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CONTRIBUTIONS
TO
PRACTICAL SURGERY.

BY
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SINCE last September, when I first commenced clinical duty at the Meath Hospital, a number of cases presenting features of unusual interest have occurred, many of them requiring prompt operative interference. I propose in the following pages to notice briefly those which presented characters rendering their record of value and interest to the student of surgery.

Operative surgery has of late years made great progress; but, although this advance is to be attributed, in no small degree, to many truthful and ardent workers in the schools of the United Kingdom, we cannot omit giving a just meed of praise to the labours of many of our distinguished continental colleagues; for example, to those of Langenbeck, Pirogoff, Esmarck, Schuhe, Nélaton, Ollier, Maisonneuve, and others; and, in ophthalmic operative surgery, to those of Graefe, Arlt, Donders, Desmarres, and many others. I have naturally placed at the head of this list of distinguished names, that of my illustrious friend and teacher, Professor Langenbeck, of Berlin. With his name will now be associated many of the most

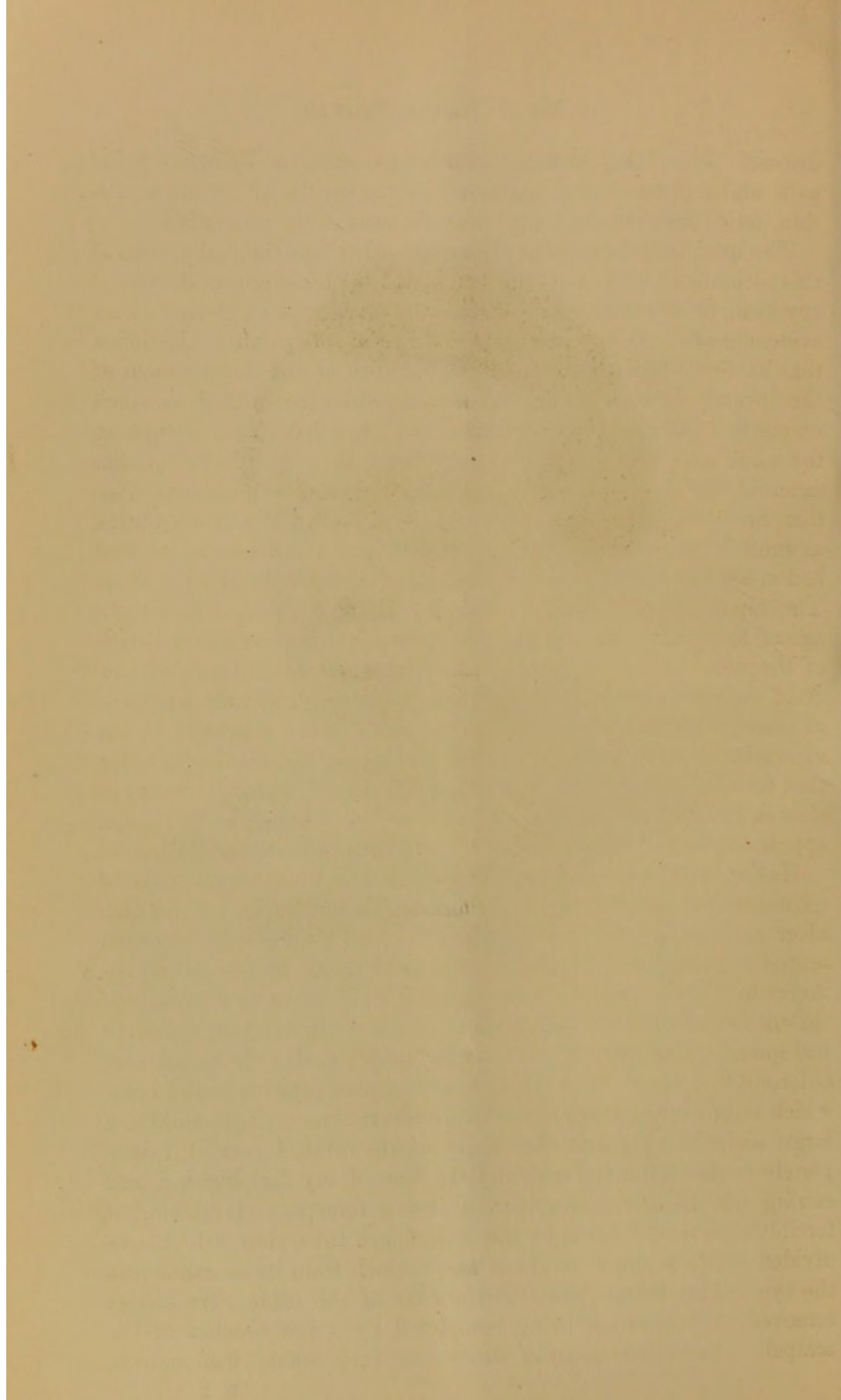
important improvements that have of late years been made in operative surgery; for example, the osteopalinthesis or osteoplastic operation of the superior maxilla, also the ingenious modifications and improvements in the uranoplastic and Indian rhinoplastic operations. These are only a few of many with which his name is justly connected. In the following observations I wish to draw particular attention to a case in which the last-named of these operations—namely, the Indian rhinoplastic, as modified by Langenbeck—was performed by me; and also to another operation, which I believe is novel in this country, namely, the sub-periosteal resection of the elbow-joint.

I shall commence by adverting to the particulars of the case of Thomas Scally, whose portrait was most successfully taken by Mr. Connolly, both previous to and after the performance of the operation, as shown in the accompanying chromo-lithographs by Mr. Lewis.

I.—*Extirpation of the contents of the Orbit for Lupoid Ulceration engaging the Eyebrow, Eyelids, Conjunctiva, and Cornea of the Right Eye; Indian Rhinoplastia performed.*—Thos. S., aged nineteen, was admitted into the Meath Hospital on August 27th. A glance at the portrait will show the condition of the patient on his admission. The rodent ulceration engaging the eyebrow, lids, ocular conjunctiva, and cornea of the right eye measured, in its transverse diameter, three inches and one-third, and in its vertical diameter two inches. The disease had lasted nearly seven months; it commenced, at the inner angle of the eye, by the formation of a "pimple," which, after remaining without any alteration for fully a month, commenced to spread along the lower lid, towards the outer angle of the eye. The ulcerative process then appeared for a time to be arrested, but soon recommenced at the primary seat of the ulceration, taking, however, an upward course, spreading over the upper eyelid. In less than three weeks the circumference of the ulceration was completed. About eight weeks before the performance of the operation which I had recourse to the sight of the patient became affected, owing to the ulceration commencing to spread over the conjunctiva. The sight of the eye was completely lost in about a fortnight, as far as the power of distinguishing objects was concerned, but the retina was still sensitive to light, showing that the deeper structures of the eye were probably unaffected by the



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disease. The patient suffered from intense ocular and circum-orbital pain, and was also much distressed by the continual secretion of a thin, fetid, purulent discharge from the seat of the ulceration.

The question, then, naturally arose—what was the real nature of this ulceration? Was it one connected with malignant disease of any form, or was it the same disease the ravages of which there were evidences of in the nasal region and in the soft palate? I confess that at first—bearing in mind the rapidity of the development of the ulceration, and its general aspect, which resembled so much unquestionable cancerous ulcerations which I have seen occupying the same situation—I held the opinion that the ulceration was cancrroid or an epithelioma. After careful microscopical examination, however, I abandoned this view, and looked at this ulceration as another and more formidable expression of the same disease that had at a former period engaged the nasal structures and soft palate. The lupoid disease previously existing in these situations, and the age of the patient, militated strongly against the cancerous nature of the affection. It is true, certainly, that the occurrence of cancrroid disease at an early age has been observed, but these are cases of extreme rarity. The fact of the rapidity of the extension of the ulceration was the cause of my not entertaining the idea of its being that form of ulcer described by Professor Jacob, which is always so slow in its growth, and which, if not purely cancrroid in its nature, appears to be very closely allied to this form of malignant disease.

Having stated to my patient the view I took of his case, I recommended him to have this formidable and rapidly extending ulcer completely removed by the knife. This he willingly consented to; and this procedure was fully sanctioned by my colleagues. Accordingly, on the 2nd of last September, I proceeded to remove the entire ulceration, including the contents of the orbit over which it had spread. The patient being brought fully under the influence of chloroform, I commenced by making an incision down to the bone, which completely encircled the entire ulceration. Then, sinking a large scalpel deeply into the cavity of the orbit, I carried it completely round, following carefully the line of my first incision, and seizing the diseased mass with a strong forceps, and drawing it forcibly forwards, I brought the optic nerve into view, which was divided with a scissors, at about half-an-inch from its entrance into the eye. This being done, the contents of the orbit were almost removed, the operation being completed by a few touches of the scalpel. For some minutes there was very smart hemorrhage,

which, however, was easily arrested by compresses. The patient was then carried back to bed, and shortly after was given a strong opiate draught.

It would be tedious and without purpose to give the daily account of the progress of this case after the operation. Suffice it to state that, in the comparatively short period of six weeks, the entire orbital cavity was completely filled up, and the extensive wound cicatrized. This result, which surpassed my most ardent expectations, naturally caused me to direct my attention to the improvement of the nose, which in my patient's early youth had been so much damaged by the ravages of lupus.

On the 26th of last October I performed a complete rhinoplastic operation, adopting Langenbeck's modification of the Indian rhinoplastic.

The object of this operation, which, as my readers are no doubt aware, is to form an organic substitute for the parts which have been either partially or completely destroyed, has hitherto been effected by two operative procedures, namely—the Indian and the Italian rhinoplastic. The late Professor C. von Graefe, the father of the present renowned ophthalmic surgeon in Berlin, was the first who introduced the former of these methods into European surgery. This was the operation which Dieffenbach, during the latter years of his brilliant career, so frequently performed, and which of late Mr. Hamilton has also adopted. Still it cannot be denied that, until a very recent period, no attempt at any real improvement upon the plans of Graefe and Talliacotius has been either practised or even suggested.

In 1859 Langenbeck first performed the periosteal rhinoplastia—that is to say, he transplanted a piece of periosteum from that covering the frontal bone, along with the flap from the same situation, with which to cover the defect—(*Deutsche Klinik*, 1859—*Beiträge zur Osteoplastik*). The next modification was one suggested and put into practice by M. Ollier, of Lyons—(*Gaz. des Hôpit.*, Nov., 1861). He combined the periosteal with osseous transplantation, introducing, namely, into the flap the remains of the right nasal bone and a portion of the nasal process of the superior maxilla. The object of these osseous and periosteal transplantations is obviously to give greater firmness, and if possible a greater elevation, to the nose. Ollier has published the records of three cases operated on in this manner, and in two of them the result was favourable; in the third the transplanted bone became necrosed—

(Ollier—*Ostéoplastie Appliquée à la Restauration du Nez*). I cannot, however, but think that the principle of this operation of Ollier's is irrational, for the nasal bones and the nasal processes of the superior maxilla in their natural situation form a most important lateral support to the soft parts of the nose. Remove the bony structures forming this, and you deprive the nose of its support in the situation in which it is most required; and, again, there is the great risk of the transplanted bone becoming necrosed. Looking, therefore, at these circumstances, I did not feel myself justified in performing this operation, preferring rather to combine the ordinary Indian rhinoplastic with periosteal transplantation from the frontal bone. It is remarkable what a great fear surgeons have hitherto had of any injury being done to the periosteum in this operation. Mr. Hamilton, in his excellent essay on the rhinoplastic operation, observes that in raising the flap "care should be taken to leave the periosteum untouched, to prevent the exfoliation of the os frontis." The late Mr. Miller, of Edinburgh, in his work on the Practice of Surgery, observes, speaking of this operation:—"In no part of the wound is the pericranium interfered with." Fritze, in his work, *Die Plastische Chirurgie*, observes:—"We have to deal, in plastic operations, with the *integument* only." Mr. Pirrie, the Professor of Surgery in the University of Aberdeen, remarks:—"The outline of the flap having been marked with ink, or with a knife, the flap is dissected down, care being taken to make it of uniform depth, and not to interfere with the pericranium." And Mr. Coote, in his article on plastic operations, published in Holmes' *System of Surgery*, observes:—"In plastic surgery the operator avails himself of the true skin, with the subcutaneous areolar and fatty tissues; sometimes, likewise, of the mucous membranes." Mr. Syme, in his paper on the "Restoration of the Nose," published in his *Clinical Observations in Surgery*, does not deal with periosteal transplantation in connexion with this operation; indeed, neither the operation of Talliacotius or the Indian rhinoplastic find much favour in his eyes, as the former he considers a "wild scheme," which is "not to be taken into consideration," and the Indian or frontal method "very objectionable" for many reasons, but principally from its being necessarily tucked up between the eyes." What he considers greatly preferable is a truly artificial one of silver or gutta percha, secured in its place by some "adhesive tissue," which, he considers "enables the patient to go into society with a considerable degree of comfort." I confess I have my

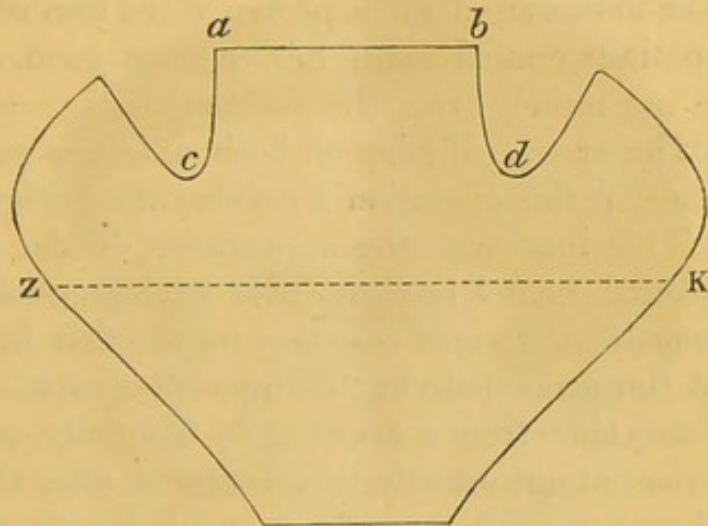
doubts as to the comfort of a patient in society with a silver nose secured by "adhesive tissue."

In truth, when we consider the sources from which the cranial bones derive their vascular supply, we need not so much fear the deprivation from the os frontis of a portion of its periosteal covering, as this and the other cranial bones derive their means of nutrition and reparation not merely from the periosteum, but also from the dura mater. The case is different when other bones have become deprived of their periosteal covering from injury or suppurative disease. Then we may not unreasonably apprehend the unhappy sequence of partial necrosis of the bone; but even this does not occur so frequently as is commonly supposed. Mr. Humphrey, in his classical work on the Human Skeleton, when speaking of this subject, observes that "the end of the bone in a stump, though it may be bared of periosteum for some distance, does not always necrose. In excising the bones of an elbow-joint, crushed between the buffers of a railway carriage, I left the humerus bare for nearly an inch above the sawn end; but the wound healed up without any further loss of bone. In a little boy the periosteum was detached from the fibula to a considerable extent by suppuration, yet no necrosis took place. A gentleman sustained a severe contused wound on the shin; subsequent events proved the tibia to be exposed, and necrosis was confidently predicted, but he escaped without it."

The results, too, of a series of experiments on the lower animals, which in conjunction with Dr. Robert M'Donnell, I have recently made, with the view of determining the amount of osseous reproductive power of transplanted periosteum, have afforded evidence of the greatest importance, to show how groundless is the usually accepted theory held with regard to the necessary death of the bone after injury to, or partial removal of its fibrous envelope. In none of the animals on which we have made periosteal transplantations have we been able to determine the existence of any necrosis occurring as a sequence to the operation. May we not, therefore, reasonably suppose that, as far as this matter is concerned, what holds good in the lower animals may also hold good in man? I may also add, that in the two operative procedures on man, combined with periosteal transplantation, namely, the rhinoplastic and the uranoplastic operations (both of which I have repeatedly had opportunities of witnessing), no injurious effect was produced on the bone from which the membrane was removed.

I commenced the operation by dissecting off all the remains of

the nose in which lupus had in early life made such ravages. This being removed, I proceeded to dissect off the flap for the formation of the new nose from the forehead. The flap was of this shape.



The object in having the central portion at the upper margin of the flap so broad is to enable the operator to make the formation of the septum part of the primary operation. The points at *a b* and at *c d* should be brought together by means of metallic sutures. The anterior portion of the septum is then formed by forcing back the rectangular portion of the flap, the sides of which are united, in the manner I have described, behind the remainder of the flap, and fixed in this position to the subjacent soft parts by means of sutures. The edges of the remainder of the flap were then carefully adjusted to the raw margin left after removing the remains of the partially-lost nose at the first stage of the operation. To do this I used upwards of twenty iron wire sutures. At the part of the flap corresponding to the dotted line (*z κ*) I cut deeply down to the bone, and at this situation I commenced removing the periosteal covering by means of one of the periosteal elevators used for elevating the membrane at the junction of the alveolar with the horizontal plates of the superior maxilla. No difficulty attended this stage of the operation, and the membrane when removed was turned over and placed underneath the flap forming the new nose; the raw surface on the forehead was then dressed with charpie.

Second day after the operation.—The patient had a good night, but complained of considerable pain in the frontal region. The new nose was warm.

Fourth day.—Adhesions were beginning to take place on the left side of the nose; the frontal pain considerably less; there was no perceptible difference between the temperature of the new nose and that of the rest of the face

Sixth day.—I took out on this day five of the iron sutures on the left side; the patient was cheerful, his appetite good, and he slept well.

Twenty-fourth day.—Adhesion on both sides was perfect.

Five weeks after the operation I divided the bridge at the root of the nose. This improved the appearance of the patient very much. The stalk, which I brought over to the mesial line, united to the parts beneath in its new situation by the first intention.

A glance at the accompanying chromo-lithograph, executed by Mr. Lewis, of this city, from a drawing by Connolly, will show the appearance of the patient exactly three months after the operation. The only unfortunate circumstance connected with this case has been the tendency to a slight falling-in of the right ala of the new nose. This, however, is not very apparent when you view the face directly in front, and hardly at all observed in the three-quarter face, as may be seen by referring to Mr. Connolly's drawing. I have no doubt, however, that I shall easily rectify this slight defect by a future operation.

SUB-PERIOSTEAL RESECTION OF THE ELBOW-JOINT.

The resection of articulating extremities of bones is becoming every day more popular among practical surgeons. Resection, however, as far as my experience goes, appears to be attended with more satisfactory results when performed at the elbow-joint than at any other articulation, and it is to this operation that I would direct the attention of my readers in the following remarks.

I do not think that, hitherto, sufficient attention has been directed by surgeons to the best means of obtaining good flexion and extension of the limb after excision of the elbow-joint. In truth, without obtaining this, to a greater or less degree, the operation cannot be looked upon as a success. To obtain the greatest amount of useful motion in the limb after resection should be the ambition of every surgeon, and to effect this I wish to



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Editorial
The American Medical Association
has been organized for the purpose
of promoting the highest standards
of medical education and practice
and of maintaining the integrity
of the medical profession.
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physicians of all branches of
medicine and surgery, and
of all other persons interested
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advocate, in the performance of this operation, careful attention to four important particulars:—

First.—The adoption of the long vertical incision of Park.

Second.—The preservation of the periosteum.

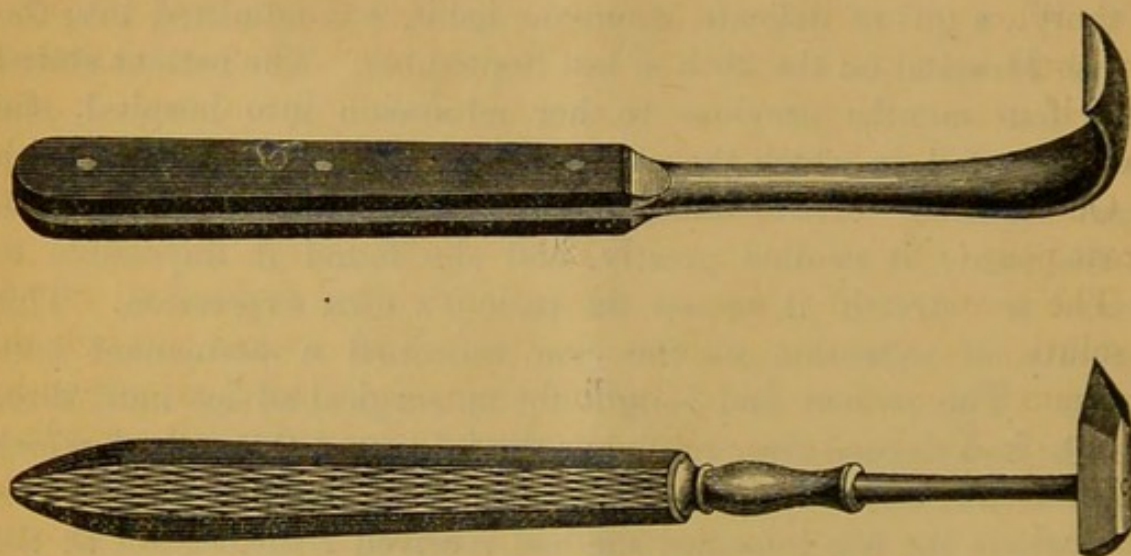
Third.—Treatment of the wound by the continual bath.

Fourth.—Gradual flexion and extension of the forearm during the convalescence of the patient.

The particulars of the following case will illustrate the practical utility of these suggestions:—

C. W., a girl of delicate, strumous habit, was admitted into the Meath Hospital on the 20th of last September. The patient stated that, four months previous to her admission into hospital, she received a fall, in which the elbow was struck on the ground with great violence. After falling, the patient suffered severe pain in the joint; it swelled greatly, and she found it impossible to extend or “stretch” it, to use the patient’s own expression. This inability of extension of the arm remained a permanent condition. The patient had sought for no surgical advice until three months had elapsed after receiving the injury, at the end of which time she was taken by her relatives to one of the hospitals of this city, where she was informed she had received a dislocation at the elbow, and that, three months having elapsed, any attempt at reduction would be useless. A month after this she was admitted, under my care, into the Meath Hospital. I found the arm forcibly flexed; extension was impossible. The soft parts about the joint were swollen and puffy, so that I was unable to determine what had been the nature of the original injury—whether it had been a luxation or a separation of the epiphysis, which the age of the patient rendered so probable. In addition to this condition, there were three sinuses situated over and in the immediate neighbourhood of the internal condyle of the humerus; and on introducing a probe into any one of these the existence of soft diseased bone could be readily determined. Through these there was a continual discharge of thin purulent secretion. We had therefore in this case two indications for operative interference. In the first place, the almost completely flexed position of the limb rendered it a perfectly useless member, and, in the second, there was undoubted evidence of incipient caries of the osseous structures of the joint. These I considered sufficient to warrant me in strongly recommending resection of the joint, an opinion in which my colleagues concurred.

On the 30th of September I proceeded to resect the joint in the following manner:—A long straight incision, beginning about an inch and a-half above the olecranon, and carried to about the same distance below it, was made along the *ulnar side* of the olecranon. I then turned the edge of the knife from me, and directed the point of the instrument deeply to the bottom of the olecranon fossa, dividing all the soft parts down to the bone, following the line of the original incision. When the soft parts were dissected off as far as the edges of the bone, I commenced raising the periosteal envelope by the two elevators which are here delineated. The elevation was



comparatively easy where it was situated over the diseased portion of the bone, for in this situation it was thickened and loose; over the sound bone it was a matter of much greater difficulty. Having succeeded in getting off two broad strips of the membrane, one over each side of the line of the original incision, I completed the operation in the usual manner, using for the removal of the extremities of the bones Mr. Butcher's saw. The edges of the wound were then brought together and fixed by iron wire sutures, a piece of oiled lint being first introduced into the wound to serve as a vent for the purulent discharge.

The operation being completed, the entire limb was invested in a gypsum bandage in the following manner:—The limb being placed in a semiflexed position, I commenced by enveloping it with a flannel roller, from the wrist to the shoulder, taking care to place a good padding of French wadding over the situation of the wound; it was next covered with a coarse muslin bandage, into which I had rubbed previously a considerable quantity of gypsum powder. This bandage, before being applied over the flannel one, was moistened with tepid water. The muslin bandage was then covered with a

layer of semi-fluid gypsum, and this, when nearly dry, was covered with another muslin roller, and after a second application of gypsum over this the bandage was completed.

September 30, 3, p.m., four hours after the operation.—The patient complains of great pain in the wound; this, however, was relieved by cutting an oval opening over it in the gypsum bandage. The long diameter of this aperture was fully half or three-quarters of an inch longer than the wound, from which there was no oozing of blood. The limb was then placed on a soft pillow, and evaporating lotions applied to it; ten drops of the solution of muriate of morphia and an ounce of wine was directed to be given. 9, p.m., ten hours after the operation—the patient much quieter; expresses herself greatly relieved by the aperture having been made in the bandage; ordered another draught containing morphia.

October 1st, 9.30, a.m.—The patient had no sleep; suffering great pain in the wound; pulse 120.

The bandage being now quite hard and dry, I painted all over it a solution of Dammar resin and ether. This soaked through the gypsum instantaneously. The limb was then placed, supported by a net, in the continual bath, which was productive of immediate relief from pain, and in *fifteen minutes* afterwards the patient was fast asleep, and slept for two hours and a half. She awoke greatly refreshed, and still free from pain.

October 2nd, 10, a.m.—The patient has had but little sleep, again suffering from pain in the wound, which was relieved by placing the arm in a *cold* water bath. She was ordered a cup of beef-tea and four ounces of wine.

October 3rd.—She had a good night, and slept soundly up to 7, a.m.; appetite improving; she was in every respect better, and free from febrile symptoms.

October 5th.—Removed the ligatures. The patient complains to-day of slight pain in the hand, which is considerably swollen, most probably owing to its being too dependent in the bath. The arm was raised so that nothing but the wound was in contact with the water. Appetite improving. Ordered four ounces of wine, beef-tea, and calvesfoot jelly.

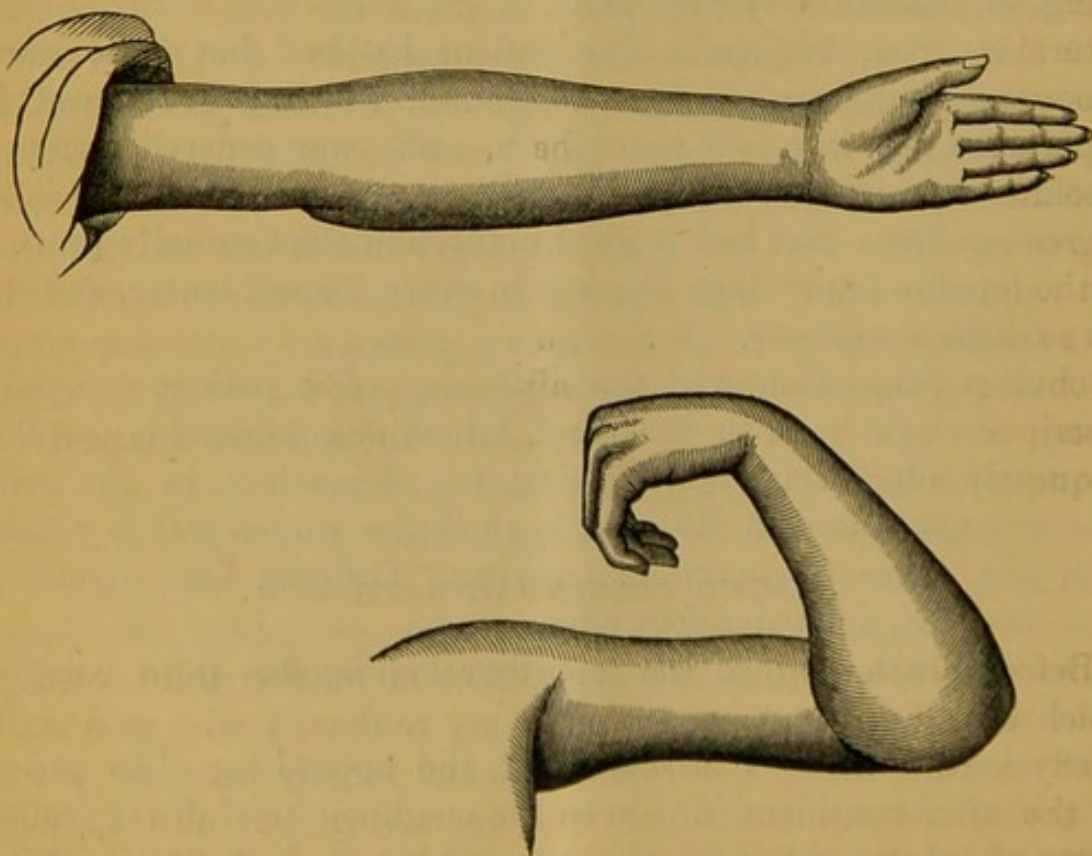
October 12th.—Since last report everything has been going on favourably.

October 24th, four weeks after the operation.—The patient complains of considerable pain in the neighbourhood of the wound, and also at the back of the arm, where it had rested on the

edge of the bath. On examination I found that two small sloughs had formed in this situation. I then took the arm out of the bath, removed the gypsum bandage, and dressed this part with warm stimulating applications. The formation of these sloughs somewhat retarded the progress of the case, but when they separated and came away the healing process went on slowly but steadily.

On November 7th I commenced the gradual flexion and extension by means of a splint placed on the anterior surface of the arm, consisting of two portions, nearly equal in length, connected together by means of a hinge. Across these two portions a screw was fixed analogous to the one in M'Intyre's splint, by screwing and unscrewing which, when the splint was fixed to the arm, flexion and extension of the limb was effected.

It would be useless to enter further into the daily account of the progress of this case. The limb was exercised every day up to the middle of January, when I removed the apparatus. The annexed wood-cut, taken from the faithful pencil of Mr. Connolly, shows the amount of flexion and extension that the arm was capable of *three months and a-half* after the operation was performed. These motions were unattended by pain; and, in a short time, the girl was able to assist the nurse in the ordinary duties of the ward.



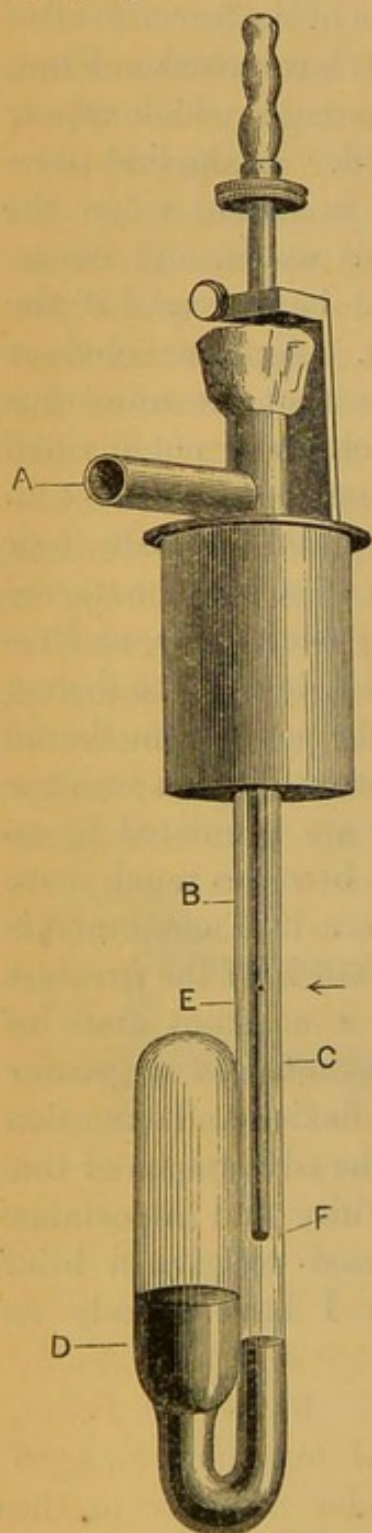
With regard to the four conditions which we have already

alluded to, and which, in my opinion, contributed so largely to the attainment of useful flexion and extension of the arm after excision of the elbow, namely, the adoption of the long vertical incision of Park, preservation of the periosteum, treatment of the wound by the continual bath, and gradual flexion and extension of the fore-arm after the complete healing of the wound, I would add a few remarks. First, with regard to the vertical incision. The advantages which appear to me to accrue from this procedure are threefold. In the first place the suppurating surfaces are necessarily less in extent when the vertical than when the ordinary H incision is made, and consequently the chances of rapidity of healing will be increased if the opportunities for suppuration be diminished. Another obvious advantage arising from the vertical incision is that the numerous muscles in the neighbourhood of the elbow-joint are not divided transversely, consequently there can be no transverse cicatrix in these tissues, the existence of which would certainly impede their subsequent action; and thirdly, the formation of a broad external cicatrix is avoided, which, when it exists, must necessarily, as Professor Syme has observed, impede in no slight degree the flexion and extension motions of the joint. Secondly, the periosteum should be preserved, not only because it has been proved by experience that the processes of ossification and healing are promoted by so doing, but also because the shape of the joint becomes much more natural in its appearance than in the cases where this membrane is removed. Thirdly, the use of the continual bath is of the greatest importance, in order to keep the wound in a constant state of absolute cleanliness, than which nothing promotes in a greater degree rapidity of healing. Fourthly, gradual flexion and extension of the fore-arm, after the wound is healed. The advantages of this are so apparent that any discussion as to its utility and importance is obviously unnecessary. I shall now proceed to give a brief description of the continual bath, to which I have already so frequently alluded.

THE CONTINUAL BATH.

Before proceeding to the consideration of the third case, to which I shall direct the attention of my readers, I wish to describe briefly a bath which I have devised, and largely used, not merely in the after-treatment of several operations, but also in many forms of injury and surgical disease. It occurred to me that if

some method could be devised by means of which the temperature could be maintained in the bath without disturbing the patient by repeatedly changing the water, which it was necessary to do when its temperature fell below a certain point, that a great deal would



be gained; for, undoubtedly nothing is more conducive to the healing of wounds and injuries than perfect rest and cleanliness. In the after-treatment of resections, especially of the elbow-joint, it is of the greatest importance that these two conditions should be fulfilled. The former can but be obtained by encasing the limb in a fixed apparatus, such as the gypsum bandage already described, and the latter by keeping the wound for a considerable time—two or three weeks at least—continually immersed in water. Great care should be taken to avoid, as much as possible, disturbing the limb while in the bath by frequently changing the water in consequence of its losing its temperature. The method I had recourse to for preventing this was to bring *steam*, which was generated in a still, into the bath. This was accomplished easily, and nothing could work more admirably than it did. It was then suggested to me, that as there was no regulator as to the amount of steam generated and conducted into the bath, a case might occur when, in consequence of negligence on the part of the nurse or person in charge of the patient, the temperature of the water might rise to such a height that unpleasant consequences would result. To prevent this contingency occurring, I adapted a very ingeniously constructed thermometer to the bath, which, by regulating the amount of gas supplying the

burner under the still, indirectly regulates the amount of steam generated in the still, and consequently the temperature of the bath. I am not aware who was the deviser of this very ingenious instrument (a woodcut of which I affix here) but its application to the bath was suggested to me by Professor Haughton. The

letter A is opposite the tube connected with the gas burner, and conducts the gas to the glass, B, of the thermometer.

The metal tube, C, conducts gas to the elastic tube which goes to the burner underneath the still.

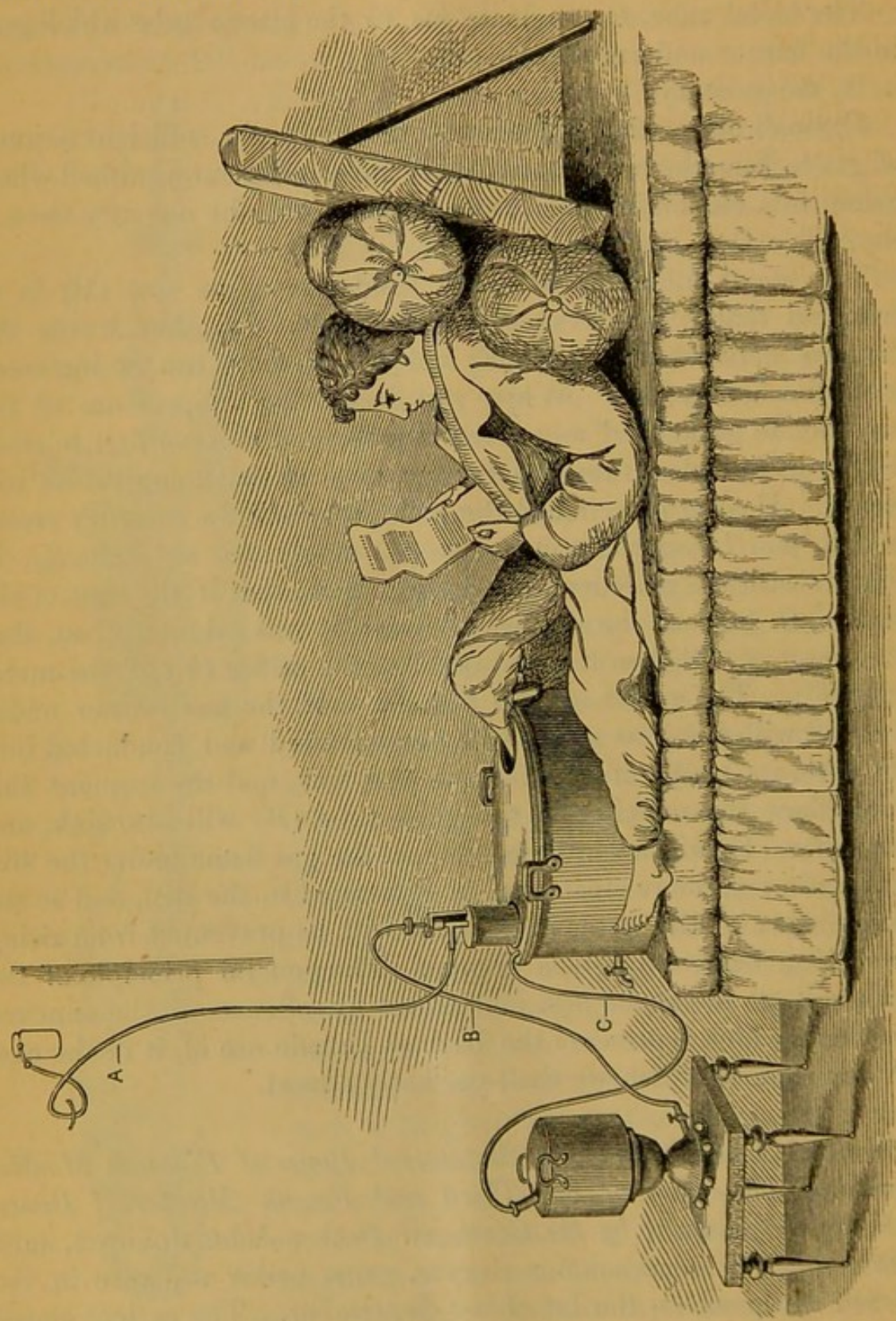
D, the mercury.

E, small orifice facing the arrow to admit of a sufficient amount of gas to keep the burner of the still from being extinguished when, owing to a too high temperature of the bath, the mercury rises to the orifice F of the metal tube C.

The metal tube (C) which is inside the glass one (B) is so arranged that it can be moved up or down—in other words the distance between its orifice (F) and the mercury can be increased or diminished at will. When you desire the temperature of the bath not to go beyond any given degree, you observe first to what height in the glass tube (B) the mercury at that temperature will rise to. Having determined the point at which the mercury ceases to rise, you bring the metal tube (C) nearly, *but not actually*, in contact with the mercury. It follows, then, that if the heat of the bath rises beyond the degree at which it was originally set, that the mercury will then rise and occlude the orifice (F) of the metal tube (C). The result of this will be that the gas burner under the still will fall, less steam will be generated and conducted into the bath, its temperature will therefore sink, and the moment this takes place the mercury in the glass tube (B) will also sink, and the orifice (F) will again become open, the gas flame under the still will again rise, more steam will be generated in the still, and so the temperature of the water in the bath will be prevented from rising or sinking below any given degree. The general principle of the bath will, no doubt, be best understood by reference to the annexed woodcut, which represents the bath as I made use of it in the case of Johnson, to which we shall presently advert.

CASE III.—*Caries of the Metatarsal Bones of Eighteen Months' duration; Excision of the Third and Fourth Metatarsal Bones, and After-treatment by the Continual Bath.*—John Johnson, aged twenty-six, by occupation a sawyer, came under my care in the Meath Hospital, on the 1st of last September. The patient stated that, eighteen months previously, he first commenced to suffer from the formation of abscesses, not only on the dorsum but also on the sole of the foot. He was quite unable to continue his work on account of the pain it gave him to put his foot to the ground, which

also rendered walking impossible; in fact he had not attempted to walk for the sixteen months previous to September, 1864. He had been



The Continual Bath.

A, the elastic tube conducting gas from gas-pipe to thermometer. B, a second elastic tube bringing gas from the thermometer to the burner below the still. C, tube conducting steam from the still to the bath.

under the care of various surgeons, who had done everything that tonic medicines, generous diet, rest, &c., could do to improve the patient's condition. The perforated elastic tubes of M Chaisagnac had also been introduced, but all in vain; the *fons et origo mali*, which was caries of the metatarsal bones, still remained. I accordingly recommended my patient strongly to consent to some operative interference by which the diseased bone would be permanently removed, and he at once consented; and, Mr. Porter and my other colleagues taking the same view as to the propriety of performing the operation, on the 2nd of September the diseased bones were removed in the following manner:—I commenced by making an incision, fully three inches and a-half in length, over the situation of the third metatarsal bone. I then dissected off the soft parts on either side of this incision, and soon got a view of the whole disease, which was confined altogether to the third and fourth metatarsal bones. The disease had advanced so far, and the bones were consequently so soft that their removal was accomplished with the greatest facility. The wound was then closed, and the edges brought into apposition by six iron wire sutures; cold water dressings were then applied, and the patient was sent to bed.

Sept. 3rd, twenty-four hours after the operation.—The patient had suffered greatly from pain during the night, which deprived him altogether of sleep; he had also been greatly distressed from continual retching for several hours after the operation; pulse, 98. Ordered beef-tea and four ounces of wine. The continual bath was now got ready, and as soon as the foot was immersed in the water the patient expressed himself greatly relieved. The temperature of the water was 85°.

I shall not detail the daily account of the progress of this case. On the 25th of September, the wound being nearly healed, I took the foot out of the bath; on the first of October it was completely healed; and on the 2nd of October, exactly one month after the operation had been performed, the patient showed that he was able not only to walk and run, but he could actually hop across the ward on the foot that had for eighteen months been the seat of a most painful and distressing disease. It has never been my lot to witness a greater triumph for the cause of conservative surgery.

The continual bath has also been employed by my colleagues; and Dr. Smyly found great advantages arising from it in cases of

burns in the vicinity of joints, in general burns, and in caries. In a case in which such extreme sensibility existed that the use of chloroform was thought of before removing a long adherent bandage, the bath produced immediate relief, and greatly assisted in the granulation and cicatrization of the eschar.

My colleague, Mr. Collis, also speaks highly of its use in cases of a similar nature.