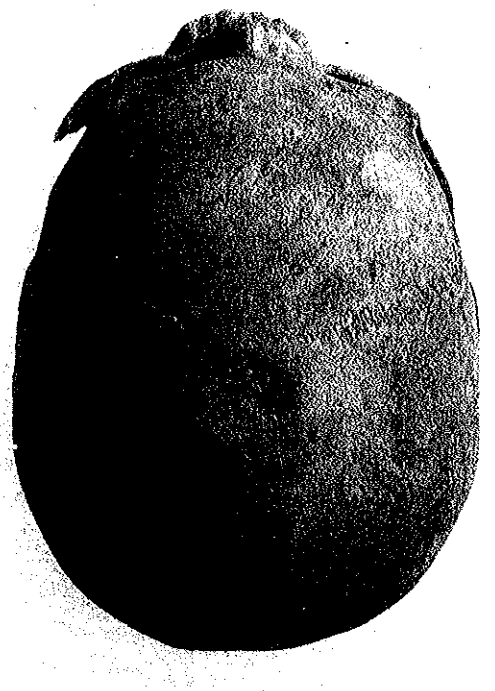

Fig 4. Trepanned skull from Kv. Clemens 9, Lund, Scania. Photo Lars Westrup, Kulturen.

KV. CLEMENS 9, LUND, SCANIA. KM 71839, Grave 1551. The churchyard was investigated in 1982-84 and contains ca. 400 graves, dated to 1100-1200. Judging from the staining, the trepanned skeleton in the grave was lying in a cist with its arms straight and without any grave gifts (information provided orally by Thorvald Nilsson, Kulturen, Lund). The skeleton of a male aged 20-30 years had a circular trepanation hole measuring ca. 15 mm above the sagittal suture. The edges of the bone exhibit a vital reaction (information provided orally by C. Arcini). Medieval Period.

KV. FÄRGAREN 22, LUND, SCANIA. KM 53436, Grave 68. The churchyard was investigated in 1961 and contains at least 180 graves (Mårtensson 1963). The skeleton with the trepanned skull was found lying in a trapezoidal cist without any grave gifts, to the east of the choir of the stave church, and can be dated to 1050-1100 (information provided orally by Th. Nilsson). The skeleton, of a male aged 35-45 years, showed signs of an in-

cipient trepanation in the form of a circular hollow ca. 10 mm in diameter situated above the bregma. The hollow reveals that the bone of the skull was not penetrated (information provided orally by C. Arcini). Medieval Period.

KARMELITERKLOSTRET, NY VARBERG, VARBERG, HALLAND. VARBERGS MUSEUM, Grave 31. In connection with excavations of the Karmeliterkloster in Ny Varberg ca. 100 graves were excavated in 1964-65 by M. Forsström. In one of these graves, situated east of the church, there was a skeleton with a trepanation. The male, aged ca. 50 years, had a trepanation of ca. 5 cm in diameter, with the edges of the bone exhibiting a vital reaction. There were marks left by blows to the forehead (Varberg Museum Archives; Forsström 1973: 117 f.). Medieval Period.

St. HANS, VISBY, GOTLAND. SHM, Grave 40. This grave was investigated in 1982 by E. Swanström, and is situated on a burial site with a total of 97 investigated graves. The burial site was in use before St Hans' church was founded (Swanström 1987: 40 f.). A further trepanned individual was found in the course of an investigation in 1913. The skull has been lost, and no details are known (information provided orally by Eric Swanström, RAGU, Visby). The male in grave 40 was aged 30-40 years and had received an injury to the back of the head, which had partly healed. The male had undergone three trepanation operations, two of which were so-called symbolic trepanations, and the third an incipient trepanation which had not penetrated the cranium. The first symbolic trepanation was performed ca. 15 mm above the injury and was in the form of a circular depression ca. 18 mm in diameter. The second symbolic trepanation was performed ca. 15 mm below the injury and was ca. 12 mm in diameter. The third trepanation is situated in the middle of the skull, above the bregma. A circular hollow, 3 mm wide in an area with a diameter of 18 mm, shows no sign of healing. The trepanations appear to have been performed with a trepanation crown (Swanström 1983). Early Iron Age/Early Medieval Period.

VÄSTERÅS, VÄSTERÅS, VÄSTMANLAND. SHM. The two trepanned skeletons were discovered in 1905 in conjunction with a building project. The skeletons were lying in an east-west direction. Fürst discusses the dating and concludes, judging mainly from the level, that the skeletons could be dated to the Viking Period. The circumstances relating to the level and the finds also permit the skeletons to be dated to the Medieval Period, although Fürst discounts this on the grounds that the skeletons were not part of a large churchyard (Fürst 1913: 4 f.). However, investigations conducted in Kv. Johannes during the 1970s have revealed the presence in former times of a churchyard, containing at least 160 graves and dated to the twelfth and thirteenth centuries, in close proximity to the probable site of the finds (Ström 1974; Annuswer *et al.* 1990: 27). It appears likely, therefore, that the two trepanned skeletons can be dated to the Medieval Period. Skeleton No. 1 was that of a female aged 30-40 years. She had a circular trepanation hole, measuring ca. 18 mm, above the bregma. The edges of the bone exhibit vital reaction, and the shape points to the use of a trepan (Fürst 1913: 52). Skeleton No. 2 was that of a male aged 30-40 years. He had an oval trepanation hole, measuring 10 x 16 mm, on the left parietal bone. The edges of the bone exhibit vital reaction (Fürst 1913). Medieval Period.

Trepanations in Sweden

A series of methodological questions and methods have examined the opportunities for identifying trepanations and distinguishing them from other skull defects. The form and position of the trepanation hole, and the inclination of the edges of the bone from the outside to the inside of the cranium (Fürst 1913, 1917; Ullrich & Weickmann 1965), the use of X-ray diagnostics to investigate the healing process and whether the trepanation was performed before or after death (Ullrich 1958; Károlyi 1963; Bruchhaus & Holtfreter 1985) have all been discussed. Scraping is the most common method of making a hole. The successive processes involved in scraping can be studied either by the so-called graphite method (Ullrich & Weickmann 1965), or by taking castings enabling the areas concerned to be measured so that the technique and the operator's hand movements can be appreciated (Wittwer 1964). A number of different skull defects are easily confused with a trepanation. These include the

Tab. I. Trepanations in Sweden

County	Site	Parish	Period
Scania	Abbekås	Skivarp	Bronze Age
	Gillhög	Barsebäck	Neolithic
	Nymölla	Gualöv	Neolithic
	St. Clemens, Grave 128	Helsingborg	Medieval
	St. Clemens, Grave 150	Helsingborg	Medieval
	St. Clemens, Grave 204	Helsingborg	Medieval
	St. Clemens, Grave 332	Helsingborg	Medieval
	St. Clemens, Grave 432	Helsingborg	Medieval
	Kv. Clemens 9, Gr 1551	Lund	Medieval
	Kv. Färgaren 22, Gr 68	Lund	Medieval
Halland	Ny Varberg	Varberg	Medieval
Småland	Åseda	Åseda	Early Iron Age?
Öland	Vannborga	Köping	Roman Iron Age
Gotland	Ire, Grave 6b	Hangvar	Neolithic
	Broa, Grave 6	Halla	Viking Period
	St. Hans	Visby	Iron Age/Medieval
Västergötland	Knaggården	Luttra	Neolithic
	Ledsgården	Gökhem	Iron Age
	Källegården	N. Lundby	Late Neolithic
	Backa	Varnhem	Late Neolithic
Östergötland	Alvastra, Grave 1	V. Tollstad	Roman Iron Age
	Alvastra, Grave 3	V. Tollstad	Roman Iron Age
	Alvastra, Grave 17	V. Tollstad	Roman Iron Age
	Alvastra, Grave 109	V. Tollstad	Roman Iron Age
	Sundby	Veta	Roman Iron Age
	Lilla Berga	Klockrike	Early Iron Age
Södermanland	Fredriksdal	Vagnhärad	Iron Age
Västmanland	Västerås	Västerås	Medieval
	Västerås	Västerås	Medieval

hereditary enlargement of the parietal foramina, dyscraphism, infections, neoplasm and damage caused by hacking blows (Ortner & Putschar 1981).

The Swedish material has been described by various researchers during the twentieth century, at a time when many significant advances were being made in various branches of science. The anthropological assessments were made by *inter alia* anthropologists, surgeons and osteologists (Retzius, Fürst, Gejvall, Hjortsjö, Persson, Arcini, Vretemark). In many cases it proved difficult to obtain complete details about the individual before this summary was compiled. This is because many of the crania could not be described in more detail because they were in poor condition or had gone missing. In spite of these various circumstances affecting the Swedish material, my own view as an archaeologist is that the skulls included in this paper represent trepanations (Tab. II) rather than other changes in the skulls, holes made by pathological causes or hacking blows.

There is heavy male dominance of trepana-

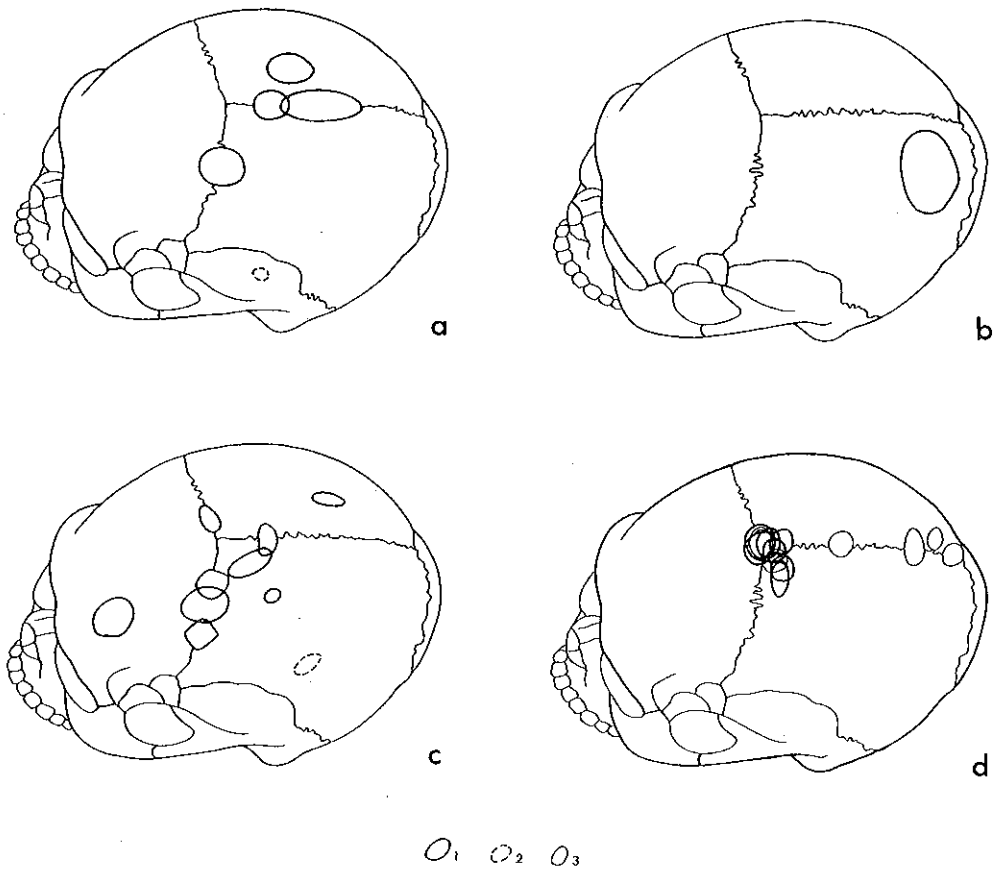

Fig. 5. Position of the trepanations. 1. right side 2. left side 3. symbolic trepanations a. Stone Age b. Bronze Age c. Iron Age d. Medieval Period.

tion for the whole of the Prehistoric Period which coincides with the situation prevailing in the rest of Europe. The Medieval material is not characterized by distinct male dominance. Six male and four female individuals have been found thus far. Most of the trepanned individuals had reached adulthood. Only two are aged below 20.

The trepanations are situated on the left and right sides of the skull, primarily on the parietal bone and in the middle of the cranium, above the bregma or above only the sagittal suture. Most trepanation holes are situated close to a cranial suture. The trepanation holes are present for the most part in those areas on the skull which, according to source-critical considerations, were regarded as being the characteristic position for so-called true trepanations, that is to say on the left parietal bone above the coronal suture or on the right parietal bone (Ullrich & Weickmann 1965: 265).

Most of the holes are relatively uniformly round or oval. In comparison with other European trepanned skulls, the Gillhög skull, with its large and elliptically oval hole, is unique. The size of the Neolithic holes varies, but gives the impression of having been slightly larger than the trepanations from later periods. Like

Tab. II. Trepanations in Sweden

Site	Sex	Age	Position	Form	Size (mm)	Healed
Neolithic						
Gillhög,	m	40-50	sagittal suture	oval	110 x 50	yes
Nymölla,	m	17-18	r. parietal bone	round	ca. 35	-
Ire, Hangvar p.	m	1-13	r. temporal bone	oval	10 x 13	
Knaggården, Luttra p.	-	-	-	round	20-30	-
Källegården, N. Lundby p.	f	40-50	l. upper coronal suture	round	25	yes
Backa, Varnhem p.	-	-	behind bregma, above sagittal	oval	20 x 22	yes
Bronze Age						
Abbekås, Skivarp p.	m	40-50	l. parietal bone	oval	65 x 50	yes
Iron Age						
Åseda,	m	young	l. parietal bone	round	ca. 10	yes
Vannborga, Köping p.	m	ca. 30	above r. coronal suture	-	-	no
Broa, Halla p.	m	40-50	r. temporal bone	oval	23 x 17	yes
Ledsgården,	-	old?	-	round	ca. 10	yes
Alvastra, V. Tollstad p., Grave 1	f	-	above l. coronal suture	round	19	yes
Alvastra, V. Tollstad p., Grave 3	m	-	above l. coronal suture	oval	38 x 25	yes
Alvastra, V. Tollstad p., Grave 17	f	40-50	above l. coronal suture	rect.	23 x 25	yes
Alvastra, V. Tollstad p., Grave 109	m	ca. 40	l. parietal bone	oval	34 x 14	yes
Sundby, Veta p.	m	-	r. temporal bone above sagittal suture	kidney	21 x 16	yes
Lilla Berga, Klockrike p.	m	ca. 50	r. frontal bone	oval	29 x 25	yes
Fredriksdal, Vagnhärad p.	-	-	r. parietal bone	round	ca. 23	no
Medieval Period						
St. Clemens, Helsingborg, Grave 128	m	25-30	a) l. parietal bone b) above sagittal suture	a) oval b) shallow pit	10 x 15 10 x 15	- -
St. Clemens, Helsingborg, Grave 150	f	35-45	above bregma	shallow pit	17 x 18	-
S.t Clemens, Helsingborg Grave 204	m	30-35	l. parietal bone	shallow pit	15 x 15	-
St. Clemens, Helsingborg, Grave 332	f	45-50	top rear part of sagittal suture	shallow pit	22 x 24	-

St. Clemens, Helsingborg, Grave 432	f	35-45	above bregma	shallow pit	-	-
Kv. Clemens 9, Lund, Grave 1551	m	20-30	above sagittal suture	round	15	yes
Kv. Färgaren 22, Lund,	m	35-45	above bregma	round hollow	10	-
Ny Varberg, Varberg	-	-	parietal bone	-	50	yes
St. Hans, Visby, Grave 40	m	30-40	a) next to lambda	shallow pit	18	-
			b) next to lambda	shallow pit	12	-
			c) above bregma	round hollow	18	-
Västerås No. 1 Västerås	f	30-40	above bregma	round	ca. 18	yes
Västerås No. 2, Västerås	m	30-40	l. parietal bone	oval	10 x 16	yes

the find from Denmark (Bennike 1985), the only known skull in Sweden dating from the Bronze Age, from Abbekås in Scania, has a large opening which is unlike all the others. The trepanations on the Iron Age skeletons give a heterogeneous impression with regard to both form and size. The Medieval trepanations, on the other hand, form a more homogeneous group. The Medieval trepanations are similar in position, form and size, and all are consistently smaller than the prehistoric ones, with the exception of the cranium from Varberg. The Medieval crania reveal that an individual may have been operated on more than once. There are many examples of repeated trepanations having been performed on the same individual outside Scandinavia; a Peruvian skull, for example, has no fewer than seven healed trepanation holes (Oakley et al. 1959).

The customary method of making holes was to scrape through the cranium with a sharp object held at an angle. This method reduces the risk of damaging the cerebral membranes and is used in all areas where trepanations are found. Another method involves first drilling two or more holes, followed by chiselling and scraping away the edges. A third method involves chopping, sawing or chiselling directly through the cranium. A fourth method is to drill through the cranium, using either a trepanation crown with a hollow cylinder or a solid drill bit, as described by Hippocrates and Celsus. Interesting detail is provided by the French surgeon, J. Lucas-Championnière, who experimented by boring into the cranium of a cadaver. It took 35 minutes to produce an opening using unworked flint as the only tool (Hæger 1988).

Different trepanation techniques are represented in the Swedish material. No technique has been described for some of the trepanations. Some were determined more from a layman's point of view. In spite of this, it appears that the most usual method during the Prehistoric Period was scraping with a sharp stone or flint or some other sharp object. Fürst maintains that most of the Iron Age cases were operated on in such a way that two or more holes were first bored, followed by chiselling and scraping between them (Broa, Alvastra, Grave 17). A trepanation crown was used in the cases Västerås 1 and Lilla Berga. A trepanation crown was also used on the skeleton at St Hans on Visby, that is to say a hollow instrument with saw teeth on its lower edge, such as that described by *inter alia* Celsus (Odenius 1906).

Analyses of the edges of the bone support the interpretation of the operation technique. How the patient was anaesthetized is not known, however; alcoholic drinks, narcotic

drugs, plant extracts and ants are some examples of anaesthetics. Whatever method was used, the procedure was not excessively painful and did not cause great discomfort. After-treatment reveals some familiarity with infection-preventing substances. Ethnographical descriptions refer to the use of coca leaves, which were chewed and spat out into the wound, and various other plants (Walker 1959; Hæger 1988).

The edges of the bone in most of the skeletons exhibit vital reaction, that is to say the patients survived the operation. There is a whole series of complications which might have arisen as a result of damage to the cerebral membrane or infection. Like the global situation, the Swedish material indicates that the survival rate was very high in the case of so-called primitive trepanation. In spite of the risk of heavy loss of blood and infection, the operation has had an impressive rate of survival in various parts of the world (Stewart 1958).

Trepanations, a discussion

I believe that the sociocultural and religious side of human societies have frequently been ignored in previous studies of trepanations. Man has presumably always had to struggle with existential problems such as disease and death. A logical-scientific approach is now increasingly characterizing the matters with which a reasonable individual should concern himself. The link between medicine and religion is clear. A motley selection of individuals, such as priests, shamans and medicine men, has concerned itself with the healing arts. Research into trepanations has ended up in an interpretation framework or paradigm which can be referred to as the biological world view and the biological human outlook. In this way it can be said that science has been set the task of revealing human nature and defining what was natural, i.e. a task performed by religion in other cultures (Rosenbeck 1989).

With the renewed interest in palaeopathology, there are now opportunities to investigate the state of health of the individuals living in ancient times. The trepanations can be seen as belonging to the more speculative end of the spectrum, and do not reflect the normal variation in diseases or in the state of health of the population during ancient times. Since trepanations are one of the oldest known types of surgical operation performed on humans, they can be placed in the context of the understanding of diseases, medical skills and ritual ceremonies. Medicine and magic, society and religion are concepts which belong together and which characterized man in ancient times in an entirely different way than in the secularized world of today. Whether one opts for a religious/phenomenological or a religious/ecological approach, or resorts to historical analogies, an appreciation of the religious attitudes and the approach to life of different cultures can also serve to broaden our perspectives of the so-called primitive trepanations.

Are trepanations a method of medical treatment or a ritual ceremony ? Or did they serve both purposes? I believe that this close link between medicine and religion has often been overlooked in archaeological and osteological studies into the reasons for trepanations, just as it has also been ignored in publications covering the history of medicine (Biedermann 1976). The understanding of diseases and the perception of death by prehistoric societies is a significant aspect which could contribute to our understanding of trepanations. What explanations can be found within society? A number of modern descriptions of trepanations reveal that the reason for performing a trepanation is not always medical. Ethnographical descriptions of trepanations reveal that a common feature is the notion of "taking something away". Margetts writes that, "There is a continuum, from immaterial to material, from magic and thaumaturgy to science - evil spirits and demons, vapours, humours, air, hypothetical "pressures", actual pressures, real and fictional foreign bodies, "unknown substances", pus, blood, and finally, pieces of bone" (Margetts 1967: 692).

Rationality in the modern sense of the word cannot be applied to other societies where religion, belief and living standards appear to us largely to give rise to irrational behaviour patterns. We cannot, however, adopt such a rational stance that we see only medical reasons behind trepanations. It may well be that the ground gained by medical science at the end of the nineteenth century and during the twentieth century has had an excessive influence on our interpretations (e.g. Hansen 1889; Wölfel 1925) and has given rise to an excessively rational human outlook in which the perception of reality in former times is ignored to too great an extent. From the point of view of the history of medicine, trepanations are linked with the Hippocratic tradition, which can scarcely be associated with the operations performed in prehistoric Europe. D. Campillo advances the view that the character of the prehistoric trepanations does not coincide at all with present-day therapeutic criteria (Campillo 1984). The claim that prehistoric trepanations were performed for sound medical therapeutical reasons is both perplexing and inexplicable from a modern neurosurgical point of view. Károlyi believes that the ethnographical descriptions which have been quoted for decades fail to provide explanations which are acceptable from a medical point of view, and writes that no acceptable explanation of the phenomenon has yet been offered (Károlyi 1968: 92).

A series of explanations has been proposed for the various complaints which may have led to the trepanations: treatment of injury by crushing, headache, epilepsy, brain tumours, poor health due to evil spirits - releasing the spirits. One problem is that the trepanation and the skull are described morphologically, whereas the skeleton as a whole, which could provide us with valuable information to help us to appreciate a possible pattern of illness, is described less frequently (Ullrich 1958).

If we now return to the Swedish trepanations, the problem of understanding them also has to do with representativeness. The grave material known today is very comprehensive, although a very large amount of skeletal material remains to be processed. The character of the source material and the limited interest shown until now by the palaeopathologists in examining skeletal material have placed obstacles in the way of our appreciation of the normal variation in disease and illness within a prehistoric population. Several sources of error and factors which are difficult to evaluate affect the number of known trepanned skulls. It would be desirable, amongst other things, to set the number of trepanned skulls in relation to the number of excavated graves. The interest in, or the conditions enabling comparisons of osteological descriptions of the deceased are of vital importance. Similarly, the opportunities for identifying trepanned individuals are governed by the manner in which the corpse was handled, that is to say whether the dead were buried or cremated, which varied in different periods and in different parts of the country. The details of finds and the descriptions of finds, above all those which relate to the older finds, are very often inconsistent, in addition to which a professional approach was not always adopted towards the excavation of the graves. The circumstances of the finds and the datings of the skeletons are consequently difficult to judge. A number of source-critical points of view have an influence on any historico-cultural discussion, and may be regarded as efforts to give an impression and an appreciation of trepanation both locally and regionally in relation to the occurrence of trepanations in the rest of Europe.

47 trepanations dating from various periods, more precisely from the Late Stone Age, the Bronze Age, the Iron Age and the Medieval Period, have been found thus far on the Scandinavian peninsula. It can be assumed that the earliest trepanations have associations with farming communities and the Neolithic.

In Europe, a large number of trepanations dating from the Stone Age are associated with the Danubians, megalithic cultures and Corded Ware culture. A large number of researchers have used these finds as the basis for discussing

various trepanation centres, from which the operating procedure spread in various directions (e.g. Piggott 1940; Behm-Blancke 1964; Ullrich 1967). These different diffusionistic interpretations are based on the fact that trepanations occur in different cultures and at different times in the different parts of Europe. Otto Rydbeck writes that the trepanations could have arisen independently in different parts of the world where more or less similar perceptions of magic prevailed. Since the Swedish finds were made in passage-graves and cists, one of which had a hole in the end wall, and probably belonged to the Late Neolithic Period, he believes that the trepanations were performed under influence from the west (Rydbeck 1933: 22). The Danish finds also date from the Early Neolithic, and one find has been attributed to the Single Grave Culture. The Norwegian find has been dated to the Late Stone Age and was found on the Varanger peninsula in Finnmark in the far north of Norway (Andreassen 1988). The Scandinavian Stone Age finds thus enjoy wide chronological distribution and are represented in a variety of so-called cultures. It is difficult, therefore, without detailed processing of the archaeological source material, to find evidence of a diffusionistic theory for the phenomenon of trepanation. My own impression of Stone Age trepanations in Europe is that, if the idea of centres and the distribution of trepanations occurred between "cultures", this should be tested against more general source-material, including sacrificial finds and grave gifts in different types of grave constructions. As a part of such a project, the biological determinism embodied in the explanations of the reason for trepanations should be supplemented by theories relating to religious expressions and ritual ceremonies.

The same is true of the Bronze Age trepanations. As in Continental Europe, the number of trepanned individuals which can be dated to the Bronze Age in Scandinavia is small. The method of disposal of the corpse and the gradual transition to cremation have very probably had an effect on the representativeness. The two trepanations in Scandinavia, from Denmark and Sweden, exhibit large openings, like the trepanations in Europe (Breitinger 1938). A more general source material should be taken into consideration in order to provide a more complete appreciation of the trepanations dating from the Bronze Age.

Inhumation burials again become more common during the Roman Iron Age, and a large number of trepanned individuals has been found. Individual and widespread finds of trepanned skeletons dating from the Early and Late Iron Age have been made in different parts of both Sweden and Denmark. Six trepanned skeletons were also found in the southern part of the Östgöta Plain, where a number of large Iron Age grave fields have been investigated (Oxenstjerna 1948, 1958; Borgström 1973). The concentration of trepanned skulls dating from the Roman Iron Age in this part of the country is specific, and is most certainly associated with local and culture-linked knowledge of trepanation. There are no signs which indicate that these individuals were buried differently from other individuals in society. If these trepanations had some magical or ritual connotations whilst the individuals were still alive, this is not believed to be reflected in their burial. Fürst writes that there were skilled practitioners during the Early and late Iron Age in Sweden, especially at Alvastra (Fürst 1917: 55). The Medieval trepanations and the so-called symbolic trepanations contained in the Swedish material give a homogeneous impression, and one can ask whether the operation was performed by one and the same person or "operating school". The impression that the Swedish Medieval symbolic trepanations are not isolated occurrences, and that they occur at the same point on the skull is supported *inter alia* by a large proportion of the symbolic trepanations found in a Medieval churchyard in Bulgaria (Jordanov *et al.* 1988).

It can be established throughout that, in order to be able to explain the trepanations in Scandinavia, only a more detailed analysis of the various types of source material can pro-

vide a detailed understanding and a general historico-cultural view. There is nothing to suggest that the individuals in any given period were buried in a manner different from that of the rest of the population. The Danish bog finds provide us with evidence of the special ritual treatment of individuals, including those who had been trepanned.

The examination and discussion of the trepanned material in Sweden, and of trepanations more generally, provide both an archaeological history and a medical history which extend over a considerable period. Trepanations have continued to be performed without interruption up to the present time, and it is only now, with reference to our modern neurosurgical techniques, that we are able fully to understand the methods and operational techniques which resulted in a very high degree of survival in prehistoric times. Adult women and men were trepanned. Children were trepanned rarely, although examples are known from various parts of the world (Mallin & Rathburn 1976). From the point of view of the history of research, considerable knowledge and skill must have been involved. Those involved had knowledge of the anatomy of the skull, the tools and techniques, and aftertreatment. Having once been very closely linked with religion and ritual ceremonies, trepanations now have a rational explanation.

It is thus possible, with reference to the archaeological, medical historical and ethnographical sources, to describe trepanations as having been a universal phenomenon, but one which was intimately culture-specific in its purpose and execution. The whole of the skeleton should be examined in any future studies into trepanations. A more detailed analysis of the representativeness is desirable in any assessment of the frequency with which trepanations occurred. In order to be able to evaluate the socio-cultural reality, a theoretical superstructure based on a humanistic approach is needed accompanied by the widest possible range of source material. In this respect I believe that an approach should be made bearing in mind the history of religion and that, by resorting to palaeopathology and medical anthropology, it should be possible to broaden the debate relating to trepanations in order to gain a more detailed appreciation of these ritual ceremonies and of the individual members of society in ancient times.

Acknowledgement

I am surely indebted to a variety of people for their comments and for placing information to my disposal, including especially the osteologists Caroline Arcini, Elisabeth Iregren and Mia Vretemark, the archaeologists Anders Löfgren och Thorvald Nilsson, and the neurosurgeon Leif Salford.

Translation by Roger J. Littleboy

Abbreviations

ATA Antikvarisk-Topografiska arkivet (Antiquarian-Topographical Archives, Stockholm).

KM Kulturen, Lund.

KVHAA Kungliga Vitterhets-, Historie- och Antikvitetsakademien (Royal Swedish Academy of Letters, History and Antiquities).

LUHM Lunds universitets historiska museum (Lund University Historical Museum)

SHM Statens Historiska Museum (Museum of National Antiquities, Stockholm).

References

Almgren, O. 1900. Ett graffält från äldre järnåldern vid Alvastra i Östergötland, undersökt sommaren 1900. *KVHAA. Månadsblad* 29.

- 1901. Ett graffält från den äldre järnåldern vid Alvastra i Östergötland. *Ymer*.

Andreassen, R. L. 1988. Grav og dødskult i yngre steinalder i Varanger. *Ottar* 1. Tromsø.

Annuswer, B. & Bergquist, U. & Forenius, S. & Syse, B. 1990. *Västerås 1000 år genom tiden*. Västerås kulturnämnds skriftserie nr 23.

Arne, T. J. 1903. Förhistoriska undersökningar och fynd. *Meddelanden från Östergötlands fornminnesförening*.

- 1904. Järnåldersgraffältet vid Alvastra II. *Meddelanden från Östergötlands fornminnes-förening.*

Bandelier, A. F. 1904. Aboriginal Trephining in Bolivia. *American Anthropologist* N. S. 6:1.

Behm-Blancke, G. 1964. Zur Herkunft der neolitischen "Neurochirurgenschule" in Mitteldeutschland. *Ausgrabungen und Funde* 9:5.

Bennike, P. 1985. *Palaeopathology of Danish Skeletons.* A Comparative Study of Demography, Disease and Injury. København.

Biedermann, H. 1976. *Medicina Magica.* Örebro.

Borgström, H. 1973. *Järnåldersgravfältet vid Alvastra.* Seminar paper. Archaeological Institution. University of Stockholm. Stockholm.

Breitinger, E. 1938. Zur Trepanation in der Frühbronzezeit. *Anthropologischer Anzeiger* 15.

Bruchhaus H. & Holtfreter J. 1985. Zwei trepanierte Schädel aus der Schnurrkeramik des Mittelelbe-Saale-Gebietes von Braunsdorf, Kr. Merseburg, und von Laucha-Dorndorf, Kr. Nebra. *Ausgrabungen und Funde* 30:4.

Campillo, D. 1984. Neurosurgical Pathology in Prehistory. *Acta Neurochirurgica* 70.

Carlsson, A. 1988. *Vikingatida ringspännen från Gotland.* Stockholm Studies in Archaeology 8. Stockholm.

Crump, J. A. 1901. Trephining in the South Seas. *The Journal of the Anthropological Institute* XXXI.

Ellis, W. 1838. *Polynesian Researches.* London.

Forsström, M. 1973. Karmelitklostret i Ny Varberg. *Varbergs museums årsbok.*

Fürst, C. M. 1913. Trepanerade svenska kranier från äldre tider. *Kongl. Fysiografiska sällskapets handlingar* N. F. 24:4.

- 1917. Några nyfunna trepanerade svenska fornkranier. *Fornvännen.*

- 1922. Trepanerad människoskalle från Småland. *Meddelanden från norra Smålands fornminnesförening* VI.

- 1924. Tvenne nya fall av trepanation i vårt land, ett från stenåldern och ett från bronsåldern. *Fornvännen.*

Gejvall, N.-G. 1974. Discription of the human skeleton from the graves and some associated animal bones. In Janzon, G. , *Gotlands mellanneolitiska gravar.* Studies in North-European Archaeology 6. Stockholm.

Guiard, E. 1930. *La Trépanation Cranienne chez les Néolithiques et chez les Primitifs Modernes.* Paris.

Hansen, F. 1924. Gravhögar vid Abbekås fiskläge. *Kungl Humanistiska Vetenskapssamfundet i Lund. Årsberättelse* 1923-24.

Hansen, S. 1889. Om forhistorisk trepanation i Danmark. *Aarbøger for nordisk oldkyndighed og historie.*

Heidenstam von, V. 1909. *Svenskarna och deras hövdingar.* Stockholm.

Heyerdahl, T. 1952. *American Indians in the Pacific.* Stockholm.

Hildebrand, B. E. 1864. Berättelse om antiqvariska undersökningar i Vestergötland år 1893. *Antiqvarisk tidskrift för Sverige.*

Hildebrand, H. 1876. Den antropologiska-arkeologiska kongressen i Budapest. *KVHAA Månadsblad.*

Hilton-Simpson, M. W. 1913. Some Arab and Shawia Remedies and Notes on the Trepanning of the Skull in Algeria. *Journal of the Royal Anthropological Institute* 43.

Hæger, K. 1988. *Kirurgins historia.* Göteborg.

Janzon, G. 1974. *Gotlands mellanneolitiska gravar.* Studies in North-European Archaeology 6. Stockholm.

Jordanov, J. & Dimitra, Br. & Nikolov, Sp. 1988. Symbolic Trepanations of Skulls from the Middle Ages (IXth-Xth century) in Bulgaria. *Acta Neurochirurgica* 92.

Károlyi, L. 1963. Daten über das europäische Vorkommen der vor- und frühgeschichtlichen Trepanation. *Homo* 14.

- 1964. Die vor- und frühgeschichtlichen Trepanationen in Europa. *Homo* 15.

- 1968. Das Trepanationsproblem. *Homo* 19.

Lindquist, M. 1988. *Arkeologiska fältundersökningar på Gotland mellan åren 1826 och 1985.* Riksantikvarieämbetets Gotlandsundersökningar/RAGU. Arkeologiska skrifter 1988:1.

Lisowski, F. P. 1967. Prehistoric and Early Historic Trepanation. In Brothwell, D. & Sandison, A. T. (eds.) *Diseases in Antiquity.* Springfield.

Löfgren, A. 1988. Nya undersökningar på S:t Clemens kyrgogård. Glimtar av Helsingborgs historia i arkeologisk belysning. *Kring Kärnan* 17.

Löwegren, M. K. 1909. *De Hippokratiska skrifterna i svensk översättning.* Del 1 och 2. Lund.

Mallin, R. Rathburn, T. A. 1976. A Trephined Skull from Iran. *Bulletin of the New York Academy of Medicine* 52:3.

Margetts, E. L. 1967. Trepanation of the Skull by the Medicine-men of Primitive Cultures, with Particular Reference to Present-day Native East African Practice. In Brothwell D. & Sandison A. T. (eds.) *Diseases in Antiquity*. Springfield.

McGrew, R. E. 1985. *Encyclopedia of Medical History*. London.

Montelius, O. 1905a. Orienten och Europa. Ett bidrag till kännedom om den orientaliska kulturens inverkan på Europa intill midten af det sista årtusendet före Kristi födelse. *Antikvarisk tidskrift för Sverige* XIII.

- 1905b. Östergötland under hednatiden. *Svenska fornminnesföreningens tidskrift* XII.

Mynors, R. 1785. *A History of the Practice of Trepanning the Skull and the After-Treatment*. Birmingham.

Mårtensson, A. W. 1963. Gravar kring stavkyrkan. In Blomqvist, R. & Mårtensson, A. (eds.) *Thulegrävningen 1961*. Archaeologica Lundensia II. Lund.

Nylén, E. 1967. En oskadad glasbägare bland nya rika fynd från gotländsk folkvandringtid och vendeltid. *Gotländskt Arkiv*.

Oakley, K. P. & Brooke, W. M. A. & Akester, A. R. & Brothwell, D. R. 1959. Contributions on Trepanning or Trephination in Ancient and Modern Times. *Man* 133.

Odenius, M. V. 1906. *A. Cornelius Celsus' åtta böcker om läkekonsten*. Lund.

Orrling, C. 1970. *En presentation av gravfältet vid Broa i Halla och Högbro i Roma*. Seminar paper. Archaeological Institution. University of Stockholm. Stockholm.

Ortner, D. J. & Putschar, G. J. 1981. *Idendification of Pathological Conditions in Human Skeletal Remains*. Smithsonian Contributions to Anthropology 28. Washington.

Oxenstjerna, E. 1948. *Die Urheimat der Goten*. Stockholm.

- 1958. *Die ältere Eisenzeit in Östergötland*. Linköping.

Parry, W. 1936. Three skulls from Palestine showing two types of primitive surgical holing; being the first skulls exhibiting this phenomenon that have been discovered on the mainland of Asia. *Man* 223-234.

Persson, O. 1977. A trepanned skull from the Gillhög passage-grave at Barsebäck in West Scania (South Sweden). *OSSA* 3/4.

- 1979. Skeletal remains from the Stone Age graves at Nymölla. *Fornvännen*.

Pettersson, A.-M. 1982. Gravfältet vid Broa i Halla. *Gotländskt Arkiv*.

Piggott, S. 1940. A Trepanned Skull of the Beaker Period from Dorset and the Practice of Trepanning in Prehistoric Europe. *Proceedings of the Prehistoric Society* VI.

Retzius, A. 1845. Om skeletter och fornlämningar. *Öfversigt af Kongl. Vetenskapsakademiens Förhandlingar* 5.

- 1899. *Crania suecica antiqua*. Swedish ed. Stockholm.

- 1900. *Crania suecica antiqua*. German ed. Stockholm.

- 1901. Om trepanation af hufvudskålen, såsom folksed i forna och nyare tider. *Ymer*.

Rosenbeck, B. 1989. Den mytiska biologin. *Häften för kritiska studier* 1. Stockholm.

Rydbeck, O. 1931. En trepanation i Skåne för 3000 år sedan och dess orsaker. *Meddelanden från Lunds universitets historiska museum* 1930-31.

- 1933. Några synpunkter rörande trepanationssedens ursprung i anslutning till ett nytt fall av stenålderstrepanation. *Meddelanden från Lunds universitets historiska museum* 1932-33.

Sahlström, K. E. 1915. Förteckning öfver Skaraborgs läns stenåldersgravar med bilder och kartor. *Västergötlands fornminnesförenings tidskrift*.

- 1939. *Valle härads fornminnen*. Skövde.

Salin, B. 1922. Fyndet från Broa i Halla, Gotland. *Fornvännen*.

Schreiner, K. E. 1946. *Crania Norwegica* II. Instituttet for sammanlignende Kulturforskning. Serie B: Skrifter XXXVI. Oslo.

Schulze, H. 1987. Köpings sn. In Beskow Sjöberg, M. (ed.) *Ölands järnåldersgravfält* 1. Kalmar.

Steinbock, R. T. 1976. *Paleopathological Diagnosis and interpretation*. Bone diseases in Ancient Human Populations. Springfield.

Stenberger, M. 1933. *Öland under järnålder*. Stockholm.

Stewart, T. D. 1958. Stoge Age Surgery: A General Review, with Emphasis on the New World. *Annual Report Smithsonian Institution*, 1957.

Strandman, E. 1989. *Trepanering i Sverige under stenåldern*. Seminar paper. Archaeological Institution. University of Uppsala. Uppsala.

Ström, K. 1974. Kvarteret Johannes dolde mer än en silverskatt. *Västmanlands fornminnesförenings årsskrift* LII.

Swanström, E. 1983. Arkeologisk undersökning av S:t Hans kyrkoruin i Visby. *Gotländskt arkiv.*

- 1987. "Allhelgonakyrkan", S:t Per och S:t Hans i Visby. *Arkeologi i Sverige 1985.* Stockholm.

Ullrich, H. 1958. Methodische Bemerkungen zur Untersuchung von drei Schädeltrepanationen aus der Frühbronzezeit von Grossbrembach. *Ausgrabungen und Funde* 3:6.

- 1967. Entstehung und Ausbreitung der Trepanation in der Europäischen Vorgeschichte. *Antropos.* Akten des Anthropologischen Kongresses Brno (Tscheckoslowakei) 1965. Brno.

Ullrich, H. & Weickmann, F. 1965. Prähistorische Trepanationen und ihre Abgrenzung gegen andere Schädeldachdefekte. *Anthropologischer Anzeiger* 29.

Walker, A. E. 1959. The Dawn of Neurosurgery. *Clinical Neurosurgery* 6.

Weidhagen - Hallerdt, M. 1972. *S:t Clemens kyrka och kyrkogården i Helsingborg.* Unpublished lic.-dissertation. Lund.

- 1986. S:t Clemens kyrka i Helsingborg. In Andrén, A. et al. (eds.) *Medeltiden och arkeologin.* Lund.

Wilkinson, R. G. 1975. Trepanation by drilling in Ancient Mexico. *Bulletin of the New York Academy of Medicine* 51:7.

Wittwer, B. 1964. Osteologische Studie am trepanierten Schädel von Wiedebach, Kr. Weissenfels. *Ausgrabungen und Funde* 9:1.

Wölfel, D. J. 1925. Die Trepanation. Studien über Ursprung, Zusammenhänge und kulturelle Zugehörigkeit der Trepanation. *Anthropos* XX.

- 1936. Die Methoden der urgeschichtlichen und primitiven Trepanation. *Ciba Zeitschrift* 38.

Wyszomirski, B. 1979. A double grave with yellow ochre at Nymölla in Scania. *Fornvännen.*

Östmark, K. 1970. *Broa - Halla, Gotland.* De vikingatida gravfynden. Seminar paper. Archaeological Institution. University of Stockholm. Stockholm.

Offprint

ACTA ARCHAEOLOGICA LUNDENSIA
SERIES IN 8º Nº 20

REGIONS AND REFLECTIONS

IN HONOUR OF MÄRTA STRÖMBERG

EDITED BY

KRISTINA JENNBERT
LARS LARSSON
ROLF PETRÉ
BOZENA WYSZOMIRSKA-WERBART

Almqvist & Wiksell International

LUND 1991