ACUPRESSURE.*

BY WILLIAM PIRRIE, M.D.,
Professor of Surgery in the University of Aberdeen.

ACUPRESSURE—for which we are indebted to the wonderful genius of Sir James Y. Simpson—is a hæmostatic of which I have had considerable experience; and, as I have formed decided opinions of its reliability for arresting surgical hæmorrhage, and of its influence in accelerating the healing of wounds, I shall now describe the several methods of this proceeding in use at the Aberdeen Hospital, give a synopsis of my own experience, and state my appreciation of acupressure and its advantages over the ligature, in the hope of promoting the more general adoption of this admirable method of arresting surgical hæmorrhage. The principle in all forms of acupressure is the same; viz., closing an artery by a needle or by some other form of temporary metallic compression.

Methods of Acupressure.

THE FIRST METHOD may be quickly and easily performed by placing the left forefinger or thumb against the mouth of the bleeding artery, sending the needle from the cutaneous surface direct through the whole thickness of the flap, and causing it to emerge a little to the right side of the tube of the vessel. The projecting end is then pressed firmly against the site of the artery, made to re-enter the flap close to the left side of the vessel, and pressed on till it emerges on the surface of the skin. In this method, the artery is compressed against the component parts of the flap, to use the words of Sir James Y. Simpson, "just in the same way as, in fastening a flower in the lapelle of our coat, we cross over and compress the stalk of it with the pin which fixes it, and with this view push the pin twice through the lapelle." In some cases, the vessel can be conveniently pressed against a neighbouring bone instead of against the soft parts of the flap. The portion of the needle within

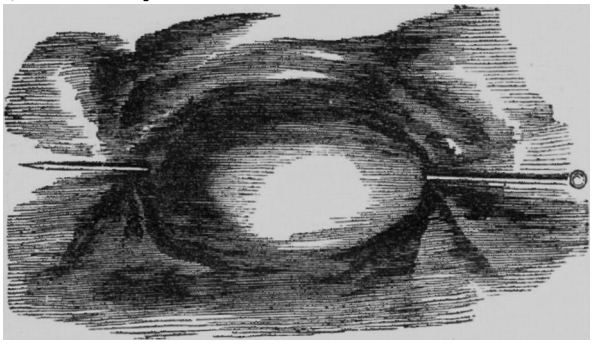

Fig. 1.—Cutaneous surface of a flap, in which an artery is secured by an acupressure-pin, according to the first method. (From Sir James Y. Simpson.)

the wound is very small; but, in many cases, it may be passed higher up, so as to compress the artery without emerging on the wound-surface. In many of my most gratifying cases, I have adopted this modification;

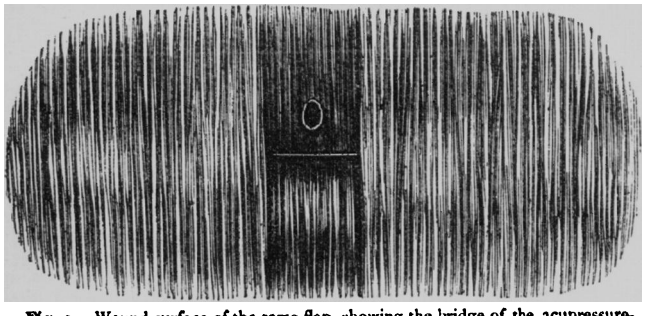

Fig. 2.—Wound-surface of the same flap, showing the bridge of the acupressure-pin compressing the artery.

and by so doing the wounds have not had, even for the shortest time, any foreign body within them. The accompanying illustrations (Figs. 1 and 2) render this method intelligible.

* Read at the annual meeting of the Association at Dublin.

THE SECOND METHOD is performed with a needle threaded with twisted iron-wire, and—unlike as in the first method—the skin is not interfered with, and the needle is passed above, instead of below, the artery. The needle is pushed twice into the soft tissues of the wound. The first point of entrance is at a little distance from the artery to be acupressed, and the first point of exit close to it. The second point of entrance is close to the vessel on its opposite side; and the second point of exit at a little distance. Between the first point of exit and the second point of entrance, the needle is made to bridge over the track of the artery; and care must be taken, before making the needle re-enter the wound, to press it down sufficiently to close the artery. For this purpose, the soft parts may be pressed with the tip of the left forefinger, to aid the pressure of the needle in closing the artery before the needle is fixed by being pushed a second time into the soft parts. I trust this description and the accompanying diagram (fig. 3) will make the perform-

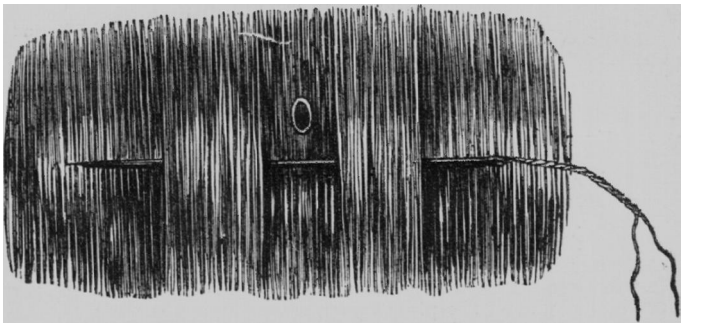

Fig. 3.—Second method, by means of an acupressure-needle threaded with iron wire, to admit of its being withdrawn.

ance of this method perfectly clear. The needle can be removed at pleasure by pulling the twisted wire. In minor operations, and in acupressing vessels of moderate size, I have often used this method; but I have never adopted it in acupressing an important artery in a major operation; because, although I have been greatly surprised how little pressure, when direct, is sufficient to stop the circulation through an artery, there are other methods whose reliability is unquestionable, and I have, therefore, thought it judicious to give them the preference. Occasionally I have used a pin instead of a threaded needle; and I invariably do so when the form of the wound and the situation of the artery admit of the head of the pin being conveniently kept without the wound.

THE THIRD METHOD requires for its performance a threaded needle and a loop of inelastic iron wire; and consists in effecting compression between the needle *below* and the loop *above* the vessel. The needle is entered a few lines to one side of the vessel, as is shown in the accompanying diagram (fig. 4), and, as I now demonstrate with this needle and flap, pushed behind it; caused to emerge a few lines beyond the vessel; the loop of wire is thrown over the point of the needle; brought over the track of the artery and behind the stem of the eye-end of the needle; drawn sufficiently to shut the vessel; and fixed by half a twist around the needle. A glance at fig. 4 will render the description intel-

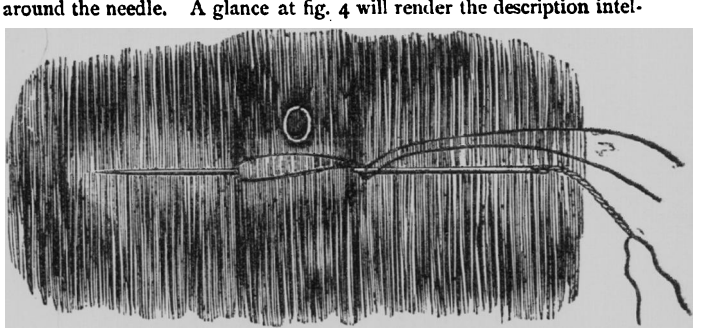

Fig. 4.—The third method, by means of an acupressure-needle threaded with iron wire, and a loop of inelastic iron wire.

ligible. It is important, in the performance of this method, to avoid including an unnecessary amount of tissue; not to draw the wire tighter than is absolutely necessary to close the artery, lest its coats should be lacerated or the tissues molecularly injured; to arrange the wires so as to prevent wriggling or entanglement, and to relieve the vessels from acupressure at the earliest moment deemed advisable, which is done without the slightest difficulty. By pulling the twisted wire, the needle is removed; and the loop being liberated is easily withdrawn.

THE FOURTH METHOD differs from the third, inasmuch as a long pin is substituted for the threaded needle, as shown in the accompanying illustration (fig. 5). Little as the difference is, the pin should be preferred in all cases where the form of the wound and the position of the artery admit of the head of the pin being conveniently and without

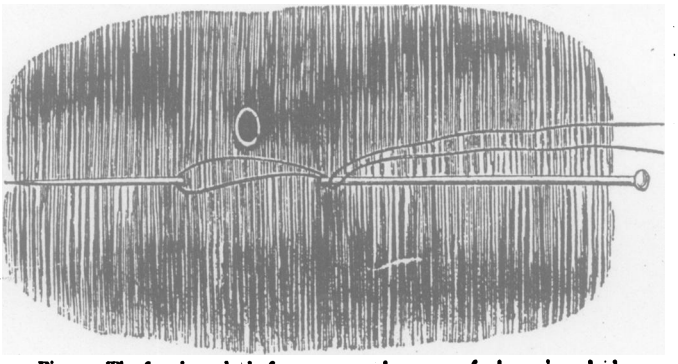

Fig. 5.—The fourth method of acupressure, by means of a long pin and a loop of iron-wire.

straining of tissues kept without the wound. Kinking of the wire at the head of the needle has sometimes caused pain in withdrawing the needle. In the method with the pin this kinking is avoided; and, besides, there are the advantages—of greater facility of insertion; being more easily withdrawn; admitting of being twirled, which greatly facilitates removal; and avoiding all wriggling and entanglement of different kinds of wires. The pin, however, cannot always be used; as certain forms of wounds and some positions of bleeding vessels render it impossible to insert the pin in the proper position and keep its head out of the wound without straining of tissues, in circumstances where the threaded needle—owing to less length of unbending material—can be used with facility. The third and fourth methods are as efficient means of arresting surgical hæmorrhage as could possibly be desired; and the principle of both is precisely the same.

THE FIFTH METHOD, OR ABERDEEN METHOD, OR THAT BY THE TWIST, is a favourite practice with my colleagues and myself, and may be performed with a long pin or a threaded needle; but the former, when admissible, is greatly to be preferred. For making clear the description of this admirable method—which may be said to consist of three different steps—I hope I may be allowed to repeat what I have already published in explanation of this proceeding. "In the first step, the pin is inserted on one side of the bleeding artery, then pressed onwards a

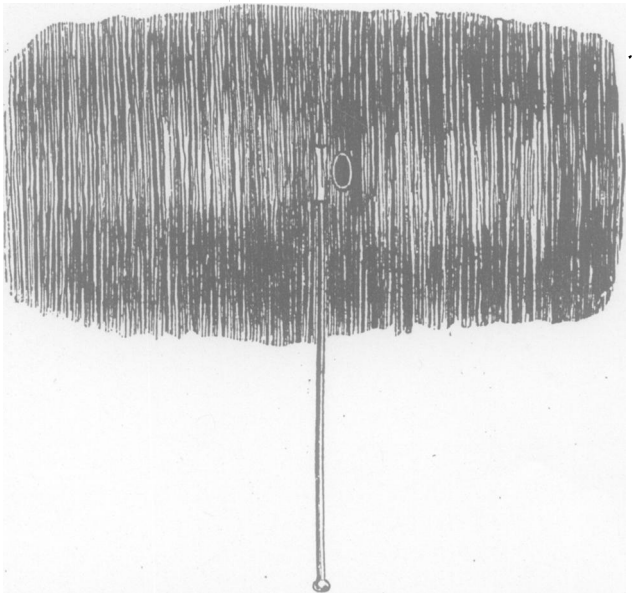

Fig. 6.—Diagram showing the appearance of the parts at the termination of the first step of the fifth, or Aberdeen, method by the twist before making the quarter rotation with the pin.

few lines in the same direction as the length of the vessel, and its point caused to emerge on the surface of the wound as shown in fig. 6. In the second step, a quarter rotation is given to the instrument so as to place it above the artery, and well pressed down against the small portion of tissues between the instrument and the vessel. In the third step, the pin is secured and the twist retained, by sending the point into the tissues beyond the artery, when the parts will present the appearance shown in fig. 7. The operator has, on the cessation of the bleeding, a reliable

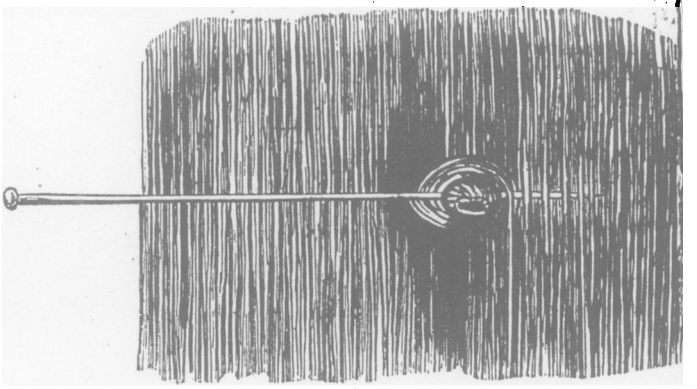

Fig. 7.—Fifth, or Aberdeen, method, with a quarter rotation of the pin. The diagram shows the appearance of the parts after the quarter rotation, and the ultimate insertion of the pin-point in the tissues beyond the artery.

proof that a sufficient degree of rotation has been given to the needle. The first time I tried the method by the twist, a half-rotation was given to the needle; but as so little pressure, when direct and steady, is sufficient to arrest hæmorrhage, I have invariably preferred, in other cases, a quarter rotation. Of all methods of acupressure of which I have experience, this is the simplest, the easiest, the quickest, and, so far as experience in the Aberdeen Hospital warrants an opinion, perfectly efficient. Simplicity, efficiency, quickness, and ease of performance, are unquestionably great recommendations of the method by the twist, when performed with a quarter rotation and a long pin; but this variety possesses two other advantages, in my opinion, of the greatest importance, for obtaining either immediate union or union by primary adhesion. The one, that there can be but little molecular injury or straining of tissues; the other, that, by the gentlest twirl and traction, the pin can be easily withdrawn, with extremely little, if any, discomfort to the patient. Surgeons who know how little produces pain in an amputation wound; how slight a degree of pain is apt to cause involuntary contraction of muscles in the stump; how certain such contractions are to separate parts of the internal surfaces of the wound from each other, although, by retentive means, its edges are kept in apposition; and who, after the greatest anxiety to obtain the best results, have so often in a few days witnessed the disheartening effects of such contractions, will fully appreciate the value of a means of arresting hæmorrhage that, at the moment deemed judicious, can be removed, not only without pain, but almost without discomfort, to the patient. In this method, the artery is, to a certain extent, twisted as well as steadily compressed; and in that way, no doubt, the occlusion of the vessel and the suppression of the hæmorrhage is produced."

THE SIXTH METHOD, OR THAT BY THE RING, was suggested by my able colleague, Dr. Keith—who has done much to promote the adoption of acupressure—and requires for its performance a long pin and a loop of passive iron wire. The pin is inserted a few lines on one side of the bleeding mouth of the artery, made to pass close to but not to transfix it, and to emerge about two lines, or so, beyond the mouth of the vessel. Another important precaution during this step is, to have the point of exit as near as possible to the point of entrance, so that too much tissue may not be included in the ring in the next step of the operation. The surgeon then takes an end of the loop of wire in each hand; throws the duplicature over the point of the pin; brings back an end on each side of the vessel; crosses them behind the body of the pin; draws them in opposite directions to the extent necessary to arrest the hæmorrhage, *but not more on any account;* brings an end up on each side; and fixes the wire by a semi-twist in immediate contact with the front of the pin. In making the semi-twist, it is important, for a reason which will afterwards be stated, to cross the end in the surgeon's left hand in front of that in his right. In every form of acupressure where wire is used, it is important not to draw it with more tightness than is absolutely indispensable to arrest the hæmorrhage; and it is surprising how little pressure is necessary when continued and direct; but in this method, more than in any other, this precaution should be observed, owing to the wire being applied in a manner more likely, with undue force, to lacerate vessels and to cause molecular injury. But, besides, if the wire should be drawn with injudicious tightness, undue constriction of the tissues it embraces

might cause difficulty in withdrawing the wire after removal of the pin. Should such difficulty occur, through forgetfulness of the necessary precaution, twisting the wire which was held in the left hand from right to left will undo the twist, and facilitate removal. This method has been

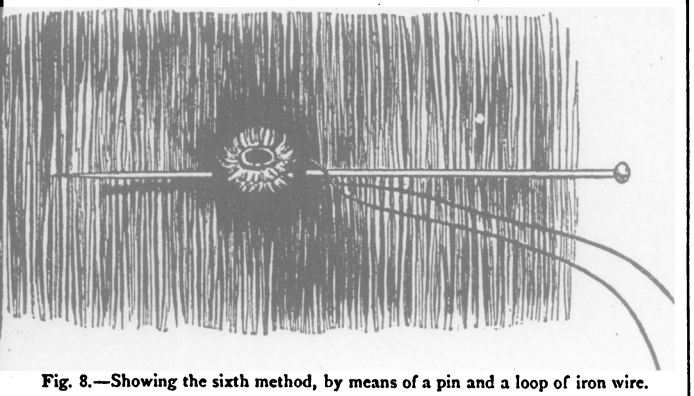

Fig. 8.—Showing the sixth method, by means of a pin and a loop of iron wire.

found extremely serviceable in perpendicular wounds where the artery has been cut short, and also in wounds containing a bleeding vessel not sufficiently accessible to be acupressed by the third or fourth methods.

THE SEVENTH METHOD requires for its performance a long pin, which is inserted twice on the surface of the body, precisely in the same way as the needle is inserted on the surface of the wound in the second method. It consists in passing a long pin through the cutaneous surface pretty deep into the soft parts, at a little distance from the vessel,

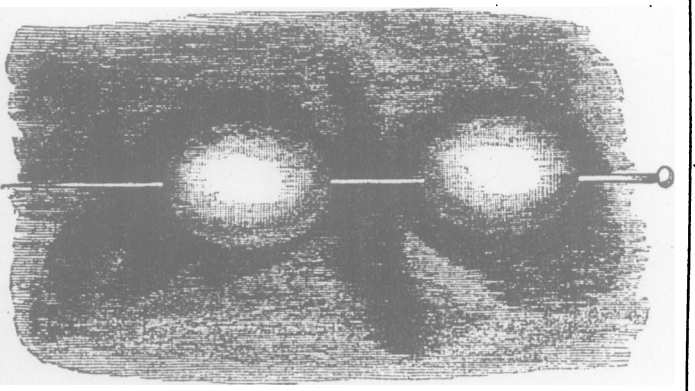

Fig. 9.—Showing the position of the pin in the seventh method. The middle portion in front of the integument bridges over the artery to be acupressed, and the compression is effected between the middle portion of the pin in front and the bone behind.

pushing it on, causing its point to rise up as near to the artery as possible, bridging over and compressing it, dipping the point of the needle into the cutaneous surface on the other side of the vessel, forcing it on, and causing the pin to emerge a second time on the skin. The artery is compressed between the bone and the middle portion of the pin in front of the integument. I have published an interesting case, in which I acupressed the humeral artery by this method, with most gratifying results, on account of a wound in the upper part of the forearm attended with great hæmorrhage.

[Professor Pirrie illustrated the various methods with large diagrams, and demonstrated with a needle on a flap.]

Synopsis of my Experience of Acupressure.

My experience of acupressure in important cases, of which records have been kept, comprehends its use in eleven cases of amputation of thigh; four of amputation of leg; two of amputation of arm at the upper part of the surgical neck of the humerus; one of amputation at ankle-joint; one of Chopart's amputation; two of amputation of the whole of great toe; twelve of excision of mamma; six of excision of elbow-joint; one of excision of knee-joint; one of excision of an erectile tumour; one of excision of tumour on chest; one of excision of tumour on thigh—wound eight inches long; one of excision of head of fibula; three of excision of testicle; one of hæmorrhage from sloughing of hand; one of wound of hand; one of wound of upper part of forearm, with great hæmorrhage; one of wound of the radial artery; and one of wound of hand, attended with great hæmorrhage.

These fifty-one cases—in which alone I have acupressed one hundred and eighty-five vessels—are of a highly diversified character, and many of them are among the most important in the practice of surgery. They are admirably fitted to test the efficiency of acupressure, and to enable a surgeon to form a just appreciation of its merits. I have also employed this means of arresting hæmorrhage in a large number of minor operations, as well as in many cases of wounds which occurred both in hospital and in private practice, but which I did not deem sufficiently important to put on record. My able colleague, Dr. Keith, acupressed the first case in the Aberdeen Hospital, and I acupressed the second. I have had occasion to assist Dr. Keith in all his hospital operations, and thus had ample opportunity of forming a correct appreciation of the value of acupressure in his cases as well as in my own. I have also assisted Dr. Fiddes in his operations; who, like Dr. Keith and myself, invariably practises acupressure. Such have been my opportunities of arriving at a just estimation of the merits of acupressure.

Merits of Acupressure.

Is acupressure a perfectly reliable means of arresting surgical hæmorrhage? In the list I have just read of fifty-one important cases, in numerous minor operations, and in all accidents to which I have been called since my adoption of this new proceeding, there has not occurred one single example in which it has failed to arrest the hæmorrhage, or where I found it necessary to substitute the ligature for acupressure; and such also has been the experience of my colleagues, Drs. Keith and Fiddes. What stronger evidence could be wished of the efficiency of acupressure for the arrest of surgical hæmorrhage? And, as to the risk of bleeding on relieving a vessel from acupressure, in only one case did I meet with return of hæmorrhage in doing so. It was a case in which I removed the leg in its upper third for medullary cancer. There was not a drop of oozing after the operation. Twenty-four hours after operation, earlier than usual, I relieved the anterior tibial artery from acupressure, and it instantly bled as energetically as if it had that moment been cut across. Acupressure pins and loops were in the ward; the house-surgeon and some of the surgical pupils of the hospital were with me at the time; and I immediately got the femoral artery compressed, opened the wound, and acupressed the artery again by the Fourth method. The blood lost did not exceed a dessert-spoonful, and the whole proceeding did not occupy more than three or four minutes. This is the only instance in which I have seen any hæmorrhage from an artery on its being freed from acupressure; and I attributed its occurrence in this case to the extreme exhaustion of the patient being unfavourable for adhesion. In only one case did Dr. Keith meet with hæmorrhage on relieving a vessel from acupressure. It was after amputation of the forearm. The radial artery bled on removing the compression; but it was immediately acupressed again, and there was not afterwards a single drop of oozing. These are the only instances in Aberdeen. In upwards of eight hundred vessels, in two only has hæmorrhage occurred on the discontinuance of acupressure; and I have no doubt that as many would be found in the same number of examples of deligation of arteries. Even without the valuable experience of surgeons elsewhere, the evidence furnished by the surgeons of Aberdeen appears to me to prove that acupressure is a means which can be entirely relied upon for the arrest of surgical hæmorrhage, and that this question may be considered as set at rest.

Does acupressure accelerate the healing of wounds? This question may be put in other words; namely, Are perfect examples of healing by the first intention, or by primary union, equally attainable under deligation and acupressure? By a perfect example I wish to be understood one where not a single drop of pus has been seen. This appears to me the great question to be determined; because, although acupressure, like deligation, is a perfectly reliable hæmostatic; and although, in my judgment, acupressure has other advantages which make me greatly to prefer it; yet, although most desirable, they are comparatively of inferior importance; and the final general adoption or rejection of acupressure will no doubt depend, mainly at least, on the opinion arrived at by surgeons on this important question. As I have stated elsewhere, the use of the ligature is attended with an insuperable obstacle to obtaining perfect examples of union by the first intention, or by primary adhesion without the formation of some pus. The well-known effects of the ligature, the laceration of two of the coats of the artery, the strangulation of the external coat, the molecular destruction of that coat, and the presence of the ligature acting as a seton in the wound, render more or less suppuration at the points and tracks of the ligatures inevitable. Healing by the first intention cannot, therefore, be perfect throughout in any case where the ligature has been used. Accordingly, I never saw in my own experience, or in that of any other surgeon, where the ligature was used, a perfect example of healing by the first intention, or by primary union, without any suppuration. I believe such a case never was, and

never will be, seen. On the other hand, acupressure, if properly performed, and not too long continued, does not, so far as my observation has enabled me to judge, cause laceration, strangulation, nor destruction and suppuration at the site of acupressure. No doubt, the precise local conditions resulting from the use of the needle are not, as yet, so well known as those succeeding the ligature. Opportunities of making such examinations in Aberdeen have fortunately been few; but in those which have occurred the coats of the vessels were perfectly entire. But, whatever the difference may be in the pathology of deligation and acupressure, I am perfectly convinced, from personal observation and experience, that acupressure accelerates the healing of wounds; and that under its use, aided by metallic sutures, the avoidance of all dressings, and perfect rest of the wounded part, surgeons may have the gratification of seeing, in many instances, the largest surgical wounds after major operations heal up perfectly without a drop of pus. Out of the foregoing list of fifty-one cases, in many of which "the major operations of surgery" were performed, twenty-one, comprising three cases of amputation of the thigh, eight of excision of the mamma, two of excision of the testicle, one of excision of erectile tumour, etc., healed entirely by the first intention, and without any pus. I regret that, on account of a recent family bereavement, my colleague Dr. Keith—whose experience of acupressure has been quite equal to my own—could not come to Dublin; as his report of cases of union by first intention without any suppuration, which I witnessed in his practice, would have added greatly to the testimony I bear to the advantages of acupressure. It should be remembered that these results have been obtained in the early days of acupressure, with but a very limited amount of recorded experience, and on many points none whatever, for guidance; and that, as surgeons become more experienced in the practice of this new proceeding, it is to be hoped that much more favourable results will be obtained. The practical results, however, already obtained have convinced me that acupressure is an invaluable means of accelerating the healing of wounds; that it does so by removing one of the hindrances to complete union throughout by the first intention; and that the anxiety, suffering, and risk, that in future may thereby be saved, are incalculable.

Has acupressure any other advantages over the ligature? In my opinion, it possesses the following:—1. A briefer sojourn of a foreign body in the wound. 2. The foreign body is of a less irritating character, owing to its being of a metallic, and not of a textile, nature. 3. Acupressure is the easiest of performance, and the quickest of all methods of arresting hæmorrhage. 4. The needle is removeable at pleasure, instead of after a tedious process of ulcerative destruction and more or less of accompanying suppuration. 5. The comfort which the patient early enjoys from knowing that, as far as vessels are concerned, all further interference and suffering are at an end. 6. The diminished risk of the occurrence of pyæmia, owing to suppuration not being an inevitable consequence of the mode of arresting hæmorrhage. It is a remarkable fact, that as yet there has not been a single instance of pyæmia in any case where acupressure has been employed by my hospital colleagues or by myself.

In conclusion, I have only to add that, having given acupressure a fair and unprejudiced trial, I have no hesitation in stating that I am a decided believer in its advantages; that my appreciation of its merits is such, that I regard it as the greatest improvement of modern times in the treatment of incised wounds; and that—with chloroform for preventing pain during operations—and with acupressure, aided by metallic sutures, perfect rest of the wounded part, and the avoidance of all dressings, much suffering to patients may in future be averted, and the success of an important department of practical surgery greatly increased.

Discussion on Dr. Pirrie's paper.

Dr. BUCHANAN: I have used the method of acupressure very extensively in the hospital of Glasgow; and my experience—perhaps owing to my want of care at first—has not been quite so favourable as that attained by Dr. Pirrie. Until I used the method of acupressure, I never saw a case of union by the first intention in all the amputations of any size in my own practice, nor in the practice of any other surgeon. There was one case of amputation of the shoulder-joint, in which I acupressed the axillary artery and two other vessels; and that case was the first case in the history of the Glasgow Infirmary of any amputation uniting by the first intention; so much so, that many surgeons in Glasgow did not believe in the possibility of such a thing, and came to visit the case. I think the thing is still in its infancy; because I am perfectly certain that union by the first intention will yet take place in all instances. I suppose it is in consequence of my want of exactness in manipulating that I have not succeeded in all instances. If you succeed in acupressing correctly, if you succeed in making an apposition of the flaps, then you may expect union by the first intention. The last case which I have related was accompanied by amputation, in the same case, of the leg below the knee. The young man on whom the operation was performed was rather restless in his bed, and, when I subsequently came to see him in bed, I found that he had kicked out two of the pins. To my astonishment, there was not a drop of blood lost. Inflammation occurred afterwards, which did not favour complete union; but it is a curious fact that, in acupressure, sometimes the pin may be removed in half an hour without hæmorrhage. I think the method is one that deserves the attention of all practical surgeons.

Dr. RAWDON MACNAMARA: It is well known to my colleagues how earnestly I have taken up this subject of arresting surgical hæmorrhage, and my experience of it is each day more and more satisfactory. In any operation I have lately performed, I have used no other means of arresting hæmorrhage. In amputation of the breast, I have used no other means; and I have been pressing the matter on some of my professional friends in this city, who have been kind enough to follow out my suggestions and to employ acupressure. The way in which I was in the habit of employing it was what was called Simpson's third method. Now, the result of my more mature experience is, that Porter's twist is more satisfactory, as it is more rapid. Latterly I have been using Porter's twist. Mr. Smyly, in the Meath Hospital, used it a few mornings ago in arresting hæmorrhage. This (exhibiting a needle) is what I have been in the habit of using, instead of the long needle to which Professor Pirrie has alluded. I was perfectly astonished by the way in which, some days ago, a large vessel was at once secured, and there was not a drop of blood lost. What I usually do is, to leave open the wound on which we are operating. (Some of our brethren may not be aware that we operate here at a much earlier hour than they do in London—we operate at 10 A.M.) Having secured all the needles, we go back about six o'clock in the evening to remove the needles and bring the lips of the wound together into perfect apposition. Union of the most satisfactory character takes place. In one instance, there was not the slightest appearance of a drop of pus; and in others it was very slight indeed. Speaking for myself, I may say that, in using this method, I see nothing left to be desired in the arresting of hæmorrhage. The more I am acquainted with it, the more satisfied I am concerning it. In one case, a very interesting one, in which I employed acupressure in amputation of the thigh, on removing the needle, a large dash of arterial blood came, and we were all under the impression for a short time that it had not sealed the femoral artery.

Dr. GEOGHEGAN: After how many hours?

Dr. MACNAMARA: The needle had been in for forty-eight hours. But a little pressure on the femoral artery stopped the blood. I think that there must have been some twist in the wire, and I tore across another vessel. But it is perfectly idle to imagine that, if the blood came from the femoral artery, a little manual compression would have resulted in sealing it up. Two months have now elapsed since the operation. I cannot too strongly express my opinion as to the value of acupressure in arresting hæmorrhage. If I were in Edinburgh, I should hold my tongue; but I should be sorry that the distinguished suggester of acupressure should be in this city, and that I, so thoroughly acquainted with its value, should sit silent while the subject was being discussed.

Sir JAMES SIMPSON, who was received with applause, said: Perhaps I have no right to speak on a section of surgery as I am not a surgeon, but I shall feel obliged if you will allow me to say two or three words. Let me first remark that, after I had worked out some problems with regard to acupressure, I happened to show the result to a lady who was a little skilled in anatomy as well as everything else; and she said, "Now, Doctor, do you want me to believe that nobody ever thought of that simple thing before?" I said that I had searched all the olden and modern authors, and to my own wonder in none of them had I found any allusion to it. Let me add that I have searched them honestly. My friend Professor Smith stated in his address to-day, as I am told, that he has found a passage in John de Vigo describing the process. I know that passage very well; and I think that my friend, Sir Dominic Corrigan, will have to change our knowledge of the Latin language before Dr. Smith will be able to prove that it relates to acupressure. Dr. Smith has committed merely an error in reading the Latin of De Vigo. It has been translated more than once. It was translated from John de Vigo's book into English three centuries ago by Trahernon, and into French by Portal. Both of these translations make Vigo say that he put a needle below the artery in order to pass and place with it the thread which was to tie and compress the vessels: and you must remember that, in the days of Paré and before him, the common way was by putting a needle around the artery altogether in order to place the thread around the vessel. De Vigo speaks of the process as one of *ligatio* (deligation); and distinctly, I think, states the thread to be left and used for tying—not the needle. But it is, after all, not a matter of any practical moment, whether the needle was ever used or not by any old authority. Let me say one thing more; that it is not seven years yet since I first offered the suggestion of acupressure publicly; and that

I think I have some little right to rejoice that, in the course of those seven short years, instead of seeing the practice expire, as so many prophesied that it would, it has already extended very widely; and I have no doubt that in the hands of such very able surgeons as Drs. Pirrie, Buchanan, Porter, Macnamara and others, it will rapidly enough extend. There is no use in its spreading too quickly; let it take good hold. I quite agree in the belief that eventually we shall probably come to have acupressure done solely or almost solely with the pin, and without the wire loop. There are various other modes of acupressure besides those described by Dr. Pirrie, in common use in Edinburgh. One, done in a moment, consists of making an over or vertical twist with the single pin instead of a circular twist. I say that acupressure will probably be yet effected perfectly and entirely by a single pin; and then, as now, the rapidity with which the process can be employed will be found infinitely greater than that with which a ligature can be applied. Acupressure can be done by one man; whereas a ligature requires two. My friend, Dr. Davidson, practising surgery extensively in Madagascar, with no educated man near him to give him assistance in his operations, told me that he there got on very well with acupressure, whilst he could not have got on with the ligature in this isolated position. I may now speak of the time for removing the pin. I have seen it removed repeatedly from a breast, after amputation, within a few hours. I think there can be nothing more curious than that case of Dr. Keith's, which has been instanced, where the boy, whose thigh was amputated, removed the pin himself from his own femoral artery after four hours. Why, that boy was already one of the greatest surgeons alive, practising thus philosophically as he did on his own thigh and femoral artery. Dr. Pirrie referred to the results which may ensue from the pin being left in too long. My friend, Dr. Humphry of Cambridge, one of the most accomplished surgeons living, in the last number of our JOURNAL spoke of its having been left for five days over a femoral artery. My wonder is that, when left so long there, it should not have had irritating results. It is against every rule that obtains in relation to the process to leave the pin inserted such a length of time. I published, at the suggestion of Mr. Compton, the rule that Dr. Pirrie speaks of, of not removing a needle while its knob throbs and moves; just as Homer describes the wounds of some of the Greeks, where the spear had been buried in the heart, that the weapon pulsated until the heart ceased to beat; so I believe that, in the case of the acupressure pin, while pulsation continues in the head of the pin, it, as a general but not absolute rule, perhaps should not be removed. With regard to the so-called methods of acupressure, termed numerically the first, the second, and the third, etc., methods, I believe we must classify them in some other way, as confusing the subject. Some time ago I saw a surgeon compress by two pins the humeral artery in a case of aneurism of the forearm. He inclosed, without any previous cutting, the humeral artery by a pin on each side of it, fixed the points in a cork, and then brought the heads together till all pulsation in the aneurism ceased. It may become yet a question whether all arteries in limbs could not be thus secured by needles alone, and without any previous use of the knife. In the case alluded to, the needles compressed the humeral nerve as well as the artery, and with what result? The woman before the operation was lying moaning with pain, apparently from pulsatory distension. The moment the pressure was effected, she said that the pain was gone; so that, instead of the compression of the nerve having given increased pain, it seemed to relieve the pain at once. A gentleman from India who, I was told, was to be at this meeting of the Association, has, I believe, done in various instances what I proposed to do long ago in the matter. Having no assistants with him, he has repeatedly placed the pin over the femoral artery when he was going to amputate the thigh, using it thus as a tourniquet. He always took it out afterwards. There I think he was wrong. I do not think surgeons have yet to learn to put a large needle over the femoral or other artery, and then by leaving it, the needle would become both a tourniquet and a ligature to the principal artery, and thus make surgery comparatively bloodless if it succeed. Remarks have been made as to the effect of acupressure in promoting the entire primary union of the wound. We are collected in a section of surgery, and I should like to ask any surgeon here, whether, in any hospital with which he is connected, or in his private practice, he has ever seen a single case of entire primary union taking place in any surgical wound where a ligature was used? Dr. Pirrie says he does not believe any man ever did see such a case; and I scarcely think it possible in the case where ligatures are employed. I have once or twice nearly got into a scrape on the subject with some gentlemen from North America (who often try to take their fun out of you); for, when they came to speak about it, I have said that I knew, of a perfect certainty, that when the Northern surgeons cut off the limbs of poor Southern soldiers, they always put five or six little morsels of dead flesh into the sides of every amputation wound. But what was the explanation? That all of them used ligatures, and each ligature necessarily strangles a small morsel of flesh; and with five or six bits, however small, of dead septic decomposing animal tissue in a wound, no surgeon in his senses would expect it to heal by complete primary union. Dr. Pirrie mentions that he has, since using acupressure, amputated twelve mammary tumours, some of them of large size. Eight out of these twelve cases of amputation of the breast recovered by entire primary union. Now mark what Dr. Pirrie speaks of as "entire primary union." In some of his first cases of amputation of the thigh, he says with respect to one, that he had only half a teaspoonful of pus; but the presence of pus at all prevented such cases from being looked on as being cases of *entire* primary union. The surgeons of Aberdeen are all agreed, and the surgeons of all hospitals should agree, that no case can be called a case of complete primary union where a single drop of pus appears; and, in eight out of Professor Pirrie's twelve cases of amputation of the breast, there was not a single drop of pus. The primary union was entire, and effected at once. Surely this is a great march forward in surgery. I believe that, up to the time when acupressure has been used, no man in any hospital, either in Dublin, London, Edinburgh, or elsewhere, has ever observed similar results with the ligature. If Dr. Hingston from Montreal is here, he will tell you that I showed him in Edinburgh, a month ago, two or three cases of removal of mammary tumours in which acupressure was employed by me, and in which there was not a single drop of pus. If surgeons are strangely apathetic as to the desirability of attaining such attainable results, patients are not equally so. In one of these cases, in which it was deemed necessary to remove the breast, more than one leading surgeon saw the case; and a most skilful and excellent surgeon was selected to perform the operation. After it, six or seven weeks of daily dressing of the wound ensued. The patient told me that at last this daily dressing and irritation became so frightful a process to her, that she used to shake when she heard the surgeon's carriage stop at her door. In three months, the tumour grew again; and no persuasions of Dr. Wood or of mine could induce her to submit to the same process again. Eventually, however, I undertook to remove the renewed growth again without ligature or dressing; for there is no dressing when acupressure is used. Except some stitches with iron wire, no kind of dressing was used. Not a drop of pus followed; and the disease has not returned, though eighteen months have elapsed since this second operation. The very irritation of the dressings, the patient argued, speedily brought it back the first time; and I wish this section could hear her dilate upon the professional iniquity and cruelty of dressings, when none such are necessarily required. I was lately told by a medical friend of a case of a gentleman who had a tumour some time ago removed in Edinburgh, and who, after being operated on, was weeks in getting well. After returning home, he happened to get hold of Dr. Pirrie's book; and, after reading it, angrily argued with his ordinary attendant, my informant, "Why was I tortured for six weeks to please old surgical prejudices? Dr. Pirrie might have cured me in a day or two." Now, speaking of complete union, let me add that, in the hospitals both of Paris, London, Edinburgh, and Glasgow, there have been tried of late years various materials as local applications to raw surfaces, for the purpose of producing primary union. The material has varied from turpentine and alcohol to iodine and chloride of zinc. The material latterly used has been carbolic acid. One of the chief reasons for recommending it and others has been, that there may be sporules, germs, or fungi floating in the atmosphere, which, if allowed access to the wound, would cause irritation and suppuration. No one has yet, I believe, seen these mythical fungi with the eye or the microscope; but carbolic acid and other chemicals are believed to have the power of destroying them, and of preventing the decomposition of blood, etc., upon the surfaces of wounds. Some years ago, Dr. Küchenmeister (see *Sydenham Society's Year Book* for 1860) wrote on carbolic acid as a disinfectant useful in surgical practice, and fitted for arresting putrefaction and preventing the development of such fungi. My colleague Professor Spence tells me that, three or four years ago, he washed the surfaces of some stumps with a solution of it, but soon abandoned it as useless. Within the last few months, the practice has been revived by Professor Lister of Glasgow, as quite novel; for there are more strange errors in the neglect of antecedents in modern than even in ancient surgery. I got a portion of the skin of the back of my hand scorched off by a diluted application of it, and the sore suppurated more or less for four weeks. It may or may not turn out, when more diluted, an useful application, and an aid to acupressure; but Professor Pirrie has shown that acupressure by itself, and without any dressings or medicated applications, can secure complete primary union for the surgeon. Surgery cannot gainsay such evidence as his. Why should it longer resist it?

Dr. BYRNE (Portlaw): The practice of acupressure is capable of being of still more service to country surgeons in small operations. In former

times, when wounds of the scalp were more prevalent in this country than they are now, I recollect there used to be great difficulty in stopping hæmorrhages. Sometimes half an hour used to be spent in compressing an artery against the cranium. I used, in dealing with small wounds, to stop the bleeding by a needle, which left me at liberty to go about my business. I therefore recommend country practitioners to turn their attention to acupressure.

Mr. MEADE (Bradford): I rise principally to express my thanks to Dr. Pirrie for his paper. I myself, in common with many other provincial hospital surgeons, have never used this plan of treatment, merely because I never knew exactly how to do it. I have often wished to know, but could never learn from merely written descriptions, without a practical demonstration, how the needle is to be used. My colleagues were in the same position; and therefore we have never used it. Of course, after hearing this paper and the interesting discussion on it, I shall not any longer defer making a trial of the plan. Another point has been, that I always felt a difficulty as to how long the needle ought to be left in. Some years ago, I was called in in a case, when bleeding was much more common than it is now. A practitioner was bleeding a patient, when the latter gave a sudden start, in consequence of which the lancet ran down deep into the ulnar artery; and there was a great gush of blood. I happened to have instruments with me, and cut down to the divided ends; and then, taking a large needle, pushed it through the section, drew it out, and tied a ligature, which perfectly succeeded in stopping the hæmorrhage.

Sir JAMES SIMPSON: As I know the difficulty of describing this process of acupressure, and the almost impossibility of afterwards understanding it, allow me to suggest to you to give Dr. Pirrie an opportunity of a practical demonstration. The great power he has of applying the needles will be infinitely better, if seen, than five hundred lectures.

Mr. WHEELHOUSE (Leeds): Anything that is calculated to promote primary union in wounds ought to be fairly and honestly tried. A few years ago, I took this subject up; but I am sorry to say that, after a ——rial, I believe owing to the imperfection of the means I used, I gave it up. I simply used sewing needles, but often found it difficult to get them through the hard tissues, when, on account of there being no protection on the other side, injury was done to my own fingers, and so on. Still I felt the idea was one which admitted of improved application; and not long ago I wrote to Dr. Pirrie, asking if he would be kind enough to tell me what improvements he had made, and asking for some hints. He was so good as to send me these new pins. I provided myself with his book, and then I felt that I had made some advance towards understanding the matter. But Mr. Meade's difficulty was mine also. I did not know exactly how the thing was to be done; but I took Mr. Meade's plan of finding it out. I went to a dissecting-room, and worked there until I found I could apply the needles in a satisfactory and proper manner. When I was perfectly *au fait*, I introduced the practice in my operations on living subjects in the hospital; and I may now say that, on three or four occasions, it stood me in exceedingly good stead. One of my colleagues was not long ago removing a large tumour from the under part of a patient's throat, when suddenly a large gush of arterial blood obscured his view. A finger was put on the vessel instantaneously, and it was proposed to ligature it. Before the ligature could be brought, I passed a pin over the vessel and compressed it against the trachea, and the bleeding was stopped. I found acupressure very useful in amputation of the metatarsal bone of the great toe, underneath which a large artery will sometimes retract, and cannot be followed up, except by further dissection. In several instances of that kind, I passed the pin underneath the vessel, and pressed it against the bone. In two amputations of the thigh, two of the upper arm, two of the leg, and two of the forearm, I never used a ligature at all. I secured every vessel in these eight amputations by acupressure; and, though I cannot say that I ever yet obtained a single case of absolute primary union, as defined by Dr. Pirrie, I can honestly say that in half of my operations I gave gone much farther towards it than I ever did before with ligature. One other point struck me; and that is, the time at which the pins should be removed. I believe they are frequently left in too long. The other day, in our hospital, I saw an amputation of the forearm. One of my colleagues tied the radial artery, but could not find the interosseous artery. I asked leave to use a pin for the purpose of securing it, and did so. He did not like to remove the pin; and an abscess unfortunately formed in the neighbourhood; the pin got the credit of it; but I believe the fault lay in the pin not having been taken out soon enough. A question has been raised, whether the pin should be removed so long as pulsation is seen at the head of it. I can answer for myself, that I have removed a pin from a femoral artery when there were distinct pulsations communicated to the head of the pin from the vessel; but I was satisfied that the vessel was plugged, and that the blood beating against the plug in a large artery like the femoral would shake both the plug and the pin. I therefore did not hesitate to take it away; and, though there were full pulsations when I did so, no damage whatever ensued. For myself, I have had no difficulty, when I used acupressure, about withdrawing the pin from fear of hæmorrhage.

PRESIDENT: If no other gentleman wishes to make remarks on this interesting subject, I call on Professor Pirrie for his reply.

Dr. PIRRIE: Mr. President and gentlemen, from the great interest I feel in the progress of acupressure, I have no words adequately to express my gratification at the manner in which the gentlemen present have spoken; and I have no doubt the opinions they have expressed will tend greatly to advance the more general adoption of this method of arresting surgical hæmorrhage. I have much pleasure in offering some remarks in reply to the observations which have been made. It has been stated by some gentlemen, that no case of primary union without suppuration was ever seen by them where the ligature was used. This has always been to me a subject of great interest, and I shall state two circumstances which impressed me strongly regarding the influence of the ligature in inducing suppuration. Previous to the use of acupressure, I had performed excision of the mamma upwards of fifty times. In two of the cases only did union take place by the first intention; and in these two cases the vessels were so small as not to require a ligature. A case occurred in my own experience, which produced a great impression on my mind and on the minds of the gentlemen attending the Aberdeen Hospital. It is the case to which Sir James Simpson has referred, and it shows the effect of the ligature in inducing suppuration. For a large cancerous tumour I removed a mamma of great size, and acupressed four arteries. The hæmorrhage was completely arrested, and the wound closed by silver sutures. Six hours after operation there was slight bleeding, on account of which the house-surgeon opened the wound, and tied an artery which, he said, was not situated near any of those seen to bleed during the operation. The needles and pins were removed in forty-eight hours, and the ligature came away on the seventh day. Primary adhesion took place throughout this large wound, except in the track of the ligature, where slight suppuration continued until the end of the second week after the operation. It is only since the adoption of acupressure that union without any suppuration has been seen where means were required to arrest the hæmorrhage. With regard to the kind of needles best suited for acupressure, I, in common with others, have found the common sewing-needle with a round point a powerless instrument and with difficulty inserted into the tissues. Pins, where admissible, are greatly to be preferred. The pins I have been in the habit of using are those I now show you. They are made by Messrs. Weiss, of London, and are of four sizes, as you here see. My colleague, Dr. Keith, frequently employs the pins I now hold in my fingers. They are made by Messrs. Turner of Birmingham. Spear-pointed pins are objectionable, as they are apt to cut the tissues; those with glover's points are greatly to be preferred. In every case where union by the first intention is possible, Dr. Keith, Dr. Fiddes, and myself, practise acupressure, both in hospital and in private practice; and the appliances you now see, are those which we employ. I am sorry I cannot give reliable guidance as to the shortest possible time at which it is safe to relieve vessels from acupressure. The practice at the Aberdeen Hospital for some time has been to remove the compression from the larger arteries in forty-eight hours, and from the smaller in twenty-four hours or in much shorter time. It is unquestionably safe at these periods; but I have no doubt that future experience will show that the early friends of acupressure have been over cautious in removing the compression, and that they thereby lost some of the advantages of its use. In one case I relieved the axillary artery from acupressure in fifteen hours; the spermatic arteries in two hours and a half in another case; and in an excision of the mamma, three weeks ago, the whole of the vessels were relieved from acupressure in three hours after operation. The two first-mentioned cases have already been published. The most remarkable case I know of the early discontinuance of acupressure is that of a boy, whose thigh was amputated by Dr. Keith. Four hours after operation the boy removed three of the pins, and one of them was that by which the femoral artery was acupressed, yet no hæmorrhage followed. I was much gratified by the remarks one gentleman made, expressive of his surprise at the amazingly short time in which he had seen an artery acupressed by means of the method by the twist. It is not only the simplest, the easiest of performance, but the quickest of all methods for arresting hæmorrhage, and it has been proved to be perfectly efficient. I cannot forget the impression produced in the theatre of the Aberdeen hospital the first time I performed acupressure by the twist. This method was suggested to me by the late Dr. Knowles, and the first time I tried it was to acupress the femoral artery in one of my amputations of the thigh. The students had not heard of this method, and they were perfectly surprised, and could not understand

by what means the bleeding from the femoral artery was so quickly arrested. In situations, where admissible, no better method need be desired. In illustration of the happy results of acupressure, aided by perfect immunity from motion and the avoidance of all dressings, I hope I may be pardoned for stating briefly the outline of one of my cases, although already published elsewhere. At the Aberdeen hospital I performed amputation of thigh in a delicate looking boy, six years of age, on account of extensive disease of the knee-joint and the condition of the leg. The femoral and other two arteries were acupressed by the Aberdeen method, by the twist, and another vessel was compressed by the fourth method. The pins were withdrawn in forty-four hours, without being followed by a drop of blood, and, the patient said, without causing any pain. After operation I thought it necessary to caution the little patient not to touch the acupressure pins, which he called the pins with the beautiful heads, and promised to give them to him after their removal. He took care not to touch them, or to allow any person except myself to do so, and, to his great delight, sent them home by his father for preservation until his return. Since the operation, the little boy has slept as well as ever he did in his life; has been anxious for his food; has had no uneasy sensation of any kind, and has been in the highest of spirits. The stump healed perfectly and throughout, either by immediate union or by primary adhesion. The healing must have been by one or other of these processes; and I am inclined to think it must be by the former, as no medium of union is discoverable at the edges of the wound. No dressings have been employed, or retentive appliances of any kind, except the few sutures and the three strips of isinglass plaster which were applied before the patient was taken from the operation table. The sutures were removed on the fourth day. This little patient has a fine musical ear; and a few days after the operation, when I entered the ward with the surgical pupils of the hospital, he was whistling most beautifully "The Braes o' Mar," and amusing himself by passing a little model carriage over an inclined plane which he had got constructed on his bed. He continued to whistle the above and other airs until it was his turn to be visited. This is one of the many instances we have lately seen in the Aberdeen hospital of a capital operation, and after treatment having been made delightful to the patient as well as to the surgeon. By the aids of chloroform, acupressure, no dressings, and the most perfect immunity attainable from every movement of the stump, many of the hinderances to these gratifying surgical scenes are removed. Since the use of dressings was discontinued in the Aberdeen hospital, patients have looked forward to the visit of their surgeon as the happiest event of the day, instead of, as formerly, dreading the visit and being thankful when it was over. [*Applause.*]

Dr. MORGAN: As a sequel to the interesting discussion we have just heard, I beg to offer a room in the College to Dr. Pirrie to-morrow morning, and the use of a subject, if he wishes it. [*Applause.*] I am sure we shall all be most anxious to see his demonstration.

Dr. PIRRIE; I must leave Dublin at two o'clock to-morrow; but, at any hour from five in the morning, it will give me the greatest pleasure to give a demonstration.

It was then arranged that the members should meet Dr. Pirrie at the College of Surgeons, at seven o'clock the following morning, for the purpose of seeing his demonstration.

MEDICAL CHANGES AT CHATHAM.—Deputy Inspector-General Bowen has been appointed to assume medical charge of the garrison. Surgeon J. Balfour Cockburn, M.D., R.E., is in charge of the Lunatic Hospital during the absence on leave of Staff-surgeon Major Blatherwick. Staff-Assistant Surgeon Madden is under orders for service at Ceylon. Staff-surgeon Slaughter is on leave till he is required for embarkation for China; and Staff-assistant Surgeon Ferguson is attached for duty to the 1st depôt battalion.

THE WILL OF SIR WM. LAWRENCE, F.R.S., Serjeant Surgeon to the Queen, and late principal surgeon to St. Bartholomew's Hospital, was proved on the 1st inst. by his son Sir John James Trevor Lawrence, Bart., the sole acting executor; power being reserved to his two daughters and to his nephew Edward John Bevir, Esq., barrister, Lincoln's Inn, the other executors and trustees. The personalty was sworn under £40,000. The will is dated November 13, 1865, and there are two codicils, October, 1866, and February, 1867, and he died July 5, aged 84. He has left his books, MSS., and papers equally between his son and daughters; and his jewellery, plate, pictures, horses, carriages, and furniture to his daughters, as well as his interest in his leasehold residence, Whitehall-place. He has empowered his executors and trustees to lay out his Ealing-park estate for building purposes, and together with all his other estate, real and personal, to be held in trust; the proceeds therefrom to be divided equally between his son and two daughters, whom he appoints residuary legatees.

CASE OF DEATH FROM ANEURISM OF THE RIGHT OVARIAN ARTERY.

By W. M. WHITMARSH, M.D., Hounslow.

ON the eve of September 23rd, 1866, I was summoned to visit Mrs. B., of Lampton, who had been taken suddenly ill. Not being at home when the messenger arrived, my assistant (Mr. Samson) went in my stead, and found the patient in a state bordering on syncope, with a fluttering pulse, great prostration, and violent retching. Very little could be gleaned from her; but she complained of great pain in the abdomen. To alleviate this, he gave her some effervescing medicine, with opium, and ordered warm applications to the feet and axillæ.

Early next morning, her friends sent to inform me that she was much worse, and desired that I should call and see her immediately.

On visiting her, I found her in bed, lying on her back, her face blanched, with an expression of pain on her countenance. The surface of the body was almost cold, and the pulse hardly perceptible. The sickness had continued, and the pain in the abdomen had not been relieved; the latter returned a dull sound on percussion. She had passed very little urine during the night, but declined having the catheter used. From her sister, I ascertained that she was 37 years of age; and had been married twelve years, four of which she had spent in America. She "had never been regular", but when she menstruated the discharge was pale and scanty, and accompanied with pain. She had never given birth to a live child, but had had four miscarriages. Her occupation had been that of a laundress, at which she had worked rather hard. She felt the commencement of this attack when she was lifting a basket of clothes from a cart. It began by a feeling of faintness which compelled her to sit down; after this she was removed home.

I questioned the patient whether she had lost blood in any way. She replied she had not. I felt convinced, however, that she had; and told her husband that she must have ruptured a vessel in the abdomen, and doubtless she would not survive many hours. I ordered brandy and water with ice, and opium to relieve pain. She died six hours after my visit.

On the 26th, I made a *post mortem* examination, and found the lower half of the abdomen covered with clotted blood; so much so, that the viscera were not discernible. The coagulum weighed about three pounds. On removing it, I traced the extravasation to an aneurism of the right ovarian artery, large enough to contain a small pigeon's egg. The sac was still filled with clotted blood. I removed it with the uterus, intending to preserve them in spirit; but the friends of the woman would not let me carry them away.

ON THE TREATMENT OF DISEASED JOINTS BY ESCHAROTICS.*

By F. KIRKPATRICK, M.D., Dublin.

I AM permitted the honour of addressing you, sir, and the members of the British Medical Association, upon the subject of Diseases of the Bones and Joints, principally with regard to a new mode of treatment by incision and the deep introduction of the caustic potassa cum calce into the cancellated structure of the articulating extremity of the bone in the incipient stage, or that of inflammatory congestion, and into the joint itself in the very advanced period. I believe that the present era of the profession is peculiarly apt for the consideration of this subject, inasmuch as the literature of this portion of surgery is daily becoming more and more unsettled and contradictory; some surgeons of highest authority advocating early operative interference, whilst yet the constitution is unimpaired by the exhausting progress of disease; other distinguished men putting their faith in rest, with proper mechanical adjustment, and advising that patient trust should be placed in the healing operations of Nature. Between those contrasted extremes, every variety of opinion and practice may be found to prevail, as boldness excites to action or caution inclines to delay.

The statistics of conservative surgery, more particularly of the great revived operation of excision of the knee-joint, are the reverse of satisfactory; the high expectations formed from the successful cases have not been fulfilled by a sufficient percentage of cures, and in many instances the reported cures have not been permanent.

In the last work on *Joint-Diseases*, published this year by Mr. Holmes Coote of St. Bartholomew's Hospital, the following conclusions are arrived at, based on the statistics of Dr. Hodges of Boston: "Considering the mortality after the operation, excision for hip-disease does not

* Read before the annual meeting of the British Medical Association in Dublin, August 1867.