and sunburn. Sunstroke is not commonly met with in England, but it is wise to protect the head of every patient with a sunshade. Heatstroke, although not common, is more often seen; it is due to a temporary paralysis, through fatigue, of the sweat glands. The warm rays of the sun heat up the body, and to rid the body of heat the sweat glands are put into action; after a while they tire, and there is nothing to prevent the temperature of the body soaring. Heatstroke is seen most commonly in young children, and whenever a child exposed to the sun commences to perspire the child should be moved into the shade. Conjunctivitis is caused by the irritation of the corneæ by the sun's rays, and can be guarded against by the use of a head sunshade. Sunburn can be avoided by exposing the skin gradually to the sun's rays, the skin then becomes sun bronzed and not sun burnt. If the skin does become burnt, it should be protected from the sun by the application of some oily substance.

LOCAL TREATMENT.

So far I have directed your attention to general treatment. Let us now consider local treatment. The title of this lecture suggests that surgical tuberculosis differs in some way from medical tuberculosis. The terms medical and surgical tuberculosis date from the time when it was thought possible to extirpate the local lesion, and thus if the site of the disease was anywhere in striking distance of the surgeon it was known as surgical tuberculosis; if the lesion was situated deep in the body remote from the reach of the surgeon it was known as medical. The surgical treatment of tuberculosis failed for two reasons. In the first place the surgeon found it hard to extirpate completely the local lesion, and secondly it came to be realised that the aim of treatment was not to remove the disease from a local focus, but to rid the body generally of tuberculosis. And so to-day the surgeon rarely operates on the local lesion. Occasionally the local lesion is situated in some site from which it can be removed entire—e.g., in the shaft of a long bone; but, as a general rule, surgical tuberculosis is not now treated by surgical means. Does this mean that nothing can be done for the local lesion? Yes and No. Nothing is done to get rid of the local lesion, but one can do something to lessen the amount of damage done by the disease. The rôle of the surgeon is that of the salvage man not that of the fireman; he does nothing to put out the fire, but stands by and sees that as little damage as possible is done.

The majority of tuberculous lesions are situated in the joints or in the neighbouring bones so that the joints become secondarily involved; and therefore the practical point for the surgeon is the care of the joint. As you know, the result of a tuberculous lesion is either a stiff joint or a joint having a limited range of movement. The surgeon can do two things. He can try to ensure that the range of movement is as full as possible; this he does by applying

traction to the two bones to pull the joint surfaces apart during the active stage of the disease. And, if there is to be only a small range of movement, he can ensure that the arc of movement is the optimum one. For instance, five degrees of movement at the knee is useless if the knee is at a right angle, but five degrees of movement from the straight position is valuable. To ensure that the arc of movement will be the ideal one, the surgeon fixes the limb in a particular position; this necessitates the use of a splint. Finally, it is the common belief that if the part is kept at rest the amount of local destruction will be less, so that the joint should be held motionless, and in the case of the lower limb and the spine this usually necessitates recumbency.

Thus, during the acute stage of the disease, local treatment consists in recumbency to ensure rest, splintage to hold the joint in a particular position, and traction to separate the joint surfaces. The manner in which these principles are applied in treating the various joints you will see when you visit the country hospital at Brockley. Most hospitals differ slightly in the details of carrying out these principles.

When the patient is convalescent the duty of the surgeon is to coax back the damaged joint to work. During this stage, if he expects a stiff joint, the surgeon will probably allow the patient to take weight on the leg while the joint is held immobile by a splint; if the surgeon hopes to get a mobile joint, he will probably allow the limb freedom of movement and prevent weight bearing. Local treatment is of great interest to those who have the care of tuberculous patients, but it is of little importance as contrasted with general treatment.

DIAGNOSIS OF HOLES IN PREHISTORIC SKULLS.

A DIFFERENTIAL DIAGNOSIS OF THE VARIOUS KINDS OF HOLES DISCOVERED IN THE SKULLS OF PREHISTORIC MAN.*

BY

T. WILSON PARRY, M.A., M.D. CANTAB., F.S.A.

"I'll see what hole is here."—

Titus Andronicus Act II., Sc. 4.

IN the year 1897 Dr. Robert Munro, for many years secretary of the Society of Antiquaries of Scotland, published a book called "Prehistoric Problems." In this book were depicted illustrations of a certain skull which had been excavated from an ancient graveyard at Eastry, in Kent. The skull was an extraordinary one, and apart from its curious shape, there were two large holes situated one on either side of the posterior parietal region. Dr. Munro stated that he considered this specimen to be the only example he had seen in Great

* A Lecture delivered at the Post-Graduate Hostel on Dec. 17th, 1926.

Britain of a double prehistoric trephination. I made a special journey to Liverpool to see this skull, which was housed in the Public Museum in that city, only to find, however, this was not a trephination at all, nor indeed was it even a prehistoric skull. It was the skull of a microcephalic idiot and the two holes, symmetrically placed, in the region specified were congenital deficiencies in the cranial bones. It is one of those specimens that is liable to be confused with a true trephination of the skull, but can easily be distinguished from it by a careful examination.

The *differential diagnosis* is as follows. In a prehistoric trephination the scraping of the bone produces a slope downwards and inwards towards the lumen, at the expense of the external table of the skull. In a congenital deficiency of bone, the upper part of the wall of the hole is made at the expense of the outer table, while the lower half is sloped at the expense of the inner table of the skull, the margins of the sides being slightly rounded. In the living skull a membrane stretches across the middle of this opening at its narrowest diameter.

INJURIES TO THE HEAD, EITHER DIRECTLY OR INDIRECTLY, ARE COMMON CAUSES OF HOLES IN THE CRANIUM.

I am taking the culture of prehistoric Peru to illustrate this section. The Incas and pre-Inca races of Peru possessed formidable weapons—slings, large wooden clubs, in the ends of which were inserted splints of stone and copper, and hatchets in which both these latter materials were employed. In their graveyards are found skulls upon which these weapons have been generously applied. The prehistoric Peruvian surgeons most courageously attacked these fractures, many of which were of an extensive and dangerous character. They trephined chiefly with stone implements—scrapers, saws and borers, though I myself believe that metal was employed in a few instances. The only metals with which they were acquainted at that time were gold, silver, and copper, and they used a mixture of these which they called “champi.” They made chisels or “estiletas” of this mixed metal.

There have been many other skulls excavated which show no signs of fracture, but on which trephination has also been performed. In my opinion, the reason for such was that the patient suffered from some medical head-symptom. Such disorders as epilepsy, vertigo, severe chronic headache, repeated severe paroxysmal attacks of neuralgia, and other kindred maladies would be the kind of cases dealt with in this way.

The following circumstances prove that the operation in question was performed for disorders such as these and not for ethical, mystic, or ritualistic reasons as was done in Neolithic France.

The religion of the Incas was a truly noble one. “They believed in a Great Spirit, the Creator of the Universe, who, being a spirit, could not be

represented by any image or symbol, nor be made to dwell in a temple made with hands. They also believed in the existence of the soul hereafter and in the resurrection of the body.”

Muniz tells us the ancient Peruvians held an almost exaggerated reverence for their dead. Such a thing as the mutilation of a dead man’s cranium to obtain an amulet was quite impossible among this people and this, he says, has been conclusively proved by the fact that not a single amulet of the human skull has ever been unearthed from the Inca cemeteries. We will see later that Neolithic France has a very different tale to tell.

DISEASE OF THE BONE CAUSING, IMMEDIATELY OR REMOTELY, HOLES IN THE CRANIUM.

About the year 1887 a finely made cyst of Bronze-age date was discovered at Mountstuart in the Isle of Bute. It contained the remains of a young woman who had not, at the time of her death, cut her wisdom teeth. In the grave was found a fine example of a Bronze-age food vessel, and at the place where lay the bones of her neck were discovered 98 bugle-shaped jet beads, two terminal triangular and four intermediate and rhomboidal plates with a triangular pendant. When re-strung a beautiful example of a Bronze-age necklace was reconstructed. There is no doubt that the hole in the skull was due to disease. How the disease in the bone originated it is impossible to say. There is no sign of any fracture. Dr. Thomas H. Bryce considers it to have been a case of disease from start to finish. Dr. Robert Munro believed it to have been a case of trephination at the outset and disease at the finish. I made a special journey to Edinburgh to see this skull and came to the conclusion that it was a case of necrosis of the bone, a sequestrum of dead bone having formed which I have reasons to think, from the hollowed-out nature of the cavity, had been scooped out by the aid of a flint implement. The surgeon had probably completed the perforation at the base of the concavity and, as likely as not, hastened the end which must have been from a general septic infection.

MUTILATION OF THE SKULL AFTER DEATH.

This section embodies five distinct groups: (a) posthumous trephination; (b) removal of parts of skull for fashioning amulets; (c) holes made in prehistoric Egyptian skulls by necrophilous beetles; (d) holes made by picks in the process of excavation; (e) post-mortem decay of part of cranial bones leading to the formation of holes.

(a) *Posthumous trephination*.—Thirteen years ago I received a welcome invitation from the late Sir Victor Horsley to accompany him on a motor trip to Northampton to pay a visit to the Museum in that place, to examine a skull which had for long been considered the only example of prehistoric trephination in England. The skull in question had been excavated just outside “Hunsbury Camp,” Northamptonshire, which is of Early Iron Age date. The trephination was situated on the vertex of the

skull and consisted of three circular holes arranged in the form of an equilateral triangle. A glance at this specimen was sufficient to show us that the three holes had been bored by a metal instrument. In my opinion these holes had been bored for the purpose of suspending the skull, probably as a trophy, the result of an Iron-Age tribal conflict. A similar specimen to this from the Hillhead Broch at Caithness, in Scotland, was pointed out to me by Mr. Alexander O. Curle, secretary of the Museum of Antiquities of Edinburgh, when showing me over this Museum.

(b) *Removal of parts of the skull for the fashioning of amulets.*—In the year 1865 Dr. Prunières, while exploring a dolmen near Aiguères, in France, discovered a human skull out of which a large portion of bone, as big as a man's fist, had been artificially removed by cutting and sawing. A small edge of this gap looked as if it had been polished. By the side of this skull he came across five fragments of cranial bones that had been deliberately cut or sawn from a skull for some special object. These fragments, however, would neither fit together, nor would they refill the gap in the skull. They had, indeed, it was shown, been removed from another skull altogether.

It was Prof. Paul Broca, not Prunières, who first pointed out that the piece of the rim of the skull that looked as if it had been polished was actually part of the circle of a trephine ring, the result of an operation conducted during life, the polished appearance being in reality the healed cicatrix of the bone. These five cranial fragments were each found to be possessed of a part with a "polished" edge, and their remaining sawn sides testified that their removal from another skull or skulls had been brought about after the death of the individual. Later, when large numbers of cranial fragments had been examined from neolithic dolmens in different parts of France, it was found that some were round, some oval or oblong and artificially polished, while others again were just rudely sawn from the dead skulls. Some were bored and others were notched and grooved, so as to facilitate suspension from, probably, the necks of their owners, for the prophylactic purpose of warding off the disease from which it may be presumed the possessor of the original trephined skull had suffered. Broca explained that among primitive peoples there is an anxious desire on the part of the deceased's relations and friends not in any way to vex or annoy the dead man, or his spirit, like the ghost of Hamlet's father, may return to earth to torment them. The amulet having been obtained, the dead man's spirit must therefore be propitiated; so, after taking what was required, a substitute from another skull was inserted in the dolmen; but always more was taken than replaced, so gain was the net result. The whole procedure, Broca shows, was part of an ethical system—strange, complicated, and mystical.

(c) *Holes made in prehistoric Egyptian skulls by necrophilous beetles.*—Two French doctors, Prof. Lortet and Dr. Fouquet, asserted that they had

discovered evidence of syphilis in the skulls of prehistoric Egyptians. This evidence was based on the fact that skulls had been unearthed with holes in them and these holes had been described as being due to an "irregular circumvoluted, serpiginous ulceration" that had been present during life.

Prof. G. Elliot Smith¹ made investigations and was able to deduce the following facts:—

1. These irregular holes always occurred in that part of the skull or other bones of the body that were in contact with the soil.
2. They never occurred in the skulls of those that were buried in rock-cut tombs or in coffins.
3. A white powder consisting of pulverised bone was often sprinkled over the damaged part and the adjoining soil; in many cases this was so obviously fresh that its age could not be more than a few months, whereas the bones had been in the soil for thousands of years.
4. When such a mutilated bone was removed from the soil, burrows of small animals could always be seen leading up to this so-called "ulcer." Fragments of the soil from the walls of these burrows and also that taken from the damaged surfaces of bones were examined by Prof. Looss and found to contain portions of the elytra of beetles.

Prof. Elliot Smith goes on to say that the soil around these so-called "ulcers" is usually converted into a hard cake which firmly adheres to the bone. Such masses usually form a cap over each hole produced by these beetles in the bone and if the cap be removed it is found to be riddled with the burrows of these beetles.

(d) *Holes made by picks in the process of excavation.*—Little need be said of this mutilation of the skull, as it will naturally speak for itself.

(e) *Post-mortem decay of part of a cranial bone.*—The softer part of a bone may become disintegrated more rapidly than the surrounding denser parts, giving rise to central crumbling of the bone which eventually becomes converted into a foramen.

The last section of my classification of the causes of holes in skulls of prehistoric date is the

TREPHINATION OF THE LIVING HUMAN SKULL WITH THE MOST PRIMITIVE IMPLEMENTS AND IN THE MOST PRIMITIVE WAY.

It is a most curious thing that we should find this extraordinary custom practised, at some time or other, in nearly every part of the world. I feel I cannot do better than give an epitome of its distribution in the five continents and in some of the countries where it was employed; but the most curious fact of all is that it was practised in these different countries, many of them widely separated, for quite different reasons and at vastly different times.

To take Europe first:—As regards time, our age of stone-culture ended about 2000 B.C., that in Egypt considerably earlier, while the holing of living skulls is practised to-day in some of the Islands of the South Pacific Ocean in all its pristine simplicity.

The finest example we possess in Great Britain is one that was dredged from the Thames about the year 1864. In the year 1914 this priceless specimen,

¹ THE LANCET, August 22nd, 1908.

which was unrecognised, was in imminent danger of being crushed up to make mortar. Its rescue by Mr. Lawrence of the London Museum I have related elsewhere. It is really a magnificent specimen, and one of which we may be justly proud. It was made by scraping the bone with flint scrapers. The operation was quite successful. Another skull, discovered by Dr. W. H. Paine, of Stroud, in the year 1863, was found in a dolmen near Bisley, in Gloucestershire. This is only a partial trephination, the operation having been abandoned either on account of the death of the patient or an unwillingness on the part of the priest-doctor to proceed with it. Prehistoric trephination was exceedingly rare in Great Britain. In France it was very different. France is, by a long way, the leading country in Europe for the large number of specimens that have been discovered there in dolmens, caves, caverns, and grottoes. I have already referred to some of the French specimens when speaking about amulets, so I must rapidly pass on to other countries of Europe—Scandinavia (particularly Denmark and Sweden), Germany, Bohemia, Poland, Russia (especially the Caucasian region), Spain, Portugal, and Montenegro.

Crossing over the Mediterranean Sea we will now mention Africa. In Algeria, among the Kabyles, the custom of primitive trephination is of very ancient origin. It is practised to-day with specialised metal implements among the Arab Shamans. In Teneriffe von Luschan collected 210 Guanche skulls, ten of which had been trephined. He found others in which the outer table of the skull only had been scraped away. Prof. Elliot Smith has examined 15,000 skulls from ancient Egypt and Nubia, but tells me he has never found a trephined specimen. The Guanches are supposed to have migrated from Egypt, so one would not have been surprised to find specimens in this latter country.

In Asia, Daghestan can exhibit primitive specimens and they have also been found in Japan; but the vast area of Asia has hitherto been unexplored from this viewpoint and, no doubt, one day other specimens will be unearthed.

In North America no specimens of skulls operated upon during life have been found, though examples of posthumous ones have been discovered in several of the States, notably Michigan, Illinois, and Ohio. In Central America Lumholz found two skulls that had been primitively trephined, one during life and the other after death. It was among the ancient tribe of the Tarahumares. In South America many specimens have been excavated, notably in Peru, as have been already mentioned, and also some in Bolivia.

Australasia: I do not know that any specimens have been found in Australia itself, but the custom was prevalent, and even exists to-day, in Melanesia (New Britain and New Ireland), in the Loyalty Group (Uvea), and in the Society Group (Bora Bora), which latter is some 2500 miles east of the Loyalties. It is still practised in these islands of the South

Pacific, sometimes for fractures of the skull produced by sling-stones and clubs, sometimes for epilepsy and other head disorders, and sometimes even to promote longevity, when a particularly handsome youth or beautiful girl is singled out as being an appropriate patient.

EXTRAMURAL POST-GRADUATE WORK

CONDUCTED BY THE CANADIAN MEDICAL ASSOCIATION.

(FROM A CANADIAN CORRESPONDENT.)

If Rip Van Winkle had been a practising physician, he would have had to look for a new vocation following his 20 years' sleep. Most physicians will agree. Medical science, ever progressive, and markedly so during the past two or three decades, demands that he or she who practises worthily must keep abreast the times. And keeping abreast the times implies an up-to-date working knowledge of what is known regarding the care of the well and the sick.

Canada is fortunate in having a medical profession that desires to render the very best type of medical service. Drones are few and far between and are soon swept into the discard. But how, ask our physicians, are we to be kept in touch with all that is new and of value in medicine. Distances in our country are great. We have, in all, nine medical schools in an area nearly 4000 miles in diameter. Obviously, only a small percentage of our practitioners can readily avail themselves of the post-graduate facilities of medical teaching centres.

The Canadian Medical Association, desiring to render a real service to its members and to the public, faced this problem with a determination to work out some plan by which the advantages of post-graduate medical education would be brought to the very door of the busy practitioner. The first and greatest essential in carrying out such a scheme was money, and in a country of such wide expanse as Canada, with long distances to be travelled between centres, the procuring of the necessary funds was a very serious problem to the Committee having this work in charge. Finally, the Sun Life Assurance Company of Canada proved itself a true benefactor to the medical profession and the public of this great Dominion by placing at the disposal of the Committee a grant of \$30,000, to be used in extramural post-graduate medical education during the year 1926.

The plan which the Committee had long had in mind was then put into operation. Teachers from the different medical schools were sent in teams to various centres throughout the country, where they gave lectures and demonstrations and held