Whilst the mouth was held open the mechanism of tongue-biting could be very distinctly observed—the gradual jerking forwards of the tongue till its tip was thrust between the champing jaws.

Relation of tonic to clonic spasm.—The essential unity in nature of the tonic and clonic spasm was in this case very distinct. At first the contraction appeared, to both eye and hand, to be continuous—i.e., tonic. Long before the least intermission in the continuity of the spasm was visible to the eye, the hand laid upon the convulsed part could detect that the apparently continuous spasm was really a succession of contractions which by their quick repetition produced a tetanic state, and, though they could not be seen, could be felt as rapidly recurring vibrations. Gradually, the interval between these contractions becoming longer, the intermission was distinctly visible, and, becoming still more complete, the characteristic clonic stage was developed.

I do not think that this relation between the tonic and clonic spasm has received the attention which it deserves. If the difference between them depend in all cases, as I believe it does, merely on the interval between the successive muscular contractions, and the transition between the two be perfectly gradual, it is not easy to accept the difference of cause commonly assumed for the two forms, and which refers the tonic spasm to the “spontaneous” undue action of the nerve-centre—the clonic to its irritation by venous blood. The inference from their essential unity is the unity of their cause.

The relative affection of the muscles of the two sides presented some peculiar features. The equal affection of the muscles of mastication of the two sides is in full accordance with their bilateral use. So, also, according to the usual law of convulsive seizures, the muscles of the forehead were affected simultaneously on both sides; while those attached to the angle of the mouth were affected only on one side at a time. Curiously, however, the orbicularis palpebrarum was affected on both sides in some fits; on one side only in others. The mode of affection of the limbs is not easy to explain. Invariably one arm and both legs were convulsed, the other arm escaping entirely. May it be connected with the more frequent simultaneous use of the legs than of the arms? It is to be observed that, in the right leg, spasm of the extensors predominated; while in the left leg that of the flexors was distinctly greater than that of the extensors.

Not less singular is the alternation which existed in the commencing spasm of the head. The spasm on the side chiefly affected (right) was preceded by transient contraction on the opposite (left) side, and even by a still earlier slight and passing affection on the right side. This preliminary alternation may, however, be compared to that which is seen not unfrequently at the close of an epileptic fit, in which the head is, at the commencement, turned to one side. In these cases, as the fit is passing off, it is common to see the head and eyes gradually turn towards the other side from which they turned at the commencement of the fit, and remain for a little while in this position after the fit has ceased. This deviation is not due to paralysis by exhaustion of the side first affected, but is the distinct result of the development of spasm on the opposite side. These two forms of alternate movements—the preliminary alternation which precedes the fit, and the subsequent alternation during its course—may be fairly compared. The latter is regarded by Dr. Hughlings Jackson as an instance of the influence exerted by each half of the brain upon the muscles of both sides of the body. The preliminary alternation I have described may be thus explained, or it may be regarded as an instance of reciprocal action between the two halves of the brain, related in a curious way to the development of the spasmodic process. The commencing evolution of the fit is accompanied by a similar process on the other side more easily manifesting itself than the severer “discharge” on the side chiefly in operation, but transient and ceasing, perhaps by inhibition, as the intenser action of that side is evolved.

The absence of any arterial spasm in the retina during the fit is a feature of considerable interest. It is not, however, surprising; for it accords with the entire absence of facial pallor. But it proves, at any rate, that a severe fit may occur under the circumstances of cerebral irritation without any evidence of coincident arterial spasm.

Queen Anne-street,

TWO CASES OF EXCISION OF CANCER OF THE BREAST BY SCISSORS-CUTTING UNDER ETHER SPRAY.

By THOMAS MOORE, F.R.C.S. EXAM.

As the exhibition of a general anæsthetic during an operation always entails more or less risk to the life of the patient, and a corresponding degree of anxiety on the operator, any other means of producing insensibility to pain should be a matter of great interest to the profession. The use of our best local anæsthetic—freezing by ether spray—has, unfortunately, hitherto been almost impossible in operations where the incisions have to be carried to any depth, owing to the difficulty of cutting through the hardened tissues. In an article in *THE LANCET* of Aug. 29th, 1874, Dr. B. W. Richardson asserted that he had overcome this difficulty, so far as operations on the breast at least were concerned, by the substitution of scissors for the knife; and he gave the history of two cases in which he had tried this method with unequivocal success. Since that time two patients have come under my care suffering from cancer of the breast, and at the same time from disease of the heart. As I made use of Dr. Richardson's operation in each of these cases, an account of my experiences with it may, perhaps, prove of interest, and will, I hope, induce others to make trial of it.

CASE 1 was that of a maiden lady, aged forty-eight, from whose right breast I had, in July 1873, removed an adenocoele without the aid of any anæsthetic. Several members of her family had died from cancer, but this tumour did not present features of malignancy. Neither she nor her friends would consent to its removal until it had become as large as a cocoa-nut, and a considerable surface of the skin over it had ulcerated. From this surface there had been several attacks of hæmorrhage, uncontrollable by styptics; and removal of the tumour appeared to afford the only hope of averting her speedy death. The heart's action was laboured and irregular, with a loud systolic murmur; the pulse was intermittent and feeble; and she had become almost childish from debility. Under these circumstances a general anæsthetic seemed out of the question, so I proceeded to operate without one, having previously exhibited brandy-and-water largely. The operation presented no special features of difficulty, but although the sensitiveness of the patient was considerably lessened by the state of almost dementia into which she had fallen, she yet suffered much pain. The after-progress of the case was satisfactory, the wound healed quickly, and the heart's action and the mental state both gradually improved.

When this operation was performed, a hard tumour, the size of a hazel-nut, could be felt in the other breast. This gradually increased in size, but my patient declined to have it removed until it had become as large as a turkey's egg, was very painful, and the skin over it was retracted. As the cardiac murmur and some irregularity of the pulse still persisted, I did not think it advisable to recommend a general anæsthetic; but at length (on the 19th of January last) induced her to allow me to operate by Dr. Richardson's method.

The ether spray was used by my partner, Mr. Cross, in accordance with the directions given by Dr. Richardson in the article referred to above. First a spray of common ether was directed over the breast for five minutes to chill it, and then a spray of anæsthetic ether for about three minutes until the part was frozen. I then cut the flaps with a pair of sharp-edged scissors, but I did not carry the incisions as low as the pectoral surface of the tumour. So far my patient did not complain of any pain. I then proceeded to use a pair of tooth-edged scissors to the deeper parts, but I found it impossible to raise the tumour from its attachments, partly because it was adherent to the pectoral muscle, but principally, I think, and as subsequent experience has shown me, because I had not made the first incisions deep enough. A considerable quantity of blood now welled up into the wound, and the freezing was consequently ineffectual. As my patient began to suffer much,

and the rate of progress made by the tooth-edged scissors was slow, I was constrained to take up a scalpel and finish the operation as quickly as possible. The wound, which was dressed with oiled lint and cotton wool, subsequently healed fairly well.

CASE 2.—A maiden lady, aged sixty-four, came on Sept. 9th, from a town fifty miles distant, to place herself under my care. She was suffering from a very hard scirrhus tumour of the left breast, rather larger than a turkey's egg, which she had first noticed eight months before, when it was as large as a walnut. There was no adhesion to the parts beneath, nor were there any glandular swellings, but there was some retraction of the skin over the centre of the tumour, and much lancinating pain. A niece had died from cancer six months before, but there was no history of the disease having shown itself in any other member of her family. She was thin and looked sallow, but her friends assured me that she had not altered in appearance for many years. The heart sounds were feeble, with a systolic murmur, and the pulse was very small and weak at the wrist. She informed me that her usual medical attendant had told her that she was suffering from heart disease.

As a general anæsthetic appeared to be contra-indicated, I determined to give Dr. Richardson's method another trial, in spite of my previous somewhat unfavourable experience of it, especially as I felt that most of the hæmorrhage and pain which occurred in the former case might have been avoided, if the parts had been more decidedly frozen, and if the incisions for making the flaps had been carried to their full depth at once.

On the 14th of September the operation was performed as follows:—First a spray of common ether was directed on to the breast for five minutes; then two sprays of anæsthetic ether were directed—the one by Mr. Cross, and the other by our assistant, Mr. Bayfield—on either side of the tumour for five more minutes, until the whole breast was frozen quite hard. I then, after making an angular cut in the skin at the outer margin of the tumour, carried the lower blade of the cutting-scissors deeply down through the breast until it appeared to rest upon the pectoral muscle. Then, keeping this blade as deep as possible, I easily cut the lower flap, about an inch from the tumour, with three or four strokes of the scissors. The upper flap was cut as easily. I next thrust the fingers and thumb of my left hand deep into the wound, and, grasping the tumour firmly, raised it as far as possible from the pectoral muscle. It was then easy to detach it with a few strokes of a pair of tooth-edged scissors. The operation so far was completed in less than three minutes from the time of the commencement of the first incision, and was attended with very little loss of blood. When the spray was withdrawn there was some hæmorrhage from three small vessels in the tissues which had been cut by the sharp-edged scissors, two of which were treated by torsion, and the other tied with silk, the ends of the ligature being cut off short. The edges of the wound were brought together by six sutures, and each of the twelve spots through which the needle was passed was previously separately frozen by the spray.

My patient, who declared beforehand that she was extremely sensitive to pain, gave very little indication of having felt any during the operation, and said afterwards that "it hurt her, but not a great deal." That her estimate of her extreme sensitiveness was correct (and indirectly the success of the anæsthetic) was proved by the fact that, during the introduction of one of the sutures through a part of the skin which had been accidentally insufficiently frozen, she cried out loudly, and declared that this "hurt her worse than all the rest put together."

The wound, which was dressed with oiled lint and cotton-wool, united by first intention, except in a spot where I had made a slight notch at the junction of two cuts of the scissors, and at the place of the first incision; but there never was more than just enough discharge to moisten the dressing, and that was entirely dried up by the sixteenth day. The patient was confined to her bed for one day, and to her bedroom and an adjoining sitting-room for a week.

The scissors used for making the first incisions were ordinary "elbow-scissors," with the blades inclined to the handles at about a third of a right angle; those for making the deeper incisions were tooth-edged and slightly curved "on the flat of the blade."

My experience of these operations has shown me that in

using this method three things must be particularly attended to:—1. That the whole breast should be thoroughly frozen before the commencement of the operation, as otherwise hæmorrhage may afterwards prevent the freezing action of the spray. 2. That the incisions should be made at once to their full depth, as the difficulty of afterwards carrying them deeper, especially if there be hæmorrhage, is considerable. 3. That great care should be taken not to notch the skin, as doing so with scissors bruises as well as cuts it, and retards the healing process.

The success of my second operation, in the satisfaction it gave both to my patient and to myself, was such that I shall not hesitate to employ this method for the future for the excision of any tumour which does not require dissecting out from the subjacent tissues; for I was able to perform it about as quickly as I have performed similar operations with the knife under chloroform, and the wound healed as rapidly as could be desired.

Petersfield.

CASES OF DIABETES MELLITUS.

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WHILE treating two cases of diabetes in my wards in the Royal Infirmary I became acquainted with the details of the following case from the personal narration of the patient.

A. B.—, aged fifty-two, in an excellent business position in the city, in 1869 became aware of his having diabetes, and his usual medical attendant ordered him a diet consisting of beef and milk and dry toast. At that time he voided daily about 250 oz. of urine, with a specific gravity of 1044. He continued under that treatment for about a year and a half. The quantity varied little, and the specific gravity remained the same. The dietary became very irksome to him, and he had lost in weight about a stone and a half. A consulting physician who was called in recommended a purely skimmed-milk diet. This was adopted in 1872, and was continued for two years and three months. He drank thirteen pints or 260 oz. of milk daily, and passed about the same quantity of urine. Latterly he decreased the quantity of milk, because so much became nauseous to him, until it fell to 180 oz., the urine voided falling to 140 or 150 oz. The specific gravity of the urine under this treatment was 1020, but though low it was still loaded with sugar whenever it was tested. His weight had decreased to 11 st., and he was becoming despondent and extremely feeble when he made, as he terms it, his discovery about diabetes. He found that he commenced to wheeze when he breathed the cold air, and that it ceased on his return to a warm room. On putting his head below the bedclothes a slight perspiration came upon him, the saliva returned, and his tongue and mouth became moist, instead of dry, as formerly. When he withdrew his head again, and breathed in the open, his mouth and tongue again became dry and parched. This moistness and dryness of the mouth alternately occurring under the conditions mentioned having arrested his attention, the question arose in his mind, how could this moisture be obtained without remaining in bed? To accomplish this he put on a respirator, and also a knitted woollen cloth over both the respirator and his nostrils when in the house, or even in bed, and was careful in protecting the nostrils as well when he went out. He also began to practise breathing by the nostrils alone, and found that breathing exclusively in this manner day and night, except when engaged in conversation, was highly beneficial. Having perfected himself in respiring by the nostrils alone, he laid aside both the respirator and the cloth, only muffling himself carefully up when he went out at night or in frosty weather. He avoided going out at night as much as possible, and refrained from all cold diet or drink, invariably taking them warm. Under this treatment an amendment was apparent in less than fourteen days, and in less than a month it was very marked. The quantity of