THE TECHNIQUE OF PREFRONTAL LEUCOTOMY.

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I HAVE been briefed to address you for half an hour on what must be a rather uninteresting subject to an audience composed mainly of physicians, namely the technique of the operation the results of which we have learnt this morning. May I congratulate this audience on showing such interest in the technicalities of the surgeon's art?

Any surgeon confronted with this operation may well be forgiven for asking, "What exactly am I asked to cut?" So far as I know no precise answer exists to this question. The critical plane of section must obviously be of prime importance in a destructive and irreversible procedure. Freeman and Watts indicate that if too much is divided great harm may be done, indolence, profound inertia or excessive euphoria resulting. If too little be divided then insufficient personality change occurs; this at least confirms that the benefits in successful cases are not due to psychotherapeutics, but to an anatomical change. The question that still requires an answer is best put as "How *little*—not how much—do we need to divide in any given patient to produce improvement?" I have done this operation 73* times, and with nine exceptions have used the same technique throughout. I do not therefore claim to have experimented much in regard to different planes of section. My feeling at the moment is that a fairly extensive mutilation is necessary. Almost certainly it should be bilateral though this is not proved. In one case in my series a unilateral operation on the right side was performed, the man made a quick resocialization, returned to work as a docker and was regarded by his employer, mates and family doctor as "normal." After three months symptoms returned, particularly delusions and hallucinations. I operated on the other side. Again prompt recovery followed, which up to date is maintained.

Freeman and Watts arbitrarily state that the plane of the coronal suture is the plane for the white fibre section. Questions such as "Should the section be made by open or closed methods? Should the fibres be divided electrically by the knife or by alcohol?" are points of individual surgical preference and are of secondary importance. Some surgeons have devised special instruments. I personally use a paper knife, but this, too, is of secondary consequence. It is what you cut, not how you cut it, that chiefly affects the patient. I have not done as much cadaver work as I should like, but here are some pictures of the operation done by the Watts Freeman technique on cadavers (Figs. 1, 2 and 3).

It can be seen that the damage to the exterior of the brain is slight. It is even less than Fig. 1 shows as the cut was forced open to show in a photograph and the brain has split a little; also I am now using a narrower knife than I did then. The cut in the white matter is truly formidable. I think the cut in Fig. 2 is too far posterior. It must be remembered that in the cadaver the C.S.F. does not flow as easily as in the live subject, and hence the control of entering the anterior horn of the ventricle used in the living is lost in the cadaver.

The Freeman and Watts Method as Understood and Used by the Author.

Fig. 4 shows the landmarks used to mark out the coronal suture and the site for the trephine hole. I regard these as approximate and not to be taken too meticulously. I now generally trephine 6 cm. above the zygoma and not 5 cm. as shown in Fig. 4. I trephine in preference to making a burr hole as the disc can be replaced. The skin incision can usually be made in the hair line. When the dura mater is reached I use a caliper to measure the width between the two dural

* At time of going to press 82 times.

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openings across the head. The width averages about 10–11 cm. I take half this to be the distance to the midline and set my knife for a little less than this half distance. The cuts are made parallel to the coronal suture line, the wound washed with Ringer's solution and the incision closed in layers. The two X-rays show the sort of result from this admittedly most imprecise procedure. Fig. 5 shows a cut a little anterior to the coronal plane. Of course the thorotrast by no means necessarily outlines the whole cut. Fig. 6 is unusual. The patient was of special interest. He was highly educated, a D.Sc. of London University, but developed persecutory ideas and is labelled as a paranoid schizophrenic. I performed leucotomy by the Freeman-Watts technique on October 14, 1941, but the result was disappointing. After much pressure I consented to reoperate, and on February 19, 1943, used Lyerly's open method. The film shows the formidable section obtained and the ventricle opened on the right side.

Anaesthetic.—I do not regard this as of great consequence. Most of our patients have been resistive and unco-operative and hence we chiefly use a general anaesthetic; at the present time nitrous oxide, oxygen and ether. I have done the operation under local on four occasions. If the patient is co-operative (an unlikely event) it is an interesting method, as the patient's reactions are observable.

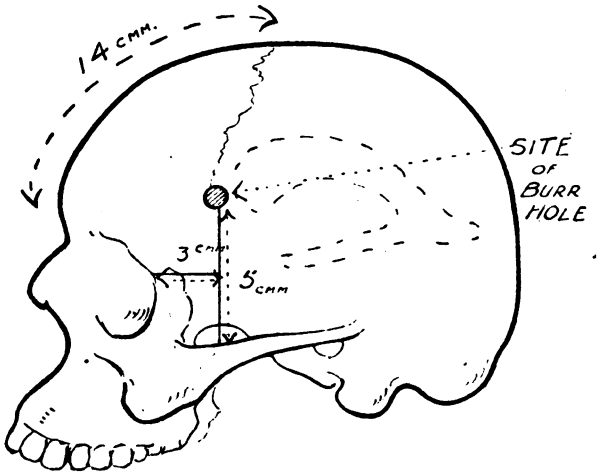

FIG. 4.—Surface markings of the coronal suture in the Freeman and Watts technique. Drawing taken from Freeman and Watts; with acknowledgments.

Mortality.—I have had two deaths in the series of 73 cases; they were Case 4 and Case 9. This caused me much concern, and after Case 9 I introduced the modification of measurement across the head. Since then no deaths have occurred and no case has caused post-operative concern. Two cases in my series were over 70 years of age; one a brilliant success, the other was done only three weeks ago. Physically speaking we can class this as almost a minor operation; its technique is easily learnt—this I dread as one of its greatest dangers, because it can easily be performed by amateur surgeons without careful psychiatric investigations, and quackery could readily follow.

A concluding paragraph on the selection of method.—I do not advocate the Moniz technique of alcohol instillation or electrically cut cores. I think it is liable to miss fibres which should be cut. Doubtless it will often prove successful, but is liable also to give more disappointments. Lyerly's open method is fundamentally sound, very attractive to the neurosurgeon and to all who hate blind procedure—it has the demerit of being a more formidable operation. The method described, the Freeman-Watts technique, is simple, relatively safe, but blind. I am pleased with the results obtained using it; I propose to continue its use, but with an open mind to the advantageous claims of other methods.