early—that nearly a washhand-basin of venous coagula were taken from it. By too early closing you in reality prevent the process of healing. If you put on the bandage, rolling the limb downwards until you come to the flaps, the stump will sustain no harm even if it is not completely closed for two or three days; and in the event of any of the circumstances to which I have alluded, happening, it is easy either to secure an artery or to remove coagula. In addition to the circumstances which I have mentioned, there are others which must be taken into consideration in the attempt to heal quickly and well a stump after an amputation. A stump is a simple incised wound, and three pathological stages take place after all incised wounds, which do not heal by what is called the first intention. First we have the effusion or flow of blood, whether arterial, or venous, or both, consequent upon the dividing the soft parts. When this has ceased, or has been controlled or arrested, the surface of the incision becomes covered with a layer of fibrin, and it is at this period that all incised wounds should be closed; if suffered to remain open after this, or if the attempt to unite them has failed; the wound secretes pus, and must then heal by a slower process—that of granulation. It is during the second period to which I have alluded, when the flow of blood has ceased, and the effusion of fibrin has commenced, that the flaps of a stump should be brought methodically together and well supported, in order to insure an early and sound union.

To digress for a moment, it is generally supposed that the patient is better if he bleeds little; but, for my own part, I think a moderate loss of blood is rather an advantage to the patient. We find that if called on to perform an operation after an accident, upon a patient in full health and with a system full of blood, the bleeding goes on to a longer period, and the patient loses more blood than would a patient who has been worn out by a long continuance of disease. There is generally more venous oozing in such cases, and a greater risk of secondary arterial hæmorrhage than in patients who have been operated on for chronic diseases, and whose constitutions are more or less anæmic or debilitated. In such a class of cases, the stump heals frequently better than it would do in the first; and this arises simply from the circumstance that there is less venous oozing, which often interferes with the adhesion or union of the soft parts. Then comes a third period: the secretion of pus. Thus you have first, the venous oozing; second, the effusion of lymph—which is the period at which an incised wound ought to be closed; and third, the secretion of pus. If you close the wound at the second period, you are almost certain to get union by what is termed the first intention. If you wait a still longer period, a degree of inflammation and irritation takes place, there is an effusion of pus; and as in the case of the hæmorrhage I have spoken of, the healing of the wound is retarded. The proper period to select for the closing of the wound, then, is that between the time when the flow of blood has ceased, and the secretion of pus may be expected. Such are the principles which are to guide you in the treatment of stumps. They are principles which exist in nature, and are founded on actual pathological laws which invariably take place, and a knowledge of these laws will always be serviceable to you, in whatever circumstances you may be placed.

Birmingham, April 1855.

THE MODERN TREATMENT OF FRACTURES.

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[*The Substance of a Paper read before the Birmingham and Midland Counties Branch, February 8th, 1855.*]

THE modern treatment of fractures is a term applied in this paper to the treatment of fractures of the bones of the limbs by closely fitting cases or moulds—a process which

has received much attention during the last year or two in this country as the starch apparatus, but which was originally adopted on the continent by M. Seutin. I have designated this plan of treating fractures as the modern, because I do not so much wish to advocate the practice in detail as in the abstract. Although starch has been employed as the adhesive and strengthening material in the cases I am about to describe, still, however, other substances have been used successfully, such as dextrine, and plaster of Paris, which, while they do not in the least alter the principles of the treatment, yet make the name “starch apparatus” inappropriate. Another reason for calling this the modern treatment is, that it is now in use; and, though mention is made by some of the old writers of a somewhat similar method, yet certainly it was not described in a systematic manner until 1830, when M. Seutin's work on this subject appeared.

The advantages of treating fractures occurring to the bones of the limbs by means of closely fitting cases, which exert an equable pressure when applied, have been lucidly set forth in a work written by Mr. Gamgee; and to this book I may refer you for a very careful description of the manner of applying the starch apparatus: but, as my own independent experience has led me to adopt a few slight changes, I will endeavour to give an outline of the method I have found most efficient.

The materials requisite for treating every kind of fracture of the extremities, whether simple, compound, or comminuted, in which an attempt is to be made to save the limb, consist of starch, millboard, lint, and bandages, and a few pieces of wood of requisite length to serve as temporary outside supports until the apparatus has, by drying, become sufficiently strong to take the place of the broken bone.

The starch, which should not be made ready until required for immediate use, is prepared as by laundresses, but of a consistence twice as thick as used by them. The millboard is the same as book-covers are made of, stout and porous. The bandages may be of the commonest calico, five or six yards long, and the width of the tips of three fingers.

The limb to be operated on having been placed in such position as the nature and site of the injury seem to require, and the fragments having been brought into apposition, it will be the intention of the operator to include the whole of the limb below the injury, and, in most instances, to continue the application of the apparatus so as to fix the joint above. Thus, for fracture of the tibia and fibula, the apparatus should reach from the clefts of the toes to half way up the thigh, that the knee-joint may be included, and so rendered immovable. Pads of lint are so placed as to protect the superficial bones from pressure; and the limb is bandaged firmly and evenly through the extent the apparatus is to be applied. This surface of bandage is thickly smeared over with starch; and next, the millboard splints, prepared in the following manner, are adjusted. Upon a sheet of millboard make an outline of the shape of the limb, according to the position the splints are to occupy; and, having cut them out in this manner, as many as may be required, let them be steeped in boiling hot water until thoroughly saturated; they are then to be pressed between the folds of a dry cloth, to free them from the water which adheres to the surface: and now the edges may be scraped thin, roughly bevelled as it were, so that, when dry, the splints may not have a defined square edge, which might hurt the patient. The splints are now placed in the desired situation, and moulded with the hands of the surgeon so as to adapt them closely to every inequality of the surface on which they are placed. A thick layer of starch is next laid on, and over all a bandage. The apparatus is now complete, and, when dry, forms a closely fitting case, and of ample strength. Until the case has become dry, which generally happens in thirty-six or forty-eight hours, it may be desirable to fix on some wooden splints, to prevent the limb from becoming curved through accident or restlessness on the part of the patient. It might appear that, in some instances, wooden splints would be required to keep up extension, as well as to support the limb, until the apparatus

is dry; but even a fracture of the femur in the adult, it will be seen, can be efficiently treated without any extending force beyond that afforded by the apparatus.

I now will endeavour to illustrate, by means of recorded cases, what has been already said; giving the various plans adopted for special fractures; and, by the same means, to show the advantages of this method of treatment, and the principles upon which it is conducted, as well as the difficulties attending its application, with the bad results likely to attend it.

CASE I. The first case I treated in this method was a fracture of the external and internal malleoli, occurring to a boatman named Greenway, aged 42 years. This man was brought to the Queen's Hospital on the 28th day of February, 1853. Half an hour previously, whilst getting into an empty barge, he missed his footing, and fell to the bottom of the vessel, alighting on his left foot. He had sustained transverse fracture of the outer malleolus, and oblique fracture of the inner, separating that process from the shaft. The foot was inverted. Lateral splints of wood were applied, carefully padded, to give the injured ankle support, and to keep the foot steady. Much effusion and swelling came on, and severe pain was complained of; so that, on the day following, it was necessary to remove the splints. Evaporating lotions to the limb, with antiphlogistic treatment generally, were next had recourse to. He shortly, however, complained of the limb starting or jumping, and begged to have something applied which would keep the foot steady, as every motion of his body gave rise to great pain at the seat of injury. The lateral wooden splints were most carefully reapplied, but with no better success than before, when, on the third day, I determined to try if uniform pressure and perfect rest of the injured parts might not have the desired effect of relieving pain and promoting the cure. With this intention, the foot and ankle were enveloped in cotton wool, and a bandage was put on firmly and evenly from the cleft of the toes, including the heel, to half way up the leg; over this starch was thickly smeared; and then two lateral splints of mill-board, softened in hot water, were applied, and retained by means of bandage and more starch. The immediate effects of this treatment were mitigation of pain and general numbness of the part; the latter subsided in three or four hours; and the man slept soundly and long, which he had not done since his admission into the hospital. In two days, the swelling, which had been very considerable, from effusion both within and about the joint, had subsided so as to render the case loose; and the man was the first to draw my attention to this fact, by asking to have the apparatus made to fit tighter; the case, when loose, permitting motion of the ankle-joint, which gave pain. To obviate this, the case was cut up with a pair of strong curved scissors along the anterior aspect of the limb; and cotton wool added, to compensate for loss of substance by diminution of swelling. The man was now able to leave his bed, and go about the ward on crutches, supporting the injured limb by a sling from his neck. He left the hospital three weeks afterwards; the fractures had united perfectly; and there was not much stiffness of the ankle-joint. He was advised to wear the apparatus for two weeks longer, which he did, and recovered the full use of the joint without deformity.

This was the first case of fracture I had ever treated after this method. On account of the excessive swelling, I used cotton wool plentifully; but experience has since shown me that a moderate padding of lint over the prominent points of the bone is quite sufficient protection; and that we can calculate our amount of pressure more certainly.

CASE II. The next is a case of fracture, of a compound and comminuted character, occurring to a bricklayer, aged 53 years, named Tustin; he was brought to the Queen's Hospital on the 18th of April 1854. While at work a short time previously, a plate of iron, four feet square and quite an inch in thickness, which was placed in an upright position, fell and jammed his left leg against a wall; it was with difficulty that he could be extricated from his painful posi-

tion. I found his trousers cut through in two places, exposing a wound an inch and a half long with lacerated edges, and muscle protruding, three inches above the outer malleolus; another wound of equal size on the inner side, situated rather lower down, communicated with a comminuted fracture of the tibia. There was much swelling, with contusion of the soft parts, and rapid oozing of blood from both wounds; the preternatural mobility at the seat of fracture left no doubt that the fibula was also broken. Dry lint was placed over the wounds, and also a pad of the same material along the shin; the apparatus was then applied as above described, but made to extend to midway up the thigh, and no cotton wool used. There was oozing of blood during the following night, and some starting of the limb, but the man complained only of numbness. On the next day, the bleeding which came from the wound on the inner side of the leg ceased. On the second day, forty-eight hours after the case was put on, it was found sufficiently dry to admit of being opened; this was done by cutting it up on the anterior surface, taking the fold of lint over the shin as a guide; one side of the limb was examined by drawing outwards one half of the case and using the other as a support, keeping it applied to the leg with the hands of an assistant; and the examination of the other side was similarly conducted. The fragments were found to be *in situ*, and the swelling of the soft parts much diminished; the edges of the wound on the fibular side were adherent, but the wound in the tibial region was inflamed and suppurating. A piece of the case was cut out opposite the latter to form a kind of trap-door to facilitate inspection and the application of dressings, without disturbing the rest of the limb; folds of lint were inserted between the case and the leg as seemed requisite to keep up pressure after subsidence of swelling; and the edges of the apparatus having been adjusted, a starched bandage was applied, leaving uncovered only the part where an opening for the wound had been made. The treatment of this man was henceforth simple; the wound on the tibial aspect of the extremity was dressed daily, and healed up in three weeks; he sat up in bed on the third day, and when about to go to sleep, always turned upon his left side. The only discomfort his leg gave him was that he could not flex the limb, as the case included the knee-joint; in two or three days, with my permission but without solicitation, he left his bed to go about on crutches. He was discharged from the hospital on the 2nd of June, forty-five days after the accident occurred; the fragments were firmly united, and without any displacement; he could bear his weight on the limb when the apparatus was on, which latter was cut down so as to allow movement of the knee-joint. A fortnight afterwards, the apparatus was removed, and an elastic stocking worn instead, to prevent that œdema which comes on after injuries of this kind.

CASE III. Fracture of the femur, oblique to the long axis of the bone, with unusually powerful contraction of the muscles giving rise to great displacement of the fragments, is the next case to which I wish to draw your attention, as illustrating the efficiency of this method of treatment in keeping up permanent extension by means of controlling muscular action. John Ady, aged 54 years, by trade a painter and glazier, was admitted into the Queen's Hospital on the 10th of January, 1854; about an hour previously, he had fallen down in the road, which was frozen and slippery, and had sustained an oblique fracture of the right thigh-bone at the junction of its middle and upper thirds. I saw him before 9 A.M.: there was then much deformity of the thigh with considerable shortening. The want of able assistants and the urgency of other business induced me to apply the long splint, but I was unable to reduce the fracture then completely. Upon visiting him at 4 P.M., he complained of severe pain at the heel, instep, and perineum, although I had used every precaution, by padding these parts, to protect them from undue pressure. I prepared to apply the starch apparatus in the usual manner: the materials having been got in readiness, I carefully removed the wooden splint, extension of the limb being at the same time steadily kept up by assistants. Finding this, however, inad-

quate for the reduction of the displacement of the broken ends of the bone, because of the powerful action of the surrounding muscles, I had recourse to the following expedient; a strong piece of calico three-quarters of a yard wide and six yards long, was split at one end for half its length; the broad undivided portion was passed obliquely under the patient's back, from the right hip to the left shoulder, while of the two ends made by splitting the calico, one was brought forward over the right trochanter and ilium, the other to the inner side of the thigh against the perineum, which was protected by a fold of lint, and both carried obliquely across the abdomen and chest to meet the one behind at the left side of the neck, where the three were fastened together, and attached by one common band to a convenient part of the bedstead; thus counter extension was fully provided for, and a covering obtained for the right buttock, which is desirable when applying the apparatus for a fracture of the thigh. Extension was made from the foot by attaching it to a pole six or eight feet long, held vertically, one end of the pole being fixed in a groove in the floor, the other used as a handle to make leverage with; and as the foot was fastened to the pole so as to raise it several inches from the bed, the required extension could be made and kept up without interfering with the application of the apparatus. Care being taken to keep the limb in a proper position, it was next bandaged from the cleft of the toes to above the ilium, and then after a coating of starch, the millboard splints, prepared as before described, were adjusted; two for the leg, reaching from the sole of the foot to above the knee; and four for the thigh, the posterior and external reaching from below the knee to the crista ili, the anterior from above the patella to the fold of the groin, and the inner from below the knee to the perineum; thus, it will be observed, the inner and outer thigh splints overlapped at the knee-joint the lateral leg splints; these were retained by careful bandaging and starch, great attention being paid to cover the hip-joint as much as possible. The counter-extension band was cut off where it appeared from beneath the apparatus, both before and behind, and the band for extension at the foot was served in the same manner. The limb being now examined, was found to be of the right length; and it was also seen that the apparatus completely controlled muscular action so as to prevent displacement or shortening from recurring; the only thing which remained to be done was to apply two or three thigh splints made of wood until the case was dry, to prevent the limb from bending; care also being taken to prevent eversion, by watching the position of the knee and foot, and obviating any tendency, by cushions or pillows.

My notes state that for three or four hours after the apparatus had been applied, much pain was felt; and that he could not sleep at night because of the starting of the limb. On the following day, he was quite easy, and remained so afterwards. The apparatus was cut open from the toes to the groin, forty-eight hours after it was put on, and the thigh inspected without disturbing the limb; a few pieces of folded lint were inserted where it seemed requisite for keeping up an uniform pressure; and, the edges of the case having been brought together, a bandage was put on from the foot to the groin, and, having been smeared over with starch, rendered the apparatus as complete as before. I should have remarked, that the limb in every respect looked well; there was little or no swelling; and its symmetry perfect. From the third day, he got up daily, and went about the ward on crutches. At the eighth week, the apparatus was removed from the leg, and retained only on the thigh; so that he might use the limb in walking. It was not, however, until the expiration of three months, that he was able to throw aside his crutches altogether. He recovered perfect use of the limb, without any shortening or other deformity: I examined this man six months after the accident occurred, and no traces of the injury could be then discovered: he had been engaged at his work for several weeks; and suffered not the least inconvenience. I have selected this case from amongst many others equally successful, as showing how perfectly this

apparatus may be made to keep up permanent extension when opposed by the most powerful muscular contraction.

CASE IV. Abel Cann, aged 11 years, a well made but delicate youth, met with a transverse fracture of his left femur, and was brought immediately to the hospital, April 11th, 1854. The apparatus was applied without delay, and he kept his bed only a few days. He left the hospital at the expiration of six weeks, and then only wore a bandage from his knee to hips, and walked with the aid of a stick. The cure was perfect and without deformity.

CASE V. Richard Tudor, aged 35 years, was admitted April 13th, 1854, with fracture of the lower third of the fibula and rupture of the internal lateral ligament, Pott's fracture, as it is called. The foot was everted, but was easily brought into its proper position; the eversion returning, however, unless restrained. The apparatus was applied immediately; he got up on the third day, to go about on crutches. He left the hospital able to walk with a stick at the end of the third week; and shortly afterwards resumed his occupation.

[To be continued.]

1, Suffolk Street, Birmingham, February 1855.

BIBLIOGRAPHICAL NOTICES.

POSITIVE MEDICAL AGENTS: Being a Treatise on the New Alkaloid, Resinoid, and Concentrated Preparations of Indigenous and Foreign Medical Plants. By Authority of the AMERICAN CHEMICAL INSTITUTE. 8vo., pp. 304. New York and London: 1854.

By the authority of the American Chemical Institute! Well, as Sylvia says, "a fine volley of words, gentlemen, and quickly shot off". In our ignorance, we knew not of this Institute; still the Union is large, and the States conglomerated beneath the Stars and Stripes many. So, excusing us to ourselves, we endeavoured to amend our knowledge, and ascertain the locality, objects, and supporters of this National Institute, which accords its *imprimatur* to works which merit it.

In this pursuit of knowledge, we first stumbled on a "Dedication", which was as *inclusive* as the most generous minds could desire; the book being "dedicated to *all* who are endeavoring to discharge the responsible duties of the conscientious physician, by their obedient servant, the AUTHOR."

Here was more information lacking to us. Who is the "Author"? almost lured us away to another trail. However, we went steadily forward, and next read "A letter to the Medical Profession", *sans* date, *sans* signature, *sans* everything it should, and with everything it should not contain; "the author" having contrived to cram the American Public, Nature's El Dorado, Christianity, Truth, the Pillars of Seth, Babylon, the Pyramids, the Thaumaturgists, the Vedas and Shasters of India, Confucius and Alexandria, the Philosophers of Greece and Rome, the Oracles of Apollo, the Chair of St. Peter, a Conclave of Cardinals, and the American Chemical Institute, into less than four pages of somewhat large print and larger margin: nor has the "author" shrunk from thrusting into such company the NAME we name not in a jesting mood. In spite of our search, we were disappointed; neither local habitation nor name could we find for the Institute nor the author; and the object of such a publication was now puzzle number three.

Its type, paper, and "getting up", are superior to most books coming to us from the United States; and yet it proved, on dipping into it here and there, a perfect farrago of absurdity, to use no harsher epithet. At last, turning its pages backwards and forwards, besides the name and address of the publisher, C. B. Norton, New York, on the title-page, we note overleaf what we had before neglected, viz., "Entered according to Act of Congress in the year 1854, by B. Keith and Company," etc.; and at